

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1001  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

**Akokoa (Hawaii Island, E. R. Hand, 1913).**—On the north coast of Hawaii, out on the extreme end of Akokoa Point, which is the most easterly of the points of the Kohala District, being at a place where the shore line turns abruptly to the south, meeting the high cliff line that extends almost in a straight line to Kukui-haele Landing, Hamokua. Station is 10 meters from cliff edge to east; 8 meters from cliff edge north; and 11 meters from cliff edge west. Marked by a cylinder of concrete with rounded top level with ground, and 1½ feet in diameter. Cylinder extends to depth of about 2½ feet.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: AKOKOA  
ESTABLISHED BY: E.R. Hand YEAR: 1913 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. A complete description follows:  
Station is located on the north coast of the island, about ¾-mile east-southeast of Niulii, on the north end of Akokoa Point, about 93 feet above the sea, on the bare, brown, dirt point extending northward from brush line.

To reach station from the post office in Kohala, go east on State Highway 27 for 4.1 miles; take right fork at sign "POLOLU VALLEY", and go 1.2 miles to side road left, at top of winding grade. Turn left and go down through cane field for 0.95 mile; turn right, entering trees, and go 0.05 mile to end of truck travel. Walk northeast about 75 yards to station.

Station mark is the center of a 1-inch iron pipe in the center of a 12-inch-diameter, round-topped, concrete monument, flush with the ground. It is 27 feet south of north end of the point, in the middle of the narrow (about 20 yards wide) point, 24 feet southeast of a 1½-inch iron pipe and an iron pin near end of bluff, 35 yards north from edge of brush line and about 20 feet lower than brush line.

Form 1-526 (1-65)  
USCOMM-DC 16809-PSS

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AKOKOA

STATE: HAWAII

YEAR: 1913

THIRD

—ORDER

SOURCE: G-92184

GEODETIC LATITUDE:	20 13 21.424	ELEVATION:	28	METERS
GEODETIC LONGITUDE:	155 44 03.232	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	8 HOR Δ 91 ANGLE °
HI 1	5101	419,696.44	504,578.91	- 0 04 52 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE 8 HOR Δ 91 FORMULA NEGLECTING THE SECOND TERM.

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

QF 112

## HORIZONTAL CONTROL DATA

Q 201553 STATION 1002  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1,5 HAWAII

### ADJUSTED HORIZONTAL CONTROL DATA

THIRD

-GRADE#

GEODETIC LATITUDE:	20° 15' 47.615
GEODETIC LONGITUDE:	155 49 17.149

ELEVATION:	METERS
	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta \theta$ ANGLE
HI 1	5101	389,829.59	519,377.51	- 0 06 41

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

PLANE AZIMUTH HAS BEEN COMPUTED BY THE SECOND FORMULA REFLECTING THE SECOND TERM			
TO STATION OR OBJECT	GEODETTIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
	D	D	

QO 223

90 223

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1003  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1,5 HAWAII

## NO ORIGINAL TEXT

Anuenue (Hawaii Island, Hawaiian Government Survey; E. R. Hand, 1913; K. T. Adams, 1929).—Near the northern coast of Hawaii, in Northern Hamakua, in the land of Anuhuhu, adjoining Kapulena, on highest point of a well-defined steep hill, 1 mile above the government road between Honokaa and Kukuihaele post offices, and 2 3/4 miles from the latter. This wooded hill is the most northerly of all the wooded area, jutting out conspicuously from the dense growth behind, to the southward. From the hill *Honokaa stack* bears N. 76° E.; and *Kukuihaele stack*, N. 46° W. Station reached from Camp 12 which is directly on government road by going "mauka" (inland) toward the wooded top which shows against the sky line and is the highest point seen; the station hill is immediately behind this hill, being part of it, slightly higher. Station marked by concrete post evidently cast in mold of corrugated roof iron, about 1 foot in diameter, and having a United States Geological Survey plate in center. It is covered by a cairn of stones 3 feet high.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
NATIONAL OCEAN SURVEY  
NATIONAL GEODETIC SURVEY

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: ANUENUE  
ESTABLISHED BY: E. R. Hand YEAR: 1913 STATE: Hawaii COUNTY: Hawaii  
RECOVERED BY: O. W. Swinson, YEAR: 1932 LOCALITY: Northern Coast of Hawaii.

Detailed statement as to the fitness of the original description:

Station not visited but signals erected by Hawaiian Government

Survey plainly visible.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
NATIONAL OCEAN SURVEY  
NATIONAL GEODETIC SURVEY

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: ANUENUE  
ESTABLISHED BY: E. R. Hand YEAR: 1913 STATE: HAWAII  
RECOVERED BY: L. G. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description: The station was recovered as described. A new description follows—

The station is located on the summit of a low, brush covered, knoll, about 5 1/2 miles west northwest of Honokaa, about 4 1/2 miles east southeast of the mouth of Waipio Canyon, about 2 miles southwest of the east shore of the island and about 0.1 mile east southeast of a plantation house.

To reach from the post office in Honokaa; go north and west on road which leads toward Kukuihaele for 5.0 miles; turn left and go westerly, on a dirt road, for 0.3 mile; cross over an irrigation ditch and continue westerly, through the cane fields, for 0.1 mile; take the left hand fork and go south and west for 0.3 mile; take the left hand fork and follow the main traveled road westerly for 0.1 mile to the end of truck travel at a plantation house; then pack east southeast for about 200 yards to the high ground and the station. High timbered ridges lie about 0.5 mile west of the station.

The station is U. S. Geological Survey Disk set in concrete and is surrounded by a slab of concrete which is about 6 feet on each side and projects about 3 feet above the ground. A concrete frustum of a pyramid with a 2 1/2 inch iron pipe in its center is centered over the station.

Object	Distance	Direction
PUU MAUU NORTH (metal target) (HTS)		00 00 00
Kukuihaele Landing, Stack NW	3 miles	44 08 53.7
Honokaa, Stack E	4 1/2 miles	166 05 45.4
KUILEI (metal target)		180 51 52.2
WAIPIO (metal target)		12 51 54.0

An early recovery note reports; Original station recovered by A.O. Burkland in December 1911. Remarked by bronze tablet centered over mark in original rock marking station. Stamped Elev. 1608 V.A.

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ANUENUE

STATE: HAWAII

YEAR: 1913

SECOND

—ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	20 °05 '38.188	ELEVATION:	450.9 METERS
GEODETIC LONGITUDE:	155 32 08.974		1611 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	S OR Δ R1 ANGLE *
HI 1	5101	487,707.37	457,790.91	- 0 °00 '44 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S OR Δ R1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUU MAUU NORTH	101 27 11.5	101 27 56	5101

QE 132

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553

STATION 1003

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

ANUENUE (continued)

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: **ANUENUE**  
ESTABLISHED BY: **E.R. Hand** YEAR: **1913** STATE: **Hawaii** BRANCH MARK(S) ALSO ☐  
RECOVERED BY: **D.M. Whipp** YEAR: **1966** 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 in good condition. The knoll has been cleared and now has sugar cane planted on it. A complete description follows:

Station is located about 4-1/2 miles west of Honokaa and 3 miles south-east of Kukuihaele, along the north boundary of the Hamakua Forest Reserve, at about 1611 feet elevation, on the highest point of a knoll in a cane field, overlooking a quarry to the north, and about 450 feet south of a macadam road. There are a few small ironwood trees about 8 feet tall by the station.

To reach station from the post office in Honokaa, go west on Mamane St. and continue on the road towards Waipio for 2.4 miles to crossroad. Turn left and go 0.6 mile to fork. Take right fork and go 0.25 mile to macadam landing strip on right. Continue ahead for 2.4 miles to quarry on left, and end of truck travel. Pack south up around quarry and along edge of cane field on east side of the bluff to top of hill and station.

Station mark is a U.S. Geological Survey disk stamped "1608", set in the top of an 8-inch-square, concrete monument. A Type B-1 signal is centered over the mark, with the 6-foot-square, concrete platform projecting 1 foot above ground. A red and white metal target extends 9 feet above platform.

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 201553 STATION 1004  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1,5 HAWAII

SEE STATION KEHENA

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BENCH MARK USGS NR KEHENA

STATE: HAWAII

YEAR: 1948

SECOND

-ORDER

SOURCE: G- 9279

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 °08'20.584	ELEVATION:	76.0	METERS
GEODETIC LONGITUDE:	155 53 21.775		249	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ & Δ ANGLE *
HI 1	5101	366,433.03	474,328.75	- 0 °08 03 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ FOR Δ & 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 KEHENA

QE 284

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

0 201553 STATION 1005  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-15 HAWAII

NO ORIGINAL TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

### RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Cairn  
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 not visited, but was verified by angle from stations  
PUU AIEA (HTS) and PUU KEHENA (HTS). Located about 7-1/2 miles south-  
southeast of Hawi and 1-1/4 miles northwest of the Kahua Ranch Head-  
quarters, on Puu o Lani, which is at 2892 feet elevation and lies 0.4  
mile southwest of State Highway 25. Station is a pole target projecting  
from the center of a large, symmetrical cairn.

R

NAME OF STATION: CAIRN

STATE: HAWAII

YEAR: 1948

THIRD

-ORDER

SOURCE: G- 9275

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 °08'21.74	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 48 25.95		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ $\theta$ 1 ANGLE *
HI 1	5101	394,620.92	474,386.38	- 0 °06'21 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$   $\theta$ 1 FORMULA NEGLECTING THE SECOND TERM.

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

QE 250

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

0 201553 STATION 1006  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1,5 HAWAII

## NO ORIGINAL TEXT

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
PORT 555

### RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: **Cast** STATE: **Hawaii** COUNTY: **Hawaii**  
ESTABLISHED BY: **O.B.F.** YEAR: **1910** LOCALITY: **North Kohala, Hawaii**  
RECOVERED BY: **Chas. L. Murray** YEAR: **1938**

Detailed statement as to the fitness of the original description:

Location of Station: On a prominent hillock about 3/4 mile north of Mahukona landing and about 400-feet above the Government Main Road that leads down into Mahukona.

Mark found: 1-1/2" pipe set in a large mound of cement and marked "CAST-1931". This mark was set in by the office of James B. Mann, private surveyor.

New Mark: H.T.S. Type D-1 Monument (Triangular concrete monument 7-1/2 feet on each side with 1-7/8" steel bar 2-feet long set on steel legs over the station mark which is left exposed to view. A standard metal signal is set over the steel rod).

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
PORT 555

### RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: **CAST**  
ESTABLISHED BY: **O.B.F.** YEAR: **1910** STATE: **HAWAII**  
RECOVERED BY: **L. O. Wilder** YEAR: **1948** COUNTY: **HAWAII**

Detailed statement as to the fitness of the original description:

On the highest hill in the general vicinity, 1/2 mile northeastward of Mahukona and about 130 yards eastward of the main highway. General area is overgrown with Kiawe trees but metal pole and target can be seen from the road through gaps in the trees.

The station recovered in 1938 by the Hawaii Territory Survey was a 1 1/2 inch pipe set in cement. A concrete platform was then built around the station and a metal target installed vertically over the old mark. The 1 1/2 inch pipe was in position in 1948.

One reference mark was stamped R. M. No. 1 1948 and set in outcropping ledge, distant 18.75 meters.

OBJECT	DISTANCE	DIRECTION
Puu Ula (metal target)		00 00 00
Ridge (metal target)		133 50 32.87
Mahukona Light		169 10 08.4
R. M. No. 1	18.75m 61.51ft	356 20 08

\* 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.

N-2519-2

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **CAST**

STATE: **HAWAII**

YEAR: **1910**

SECOND

ORDER

SOURCE: **G- 9279**

GEODETIC LATITUDE:	20 °11' 41.498	ELEVATION:	78.8 METERS
GEODETIC LONGITUDE:	155 53 51.563		259 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# OR Δ G. ANGLE *
HI 1	5101	363,643.18	494,604.64	- 0 °08' 14"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From north)	PLANE AZIMUTH (From north)	CODE
RIDGE	353 15 58.2	353 24 12	5101

QE 146

(continued on next page)

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553

STATION 1006

LATITUDE 0 / TO 0 /  
LONGITUDE 0 / TO 0 /  
DIAGRAM

CAST (continued)

FORM 526a  
(9-18-69)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CAST  
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii  
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii  
Island: 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			
RIDGE 1910-----1948 DISTANCE		and DIRECTION	-----	-----	00	00	00.0
R.M. No. 1			61.51	18.75	222	29	35
RIDGE 1910-----1967 DISTANCE		and DIRECTION	-----	-----	00	00	00.0
R.M. No. 1		NNE	61.517	18.751	222	29	44
R.M. No. 2		SE	8.130	2.478	321	48	50

Station mark and reference mark number one were recovered in good condition. A new reference mark, number two, was established. A complete description follows:

Station is located about 1/2-mile northeast of Mahukona and 5 miles southwest of Hawi, at about 259 feet elevation, on the south 1 of 2 similar, round-topped, rocky knolls, hidden by kiawe trees, about 125 yards east-southeast of State Highway 27 (the Mahukona - Hawi road), and 80 yards south of a wide, bulldozed strip running eastward from the highway. There are 3 small, circular, stone enclosures about 15 yards west, downslope from station, hidden by kiawe trees.

To reach station from the post office in Kawaihae, go northwest on the new highway along the coast for 12.0 miles to side road left to Mahukona; continue ahead on the highway for 0.35 mile to side road right, at telephone pole 75. Go right, on wide bulldozed strip, for 0.05 mile to end of truck travel. Walk southerly about 80 yards to top of rise and station.

Station mark is the center of a 1-1/2-inch iron pipe set in concrete in the center of a 9-inch-diameter hole in the center of a triangular concrete platform about 7 feet on each side. NOTE: There was formerly a 2-inch-diameter, iron shaft about 2 feet long, mounted vertically over the station, supported by 3 iron legs, upon which a red and white metal target was mounted, but the 3 iron legs have rusted off and the shaft is laying nearby. At time of recovery a black and white, wooden target was guyed over the mark.

Reference mark number one is a standard disk stamped "CAST 1 1948", cemented in a drill hole in the top of a 2-foot-diameter boulder that projects 1 foot. It is on the north one of the 2 similar knolls, and at about same elevation as station mark.

Reference mark number two is a standard disk stamped "CAST 1910 NO 2 1967", cemented in a drill hole in a boulder about 3 feet in diameter and projecting 3 feet above ground. It is set in a niche about 6 inches lower than top of boulder and is about 4 inches lower than station mark.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CAST  
ESTABLISHED BY: O.B.F. YEAR: 1910 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: D.M. Whipp 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 and both reference marks were recovered as described by D.M.W. in 1967.

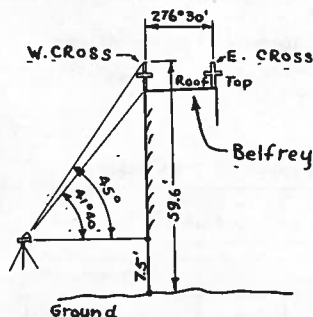


# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

0 201553 STATION 1007  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

CATHOLIC CHURCH EAST CROSS ON BELFREY (Hawaii Island, L.C.W., 1948)--Church is located 1/4 mile W of Hawi Village, about 100 feet above Hawi-Mahukona road.



F  
(11-0-00)

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

NAME OF STATION: CATHOLIC CHURCH, EAST CROSS ON BELFREY  
ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: Hawaii  
RECOVERED BY: H.O.F. YEAR: 1958 COUNTY: Hawaii

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

Recovered as described in 1948; 0.25 west of the junction in Hawi village; 100 feet above and on the south side of the Hawi-Mahukona road. Church has four similar crosses on it. The two on the belfrey, which is located on the N.W. corner of the church, are the highest and taken as the described East & West crosses. One cross, about 30 feet lower than the belfrey crosses, is above the entrance, the other cross, about 20 feet lower, is located on the east end of the main part of the church, which is now painted a cream color.

## RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Catholic Church, east cross on belfrey  
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 0.25 mile west of the main intersection in Hawi and on south side of State Highway 27. Station is the small wooden cross on the east end of the gable-roofed spire of the Sacred Heart Catholic Church, a cream-colored, wooden building. Spire is on the northwest corner of the church.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CATHOLIC CH E CROSS ON BELFREY

STATE: HAWAII

YEAR: 1948

THIRD

-ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	20 °14' 27.934	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 50 13.451		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ = ANGLE °
HI-1	5101	384,452.75	511,349.53	- 0 °07' 00"

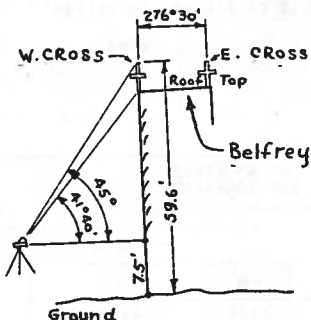
\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$  FORMULA NEGLECTING THE SECOND TERM.

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

QE 254

0 201553 STATION 1008  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-15 HAWAII

CATHOLIC CHURCH WEST CROSS ON BELFRY (Hawaii Island, L.C.W., 1948)--Church is located 1/4 mile W of Hawi Village, about 100 feet above Hawi-Mahukona road.



U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY  
(11-8-55) RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: CATHOLIC CHURCH, WEST CROSS ON BELFRY  
ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: Hawaii  
RECOVERED BY: H.O.F. YEAR: 1958 COUNTY: Hawaii

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

Recovered as described in 1948; 0.25 west of the junction in Hawi village; 100 feet above and on the south side of the Hawi-Mahukona road. Church has four similar crosses on it. The two on the belfry, which is located on the N.W. corner of the church, are the highest and taken as the described East & West crosses. One cross, about 30 feet lower than the belfry crosses, is above the entrance, the other cross, about 20 feet lower, is located on the east end of the main part of the church, which is now painted a cream color.

RECOVERY NOTE, TRIANGULATION STATION  
INTERSECTION

NAME OF STATION: Catholic Church, west cross on belfry  
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 0.25 mile west of the main intersection in Hawi and on south side of State Highway 27. Station is the small wooden cross on the west end of the gable-roofed spire of the Sacred Heart Catholic Church, a cream-colored, wooden building. Spire is on the northwest corner of the church.

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION CATHOLIC CH W CROSS ON BELFRY

STATE HAWAII

YEAR 1948

THIRD ORDER

SOURCE: G- 9279

SOURCE: G- 3219  
NO OBSERVATION CHECK ON THIS POSITION

GEODETTIC LATITUDE:	20° 14' 27.92	ELEVATION:	METERS
GEODETTIC LONGITUDE:	155 50 13.55		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ (OR $\Delta$ ) OR ANGLE
HI 1	5101	384,443.32	511,348.14	- 0 07'00"

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

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\sin \Delta$ FORMULA REGUATING THE SECOND TERM			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE

QE 255

QE 255

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1009  
HAWAII  
LATITUDE 20° 00' TO 20° 30'  
LONGITUDE 155° 30' TO 156° 00'  
DIAGRAM NE 5-1.5 HAWAII

Hawaii west base (Hawaii Island, Hawaiian Government Survey, 1872).—  
In the southern part of Hawaii, in Waimea village, between 300 and 400 feet  
north of Imiola Church, in E. W. Lyon's lot. Marked by a granite post.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FORM 536  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HAWAII WEST BASE  
ESTABLISHED BY: HAW. GOVT. SURVEY YEAR: 1872 STATE: HAWAII  
RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

This station was recovered in 1938 by the Hawaii Territory Survey  
and a concrete instrument platform built around same. The granite post,  
at this date 1948, appears to be in its original position.

Trees have grown so that few lines seen without clearing through  
private property.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HAWAII WEST BASE  
ESTABLISHED BY: HGS YEAR: 1872 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 mark was recovered and found in good condition. A complete  
description follows:

Station is located about 1/2-mile northeast of the center of Kamuela  
and 300 yards north of State Highway 19, behind the row of churches on  
left of highway, on a low grassy knoll at south end of tree row, and on  
southeast side of a track road.

To reach station from the post office in Kamuela, go easterly on State  
Highway 19 for 0.55 mile; turn left on macadam road, by power pole 2, and  
go north for 0.1 mile to Imiola Church on right; continue ahead, on track  
road, for 0.05 mile; take right fork and go northeast 100 yards to station  
on right, at jog in fence-line.

Station mark is a 5/8-inch brass plug, with punch mark in center, set  
in the top of an 8-inch-square, granite post with a rounded top, in the  
center of a 40 x 40-inch concrete platform projecting 1 foot above ground.  
It is about 400 feet north-northeast of Imiola Church, 35 yards northeast  
of a T-fence junction and cemetery plot, 20.5 feet southeast of center-line  
of track road, and 8.4 feet southeast of the fence-post at the fence jog.

FORM C&GS-526 (11-68)  
USCOMM-DOC 19505-P&S

U. S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HAWAII WEST BASE

STATE: HAWAII YEAR: 1872 SECOND ORDER

SOURCE G-SP156

GEODETIC LATITUDE	20 01 48.444	ELEVATION	840	METERS
GEODETIC LONGITUDE	155 39 55.858	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR $\alpha$ ANGLE
HI 1	5101	443,185.19	434,640.72	- 0 05 24

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

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

QI 452

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 201553 STATION 1010  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: HAWI UPOLU AIRPORT BCN

CHIEF OF PARTY: L.A. Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object: The station is located at the Upolu Airport about 2-1/2 miles northwest of Hawi and 3/4 mile southwest of Upolu Point and is the center of a revolving beacon light mounted on a 4-legged steel tower that is about 50 feet high.

## ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: HAWI UPOLU AIRPORT BCN

OBS BY NGS

STATE: HAWAII

YEAR: 1977

THIRD

ORDER

SOURCE: G-16241

GEODETIC LATITUDE:	20 15 57.50578	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 01 53.07580		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE *
HI 1	5101	374,986.10	520,406.13	- 0 07 35 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$  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 JAN 1979			

SM 036



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 201553 STATION 1012  
HAWAII  
LATITUDE 20 ° 00' TO 20 ° 30'  
LONGITUDE 155 ° 30' TO 156 ° 00'  
DIAGRAM NE 5-1.5 HAWAII

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HOEA MILL CHIMNEY WEST STACK

STATE: HAWAII

YEAR: 1910

THIRD

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 15 55.533	ELEVATION	METERS
GEODETIC LONGITUDE:	155 50 35.610		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE *
HI 1	5101	382,361.03	520,191.32	- 0 07 08

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

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

QO 224

QI 45i

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

0 201553 STATION 1014  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FORM 534

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HOKUULA 2

ESTABLISHED BY:

L. C. Wilder Year: 1948 COUNTY: HAWAII

STATE:

HAWAII

Detailed statement as to the status of the original description: The original station, "an iron pin adjoining a mamane post" was not recovered. At the present time a bronze disk, probably a U. S. Geological Survey disk, is set in concrete which is under a 2 1/2 inch iron pipe. The pipe projects about 3 feet from the top of a square concrete slab which is about 6 feet on each side and is flush with the surface of the soil. A new description follows--

The station is located about 1 mile west northwest of Waimea and near the summit of a hill named Hokuula.

To reach from the post office in Waimea; go northerly on the road which leads toward Hawi for 0.1 mile; continue straight ahead, north, for 0.3 mile to a T road intersection; turn left, west, and go 0.25 mile to a T road intersection; turn right, north, and go, up grade, for 0.2 mile; turn left, onto a track road, and go northerly for 0.3 mile to the summit of a low saddle and the end of truck travel. From this point, pack westerly for about 200 yards to the crest of the ridge, then westerly along the crest of the ridge for about 400 yards to the western edge of the hill and the station.

Reference mark number 1 is a standard disk, stamped 1 1948, set in the top of a 2 inch iron pipe which projects about 4 inches and is about 4 feet lower than the station.

Object	Distance	Direction
EAST BASE		00 00 00
Waimea red tank SE	1.0 mile	51 49 12.3
R. M. No. 1 NE	8.601 m 28.218 ft	292 19 58
PUU IO (metal target)		11 19 36.8
NOHONAOHAE (metal target)		78 12 12.0

An early recovery note reports; Description for station calls for iron pipe on east rim of crater. This is evidently in error. Wooden center stake and 4 stakes for guy wires recovered by W.H. Barringer in January 1911. On highest point on west rim of crater. This point remarked by bronze tablet set in concrete, centered over old stake, stamped 3377.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HOKUULA 2

STATE: HAWAII

YEAR: 1948

SECOND

ORDER

SOURCE: G- 9275

GEODETIC LATITUDE:	20 °02'06.082	ELEVATION:	1029.3 METERS
GEODETIC LONGITUDE:	155 41 00.503		3377 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 1	5101	437,023.26	436,426.51	- 0°03'46"

\* 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
PUU PA HGS	27 45 31.1	27 49 17	5101

QE 156

(continued on next page)



# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553 STATION 1014

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

HOKUULA 2 (continued)

FORM 526a  
(10-18-61)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HOKUULA 2  
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 1.55 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	
PUU PA (HGS) 1873-----1948	DISTANCE	and	DIRECTION-----	00 00 00.0
R.M. No. 1	NE	28.218	8.601	187 51 32
PUU PA (HGS) 1873-----1967	DISTANCE	and	DIRECTION-----	00 00 00.0
R.M. No. 2	W	17.600	5.364	68 24 22
R.M. No. 1	NE	28.218	8.602	187 51 57
Kamuela Airport, VOR	SSE			315 27 49.3

Station mark and reference mark number one were recovered in good condition. A new reference mark was established. A complete description follows:

Station is located about 1 mile northwest of Kamuela, on the summit of a prominent, grassy hill of about 3377 feet elevation.

To reach station from the post office in Kamuela, go westerly on State Highway 25, towards Kawaihae, for 0.6 mile to macadam crossroad by Union Service Station. Turn right and go up steep grade for 0.35 mile to board gate at fence corner on left, at macadam side road left. Pass through

gate and follow track road upgrade for 0.45 mile; take left fork and go 0.1 mile; take dim track road left and go 0.05 mile to base of steep hill and end of truck travel. Pack southwest up hill about 300 yards to station.

Station mark is a USGS disk, stamped "3377", set in concrete about 6 inches below ground level, at the center of a 6 x 6-foot, concrete platform flush with ground, and is at the bottom of an 8 x 30-inch recess in the platform. A tapering, concrete monument, 2 feet high, is centered over the mark and holds a target pole. Four iron fenceposts, one at each corner of the platform, surround the station.

Reference mark number one is a standard disk stamped "HOKUULA 2 1 1948", set in the top of a 2-inch iron pipe projecting 2 inches above ground, and is about 6 inches higher than station mark.

Reference mark number two is a standard disk stamped "HOKUULA 2 USGS 1948 NO 2 1967", brazed on the top of a 2-inch iron pipe that is set in concrete. It projects 8 inches above ground and is about 6 inches higher 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.

USCOMM-DC 27179-P89

Q 201553 STATION 1015  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-15 HAWAII

**Honoipu** (Hawaii Island, E. R. Hand, 1913).—On northwest coast of Hawaii, and of Kohala, the sea gable of the Honoipu landing house, on the edge of the bluff at Honoipu. The seaward side of building is red; roof, ends, and back are black. This building and all others adjacent are to be moved and the landing abandoned; the foundations, however, will remain and form a very conspicuous mark from seaward. Station mark is on outer edge of foundation at seaward end, midway between the corners, and directly under gable.

Form 526  
(11-8-55)

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

NAME OF STATION: HONOIFU  
ESTABLISHED BY: E.R.H. YEAR: 1913 STATE: Hawaii  
RECOVERED BY: H.O.F. YEAR: 1958 COUNTY: Hawaii

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 in 1913, except only the foundation now remains of the old landing house. Station used only for photogrammetry control point.

To reach go southwestward along the beach for 2.7 miles from the terminal building of the Upolu Airport, past the Coast Guard Loran Station, to end of dirt road at fence line. Take trail directly at end of road and walk for about 0.5 mile to ruins of old landing house at top of high cliff.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HONOIPU  
ESTABLISHED BY: E.R. Hand YEAR: 1913 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 is gone. The bluff is breaking back gradually and about 20 feet of the old concrete foundation has fallen off.

FORM C&GS-526 (1-68)  
USCOMM-DC 18509-P09

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1016  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

ISLAND HIGHEST POINT  
(Hawaii Island, E. R. Hand, 1913).—Off the north coast of Hawaii,  
the highest point on larger and higher of the two islands just off Honokea Gulch,  
which gulch is the dividing line between Hamakua and Kohala Districts. There  
is a third island or islet, which is little more than a pinnacle of rock.

## RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Island Highest Point  
ESTABLISHED BY: E.R. Hand YEAR: 1913 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 not visited. It is the highest point of Paokalani  
Island, the west one of 2 small islands which lie about 1/2-mile  
northwest of the mouth of Honokea Gulch, along the north coast of  
the island. It projects about 240 feet above water and has a  
rounded top with no definite point.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ISLAND HIGHEST POINT

STATE: HAWAII

YEAR: 1913

THIRD

—ORDER

SOURCE: G-92184  
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 11 43.14	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 42 20.60		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ or ANGLE *
HI 1	5101	429,458.14	494,650.66	- 0 04 16 "

\* 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

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1017  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1,5 HAWAII

**Kaala (Hawaii Island, Hawaiian Government Survey, 1877).**—In the northern part of Hawaii, on the northeastern summit of Mount Kaala, overlooking the Waipio Valley, and about 30 feet south of an olapa tree. Marked by three triangular pits, 3 feet on a side; the center marked with charcoal and a copper tube marked "H. G. S."

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
Form 586  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KAALA**  
ESTABLISHED BY: Hawaiian Govt. Year: 1877 STATE: **HAWAII**  
RECOVERED BY: L. C. Wilder Year: 1948 COUNTY: **HAWAII**

Detailed statement as to the fitness of the original description: The original station was not recovered. A U. S. Geological Survey disk was found in the top of a 4 inch concrete cylinder, it is not known if this was placed over the original station which was described as a copper tube. Two reference marks were established. A new description follows—

The station is located on the summit of a hill known as Kaala; about 0.8 mile southwest of the head of Waipio Canyon, about 3.5 miles north-east of Waimea and about 0.5 mile north of a wire fence which marks the southern boundary of the Forest Reserve.

To reach from the post office in Waimea; go easterly, on the road which leads toward Honokaa for 2.2 miles; pass the main gate leading into the abandoned CCC camp and continue easterly for 1.4 miles; turn left, pass through a wire gate and follow the lane northerly for 0.7 mile to its end at a small creek and a wire fence and the end of truck travel. From this point, cross over the fence, and pack northerly for about 0.4 mile to the edge of the timber and a wire fence. From this point pack northwesterly, through the dense jungle to the foot of a long northwest-southeast ridge. Follow the crest of this ridge for about 0.5 mile to the highest point of the hill and the station. This is about a four hour pack but can be cut down to one hour by cutting out a trail. A four foot wooden stand was left, staked down, at the station to assist in future recovery. In addition, long lengths of wire were strung from the tripod over the crest of the ridge.

The station is a U. S. Geological Survey disk, stamped HAWAII 3983, set in the top of a 4 inch concrete cylinder which projects about 6 inches.

Reference mark number 1 is a standard disk, stamped 1 1948, set in the top of a 2 1/2 inch iron pipe which projects about 1 inch and is about 1 foot lower than the station.

Reference mark number 2 is a standard disk, stamped 2 1948, set in the top of a 2 1/2 inch iron pipe which projects about 1 inch and is about 1 foot lower than the station.

Object	Distance	Direction
WAIPIO (metal target)		
R. M. No. 1 ENE	4.114 m 13.494 ft	00 00 00
R. M. No. 2 ESE	4.165 m 13.661 ft	36 59 33
PUU IO SE	7 miles	87 27 52
(metal target)		113 27 45.60

An early recovery note reports; Original station recovered by F.S. Dodge in September 1911. Remarkd by bronze tablet stamped 3983, set in concrete cylinder and centered over old mark.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KAALA**  
STATE: **HAWAII**

YEAR: 1877

SECOND ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	20 03 14.546	ELEVATION:	1214.5 METERS
GEODETIC LONGITUDE:	155 38 18.626		3985 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	S. ON Δ W. ANGLE *
H1 1	5101	452,463.43	443,318.42	- 0 °02 '51 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S. ON Δ W. FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
WAIPIO	202 28 23.4	202 31 14	5101

QE 133

(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 201553

STATION 1017

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

KAALA (continued)

### RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAALA  
ESTABLISHED BY: HGS     YEAR: 1877     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 all marks found in good condition. Distance to reference marks was checked and found correct. Station was reached by a different route than the 1948 description; it was somewhat shorter and is believed easier. Vegetation on top of the hill does not exceed 3 to 4 feet in height, but is very dense, with heavy root growth, which soon covers the marks. A complete description follows:

Station is located about 3 miles northeast of Kamuela and 0.8 mile west-northwest of Waimea Reservoir, on the summit of a brush-covered hill known as Kaala, at about 3985 feet elevation.

To reach station from the post office in Kamuela, go easterly on State Highway 19 for 3.5 miles to a graded side road left at telephone pole 299. Turn left and go 0.6 mile to a green, board gate. Pass through gate and continue for 0.2 mile to end of truck travel opposite gate in reservoir fence. Walk westerly across open pasture, keeping around left end of trees in gully, for about 1/4-mile, to fence on right. Pass through fence and cut trail through dense forest and up brush-covered ridge line for about 1/2 mile to top and station. Trail can be cleared in about 2 hrs.

Station mark is a USGS disk, stamped "3983", set in the top of a 4-inch iron pipe projecting 2 inches from ground. It is located near the east end of the flat top of the hill.

Reference mark number one is a standard disk stamped "1 1948", set in the top of a 2-inch iron pipe, flush with ground and about 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "2 1948", set in the top of a 2-inch iron pipe, flush with ground and about 1 foot lower than station mark.

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 201553 STATION 1018  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-15 HAWAII

DEPARTMENT OF COMMERCE  
U.S. COAST AND GEODETIC SURVEY  
Form 525  
Rev. Aug. 1968

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **KAHEI (HTS)** STATE: **HAWAII** COUNTY: **HAWAII**

CHIEF OF PARTY: **L. O. WILDER** YEAR: **1948** Described by: **L. O. WILDER**

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.1	HEIGHT OF LIGHT ABOVE STATION MARK METERS.
Surface-station mark, Underground-station mark	<b>1.73</b>	
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
PUU O NALE (metal target)	S	00 00 00
PUU ULA (metal target)	SW	56 28 39.3
Kehoni (metal target)	W	84 24 16.2

Located 0.8 miles west of the cross roads at Hawi, Kohala District, and 200 to 300 yards north of the main highway, on a small rise adjacent to an irrigation ditch and cane field. From Hawi turn north about 34 yards before reaching telephone pole No. 10 and after proceeding 200 to 300 yards, the station will be seen to the east.

This is an old Hawaii Territory Station, originally a drill hole in stone which that department recovered in 1938. A concrete platform, metal pole and target were installed in 1938.

(11-8-55)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KAHEI (HTS)**  
ESTABLISHED BY: **L.C.W.** YEAR: **1948** STATE: **Hawaii**  
RECOVERED BY: **H.O.F.** YEAR: **1958** COUNTY: **Hawaii**

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 in 1948 except the steel legs have rusted off and the metal target has fallen to one side. Brush now also surrounds the platform.

To reach go 0.5 mile west along the highway from the junction in Hawi; turn right on dirt road and go 0.05 mile. Station is to the east about 300 yards across cane field and about 30 feet east of a ditch in a clump of brush.

Form 526  
(11-8-55)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KAHEI (HTS)**  
ESTABLISHED BY: **L.C.W.** YEAR: **1948** STATE: **Hawaii**  
RECOVERED BY: **H.J.S.** YEAR: **1962** COUNTY: **Hawaii**

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 1948. A pile of boulders has been thrown up around the station and a wooden observation tower has been built about 25 feet north.

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KAHEI HTS** OBS BY **CGS**  
STATE: **HAWAII** YEAR: **1948** SECOND ORDER  
SOURCE: **G- 9279**

GEODETIC LATITUDE: <b>20 14 37.70300</b>	ELEVATION: <b>189.7</b>
GEODETIC LONGITUDE: <b>155 50 25.07300</b>	<b>622</b> METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	BEARING OR ANGLE
<b>H 1</b>	<b>5101</b>	<b>383,538.54</b>	<b>512,336.95</b>	<b>- 0 07 03</b>

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
<b>PUU O NALE</b>	<b>8 47 06.8</b>	<b>8 54 10</b>	<b>5101</b>

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

5M 065

\* 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.

COMS-DC 34314

JUL 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 201553

STATION 1018

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

KAHEI (HTS). (continued)

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAHEI (HTS)  
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. The support legs for the metal target have rusted off and the target no longer stands. A complete description follows:

Station is located about 1/2-mile west-northwest of the main intersection in Hawi, and 700 feet north of State Highway 27, on a low knoll in cane field, in the southeast angle of a crossroad.

To reach station from the post office in Hawi, go north on State Highway 25 for 0.1 mile; turn left and go west on State Highway 27 for 0.45 mile to side road right, at power pole 22. Turn right and go north on cane field road for 0.2 mile to crossroad and station on right.

Station is marked by a hole in rock at the bottom of a 5-inch-diameter hole 12 inches deep, in the center of a triangular, concrete platform 7 feet on each side. It is 20 feet southeast of the southeast leg of an 18-foot, wooden tower and 72 feet east-southeast of irrigation hydrant No. 3. The station is surrounded and protected by a ring of very large rocks about 4 feet higher than the platform, and is obscured by a growth of brush.

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAHEI (HTS)  
ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: L. A. Critchlow YEAR: 1977 COUNTY: Hawaii  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 1/2 mile WNW of Hawi  
HEIGHT OF TELESCOPE ABOVE STATION MARK FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 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	
				° ' "

The station was recovered in good condition but it was not occupied or measurements made to the reference marks at this time. The previous descriptions are adequate.

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 201553 STATION 1019  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAIHUOA

STATE: HAWAII

YEAR: 1910

THIRD

-ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 08 19.098	ELEVATION	METERS
GEODETIC LONGITUDE:	155 51 26.763		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE *
HI 1	5101	377,391.65	474,154.25	- 0 07 23 "

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

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

QO 233





# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1021  
HAWAII  
LATITUDE 20° 00' TO 20° 30'  
LONGITUDE 155° 50' TO 156° 00'  
DIAGRAM NE 5-1.5 HAWAII

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION KAPAAIKI

STATE HAWAII

YEAR 1913

SECOND

ORDER

SOURCE G- 9279

GEODETIC LATITUDE	20 14 18.619	ELEVATION	23.2 METERS
GEODETIC LONGITUDE	155 45 22.464		76 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ ° ANGLE °
HI 1	5101	412,159.83	510,360.16	- 0 05 19

\* 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
KAUHOLA	122 41 39.2	122 46 58	5101

QE 190

Kapaiki (Hawaii Island, E. R. Hand, 1913).—On north coast of Hawaii, northeast coast of Kohala District, out on the end of the flat grassy point on the west side of Keokea Harbor, about 15 meters from the cliff edge on the east and west, and about 10 meters from the cliff edge on the north. From the station Kauhola Point Light bears N. 70° W.; and Niulii stack, S. 49° E. Marked by hole in center of triangle on top of a concrete cylinder about 10 inches in diameter, and projecting 1 1/2 feet above the ground. Cylinder surrounded by the iron form in which it was cast. This mark placed by the Territorial Survey, but position determined independently by United States Coast and Geodetic Survey party in 1913.

### RECOVERY NOTE, TRIANGULATION STATION

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

FORM 536

NAME OF STATION: Kapaiki

ESTABLISHED BY: E. R. Hand

YEAR: 1913

STATE: Hawaii

COUNTY: Hawaii

RECOVERED BY: Chas. L. Murray

YEAR: 1938

LOCALITY: North Kohala, Hawaii.

Detailed statement as to the fitness of the original description:

Location of Station: On seacoast about 1 mile northeast of Halawa School. Take road about 500 feet East of Halawa School which goes down from the main government road. At junction with R.R. track turn East and proceed along cane field to division line between this cane field and ironwood forest. Follow this division line to the sea. The station is a little easterly from this point.

Station Mark Found: Δ on top of 10" concrete-filled cylinder set firmly in the ground.

New Mark: H.T.S. Type D Monument (Triangular concrete monument 6 feet on each side with 2-1/2" pipe 2 feet long set on steel legs over the old mark which is left exposed to view. A standard metal target is set in the 2-1/2" pipe.

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

FORM 536

NAME OF STATION: KAPAAIKI

ESTABLISHED BY: E. R. Hand

YEAR: 1913

STATE:

HAWAII COUNTY: HAWAII

RECOVERED BY: L. C. Wilder

YEAR: 1948

LOCALITY: N. KOHALA

Detailed statement as to the fitness of the original description: The station was recovered as described and is in good condition. Two reference marks were established for this station. A new description follows--

The station is located about 2 miles northwest of Akakoa Point, about 1.5 miles southeast of Kauhola Point Lighthouse, about 1.5 miles east of Halaula Post Office, 40 feet west of the edge of the sea bluff, 20 feet east of a grove of trees and on the highest point of Kapaiki Point.

The station is the center of a drill hole, surrounded by a triangle, which is in the center of a concrete cylinder. The concrete cylinder is about 10 inches in diameter and projects about 1 1/2 feet above the ground. A square slab of concrete which is 6 feet on each side and projects about 1 1/2 feet surrounds the station mark. The top of the concrete cylinder is now flush with the top of the concrete platform.

Reference mark number 1 is a standard disk, stamped KAPAAIKI 1 1948, set in the top of a 2 inch iron pipe which projects about 4 inches and is about 2 feet lower than the station.

Reference mark number 2 is a standard disk, stamped KAPAAIKI 2 1948, set in the top of a 2 inch iron pipe which projects about 4 inches and is about 2 feet 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.

16-55485-1

(continued on next page)

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553 STATION 1021  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

KAPAAIKI (continued)

To reach from the post office in Kapaau, go southeast on the paved road which leads toward Pololu Valley for 4.9 miles; turn left, onto a dirt road, pass to the right hand side of a field shed, and go northeast, through a cane field, for 0.7 mile; turn right and go easterly for about 100 yards; turn left and go northeasterly, keeping to the left hand side of a grove of ironwood trees, for 0.2 mile; turn right and pick your way through the trees for about 200 yards to the open ground and the station.

Object	Distance	Direction
KAUHOLA		00 00 00
R. M. No. 2 NW	6.217 m 20.396 ft	10 53 00
R. M. No. 1 S	4.671 m 15.320 ft	255 19 58
KAUHOLA PT LIGHTHOUSE		359 55 32.9

FORM 526a  
(10-18-68)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

R

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAPAAIKI  
ESTABLISHED BY: E.R. Hand YEAR: 1913 STATE: Hawaii  
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii  
Island: 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			
KAUHOLA -----1948 DISTANCE and DIRECTION-----		CE	20.396	6.217	00	00	00.0
R.M. No. 2		NW	20.396	6.217	10	53	00
R.M. No. 1		S	15.320	4.671	255	19	58
KAUHOLA (HGS) 1881 -----1967 DISTANCE and DIRECTION-----		CE	20.361	6.206	00	00	00.0
R.M. No. 2		NW	20.361	6.206	10	51	35
R.M. No. 1		SSW	15.322	4.671	255	17	13

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

Station is located about 5 miles east of Hawi and 1.3 miles southeast of Kauhola Point Lighthouse, on Kapaiki Point, on the bluff about 75 feet above the sea. There are low, brushy, ironwood trees on the point, which obstruct the view in most directions.

To reach station from the post office at Kohala, go east on State Highway 27 for 4.7 miles to the Wo On Store on right; continue on the highway for 0.3 mile to crossroad; turn left on cane field road and go

northerly for 1.05 miles to crossroad at ironwood trees. Turn right and go along edge of cane field for 0.2 mile to end of truck travel 75 yards after crossroad in a deep dip. Walk northerly through trees about 80 yards to station on bluff.

Station is marked by a 1-inch drill hole, surrounded by an 8-inch triangle, in the top of a 10-inch-diameter concrete monument set in the middle of a triangular, concrete platform about 7 feet on each side and projecting 16 inches above ground. It is 10 feet south of the ironwood row along bluff edge.

Reference mark number one is a standard disk stamped "KAPAAIKI 1 1948", cemented in the top of a 2-inch, iron pipe projecting 2 inches above ground. It is about 6 inches higher than station mark.

Reference mark number two is a standard disk stamped "KAPAAIKI 2 1948", cemented in the top of a 2-inch, iron pipe flush with ground, 5 feet south of edge of ironwood trees and about 2 feet lower than station mark.

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

NO TEXT

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1022  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

NAME OF STATION: KAPAAKEA

STATE HAWAII

YEAR 1910

THIRD

-ORDER#

SOURCE: G-SP156

GEODETIC LATITUDE:	20° 05' 35.495	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 52 24.142		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE *
HI 1	5101	371,887.28	457,661.33	- 0 07' 42"

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

OBSERVATION HAS BEEN CORRECTED BY THE FOLLOWING FORMULA NEGLECTING THE SECOND TERM			
TO STATION OR OBJECT	GEODETIC AZIMUTH <i>(from south)</i>	PLANE AZIMUTH <i>(from south)</i>	CODE

QD 235

Q0 235

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1023  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

## NO ORIGINAL TEXT

**Kauhola** (Hawaii Island, Hawaiian Government Survey, 1881; E. R. Hand, 1913).—On the northern coast of Hawaii, at the northeast point of Kohala District, on a high promontory known as Kauhola Point. Station is out on the low flat grass-covered end of the point, a short distance south-southeast of the light, about 30 meters from the cliff edge on the west, and 25 meters from the edge on the north. The nearest corner of the light building is 15.30 meters (50 feet) distant, on bearing N. 54° W. The near corner of an astronomical pier of brick, about 3½ feet high, resembling section of chimney, is 4.07 meters (13.4 feet) from station, on bearing N. 75° E. Station marked by a post of dressed granite 6 inches square, and projecting about one foot above the ground. It leans a trifle toward the west. In its top is a plate of the United States Geological Survey.

RECOVERY NOTE, TRIANGULATION STATION

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FORM 536

NAME OF STATION: **KAUHOLA** STATE: **HAWAII** COUNTY: **HAWAII**  
ESTABLISHED BY: **H.G.S.** YEAR: **1881** LOCALITY: **North Kohala, Hawaii**  
RECOVERED BY: **Chas.L.Murray** YEAR: **1938**

Detailed statement as to the fitness of the original description:

Location of Station: Next to Kauhola Light House which is located directly below Kohala Sugar Company's Mill and on the seacoast.

Old Mark found: U.S.G.S. Bronze Tablet set on top of the original granite post which is solidly imbedded in the ground.

New Mark: H.T.S. Type D-1 Monument (Triangular concrete monument 7-1/2 feet on each side with 1-7/8" steel bar 2 feet long set on steel legs with over the station mark which is left exposed to view. A standard metal target is set over the steel rod).

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FORM 536

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KAUHOLA**  
ESTABLISHED BY: **Haw.Govt.Survey** YEAR: **1881** STATE: **HAWAII**  
RECOVERED BY: **L. O. Wilder** YEAR: **1948** COUNTY: **HAWAII**

Detailed statement as to the fitness of the original description:

On the outer part of Kauhola Point which is ¼ miles eastward of Kepuhi Point. Station is adjacent to the lighthouse and Kohala Latitude Station. Also Station Kauhola 2 which was probably established by a local surveyor.

To reach the station, leave the main highway and go past the Kohala Sugar Co. mill and proceed to the lighthouse.

Station is now marked by a USGS disk set in a granite post and stamped 61 feet elevation. There is a triangular concrete platform about the station. In 1938 the Hawaii Territory Survey recovered the USGS tablet set in the granite post, built the concrete platform and erected a metal pole and target. The pole and target have disappeared, probably by erosion.

OBJECT	DISTANCE	DIRECTION
Kepuhi 2		00 00 00
Kauhola 2	22.39 m 73.47 ft.	00 10 26.8
R. M. No. 1, 1948	12.71 m 41.71 ft.	11 25 42
Maulili (metal target)		271 56 22.2
Kohala Mill Stack (center)		282 57 54

Records show original station recovered by C.H. Birdseye, April 1911.

Remarked by bronze tablet, stamped 31, set in top of original granite post.

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

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

H-2210-2

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KAUHOLA**

STATE: **HAWAII**

YEAR: **1881**

SECOND

ORDER

SOURCE: **G- 9275**

GEODETIC LATITUDE:	20 14 57.863	ELEVATION:	9.5 METERS
GEODETIC LONGITUDE:	155 46 27.251		31 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ ± ANGLE
HI 1	5101	405,997.11	514,329.16	- 0 05 42

\* 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
KAPAAIKI	302 41 16.8	302 46 59	5101

QE 148

(continued on next page)

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553 STATION 1023  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

KAUHOLA (continued)

FORM 524a  
(6-18-65)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAUHOLA  
ESTABLISHED BY: HGS  
RECOVERED BY: D.M. Whipp  
YEAR: 1881  
YEAR: 1967  
STATE: Hawaii  
COUNTY: Hawaii  
Island: 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	
KAPAAIKI 1913				00 00 00.0
KAUHOLA 2 1948	WNW	73.453	22.388	165 16 29
R.M. No. 1	WNW	41.698	12.709	176 31 54
KOHALA LATITUDE STATION 1881	ENE	14.770	4.502	322 31 17

The station was recovered. The station disk had been removed but the shank remained in place. Reference mark number one had been removed but the drill hole was recovered. A new station disk was set after removing the old shank, and a new reference mark number one was set in the old drill hole. KOHALA LATITUDE STATION 1881 was recovered in good condition. A complete description follows:

Station is located about 4 miles east-northeast of Hawi and 1 mile north-northeast of the Kohala Sugar Mill, on Kauhola Point, just north of the Kauhola Point Lighthouse.

To reach station from the Halaula post office, go north-northeast on main road for 0.25 mile to end of macadam road. Continue ahead on track road for 0.45 mile; take left fork, straight ahead, and go 0.25 mile; take right fork, along trees, for 0.05 mile; take left fork, gradually bearing west, and go 0.15 mile to end of road at lighthouse and station.

Station mark is a standard disk stamped "KAUHOLA HGS 1881 1967", cemented in a drill hole in the top of the original, 8-inch-square, granite post, in the center of a triangular concrete platform about 7 feet on each side and projecting 1 foot above ground. It is 7.4 feet northwest of the edge of the lighthouse foundation.

Reference mark number one is a standard disk stamped "KAUHOLA HGS 1881 NO 1 1967", cemented in a drill hole in the northwest one of 4 concrete foundation blocks. It is 1.7 feet higher than station mark and projects 2 feet above ground.

Kauhola-2 is the center of a 1-1/4-inch iron pipe flush with the top of a 15-inch-diameter, concrete monument projecting 4 inches above ground, and with "KAUHOLA" inscribed in the concrete. It is 18.7 feet west of the northwest one of the 4 concrete foundation blocks and 0.26 foot lower than station mark.

Kohala Latitude Station is marked by a 2-inch, chiseled cross in the top of a red brick pier, 1.4 x 2.5 feet in size, and 3.4 feet high. It is 6.6 feet north of north edge of lighthouse foundation and is 3 feet higher 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.

USCOMM-OC 27172-P39

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 75  
QUOTE PRIMARY REFERENCE Just north of the Kauhola Point Lighthouse  
(Direction and distance)

DESIGNATION { LISTED KAUHOLA  
STAMPED \_\_\_\_\_ TYPE OF MARK: BM \_\_\_\_\_ TT \_\_\_\_\_ TRIANG. X  
CONDITION  
Lat. 20 14 57.863 Disturbed ☐ USGS ☐ USBR ☐  
Long. 155 46 27.251 Destroyed ☐ USC&GS ☒ State GS ☐  
Elev. 31.4 feet Not Found ☐ USNPS ☐ USNFS ☐  
USGLO ☐ USBLM ☐ (Other) ☐

### REMARKS OR REVISION DESCRIPTION:

To reach station from Kapaau Post, go E. on State Hwy. 27 for 2.15 mi to side rd. left, turn left and go 0.75 mi to Y-rd. cont straight 0.45 mi to Y-rd. cont straight on main road 0.35 mi to lighthouse and station site.

The station was recovered as described. All marks were found in good condition. The 1967 recovery note is adequate with the addition on a new to reach.

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

5-0 10-64852-6

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1024  
HAWAII  
LATITUDE 20 ° 00' TO 20 ° 30'  
LONGITUDE 155 ° 30' TO 156 ° 00'  
DIAGRAM NE 5-15 HAWAII

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
PORTS 555  
Rev. Aug 1968

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION:	KAUHOLA 2	STATE:	HAWAII	COUNTY:	HAWAII
CHIEF OF PARTY:	L. O. WILDER	YEAR:	1948	Described by:	L. O. WILDER
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: ° ' "

This station was probably established by a private surveyor. It appears to be a concrete cylinder at the center of which is a hole and "Kauhola 2" has been marked in the cement. It is not very solid in the ground. It is 73.47 feet from Station Kauhola and was located by direction and distance from that station.

To reach the station go past the Kohala Sugar Co. mill and proceed to Kauhola Point Lighthouse.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAUHOLA 2  
STATE: HAWAII YEAR: 1948 SECOND ORDER

SOURCE: G- 5275  
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 ° 14' 58.087	ELEVATION:	9	METERS
GEODETIC LONGITUDE:	155 46 27.985	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 108 Δ 41 ANGLE °
HI 1	5101	405,927.26	514,351.87	- 0 05' 42"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 108 Δ 41 FORMULA NEGLECTING THE SECOND TERM.

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

POSITION DETERMINED BY TRAVERSE FROM STATION KAUHOLA

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1025  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

**Kauhola Point Light** (Hawaii Island, E. R. Hand, 1913).—On north coast of Hawaii, northeast shore of Kohala, out on the end of the long flat grass-covered Kauhola Point. Point is perfectly level, covered with short grass; it is about 30 feet in elevation. The light is hoisted to top of a support which stands immediately behind a small white shed, gray trimmed, with gable roof painted red. Light is 35 feet above ground.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAUHOLA POINT LIGHT

STATE: HAWAII

YEAR: 1913

THIRD

—ORDER

SOURCE: G-92184

GEODETIC LATITUDE:	20 14 58.232	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 46 27.709		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE *
HI 1	5101	405,953.56	514,366.46	- 0 05 42 "

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

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

QF 120



# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1026  
HAWAII  
LATITUDE 20° 00' TO 20° 30'  
LONGITUDE 155° 30' TO 156° 00'  
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

### RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: **Kauhola Point Light**  
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 4 miles east-northeast of Hawi and 1 mile north-northeast of the Kohala Sugar Mill, on Kauhola Point. Station is the center of a large, cylindrical, cream-colored tower; top of tower is 85 feet above ground.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KAUHOLA POINT LIGHT**  
ESTABLISHED BY: **L. C. Wilder** YEAR: **1948** STATE: **HAWAII** BENCH MARK(S) ALSO ☐  
RECOVERED BY: **R. B. MELBY** YEAR: **1978** COUNTY: **HAWAII**  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: **4 MILES ENE OF HAWI**

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 BY D.M.W. IN 1967. THE STATION IS THE CENTER OF THE 16 FOOT IN DIAMETER BY 85 FOOT HIGH, WHITE, CYLINDRICAL CONCRETE LIGHTHOUSE.

R

NAME OF STATION: **KAUHOLA POINT LIGHT**

STATE **HAWAII**

YEAR **1948**

THIRD

ORDER

SOURCE **G- 9279**

GEODETIC LATITUDE:	20 14 57.687	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 46 27.146		FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ OR ANGLE *
HI 1	5101	406,007.08	514,311.39	- 0 05 42

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

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

QE 257

KAUHOLA STACK

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

### ADJUSTED HORIZONTAL CONTROL DATA

(Hawaii Island, E. R. Hand, 1913).—On north coast of Hawaii, northern part of Kohala, behind Kauhola Point, on a bearing S. 25° W. from Kauhola Point Light, the brick stack at the mill of the Kohala Sugar Co.

NAME OF STATION: KAUHOLA STACK

STATE: HAWAII

YEAR 1913

THIRD

-ORDER-

SOURCE: G-52184

GEODETTIC LATITUDE:	20° 14' 13.086	ELEVATION:	METERS
GEODETTIC LONGITUDE:	155 46 54.736		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ FOR $\Delta$ @: ANGLE
HI 1	5101	403,372.37	509,816.24	- 0 05' 51"

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

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\sin^2 \Delta$ FORMULA NEGLECTING THE SECOND TERM			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

QF 118

QF 118

NO TEXT

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

### ADJUSTED HORIZONTAL CONTROL DATA

-ORDER

GEODETIC LATITUDE	20° 02' 05.67	ELEVATION:	26	METERS
GEODETIC LONGITUDE	155 49 26.04	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ (OR $\Delta$ & $\angle$ )
HI 1	5101	388,821.01	436,458.00	- 0 06 40

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta = \arctan \frac{b}{a}$  FORMULA NEGLECTING THE SECOND TERM.

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

QD 405

Q0 405

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

0 201553 STATION 1029  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1,5 HAWAII

## ADJUSTED HORIZONTAL CONTROL DATA

**Kawaihae Light** (Hawaii Island, K. T. Adams, 1928).—On the northwest coast of Hawaii, at the north end of the village of Kawaihae, and about 230 meters north-northwest along the shore from the wharf. This is the third light which has been erected at Kawaihae. The first light, prior to and during 1905, was exhibited from the old masonry conical frustum now standing between the present light and the radio mast. The second and third lights were identical in position. The lens lantern first exhibited in 1906 was supported on an open skeleton pyramidal wooden tower, which was replaced in 1914 with the present concrete tower. The present tower is 34 feet in height. The 1913 determination of the geographical position of this light was apparently in error by several meters and is superseded by the 1928 determination.

### RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Kawaihae Light  
ESTABLISHED BY: K.T. Adams 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 in good condition. Located about 1800 feet northwest from the post office at Kawaihae, 300 feet southeast from old Kawaihae Pier, 50 yards southwest of the highway, and 20 yards northeast from sea bluff.

Station is center of white light mounted atop a square, white, tapering, concrete tower. Light is 36 feet above ground.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAWAIHAE LIGHT  
ESTABLISHED BY: K.T. Adams YEAR: 1928 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: R.L. Newsom YEAR: 1968 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 was recovered in good condition as previously described by D.M. Whipp.

NAME OF STATION: KAWAIHAE LIGHT

STATE: HAWAII

YEAR: 1928

THIRD

—ORDER

SOURCE: G- 9279

GEODETIC LATITUDE	20 °02' 40.133	ELEVATION	METERS
GEODETIC LONGITUDE	155 50 08.225		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ 10H $\Delta$ 01 ANGLE *
HI 1	5101	384,806.35	439,942.72	- 0 °06' 54"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  10H  $\Delta$  01 FORMULA NEGLECTING THE SECOND TERM.

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

QJ 239



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 201553 STATION 1032  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

SEE STATION KAWAIWAI 2

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAWAIWAI

STATE: HAWAII

YEAR 1948

SECOND

ORDER

SOURCE G- 5275

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 °02' 43.855	ELEVATION	582	METERS
GEODETIC LONGITUDE:	155 44 15.292	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR $\alpha$ ANGLE *
HI 1	5101	418,456.12	440,260.51	- 0 °04' 53"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION KAWAIWAI 2			
QE 263			

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

0 201553 STATION 1033  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 51.5 HAWAII

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
Form 533  
Rev. Aug. 1965

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KAWAIWAI 2 STATE: HAWAII COUNTY: HAWAII

CHIEF OF PARTY: L. C. WILDER YEAR: 1948 Described by: L. C. WILDER

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	HEIGHT OF LIGHT ABOVE STATION MARK METERS.
2	Surface-station mark, Underground-station mark		
	OBJECT	BEARING	DIRECTION:
		feet	meters
	HOKUULA (metal target)	E	00 00 00
	PUU PA (metal target)	SE	49 33 39.5
	PUU LOA (metal target)	NW	233 53 48.4
	Kawaiwai (probably old station)	N	279 33 53
	cross in triangle	17.76	

At about the highest part of the southeasterly of two humps constituting Puu Kawaiwai, which is located close to the Kohala-Waimea highway, about 4 1/2 miles from Kamuela. The northwesterly tip or hump of this hill is the higher of the two. Station is not difficult to reach. It is a standard disk set in ledge and two reference marks were similarly established.

There have been several stations placed on the hill in the past. What appears to be old station Kawaiwai (Hawaii Territory Survey) a chiseled triangle with chiseled cross inside, on a boulder about 2 1/2 feet in diameter, set in a cairn of rocks, is distant 17.76 feet.

(11-8-55)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAWAIWAI 2  
ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: Hawaii  
RECOVERED BY: R.E.A. YEAR: 1961 COUNTY: Hawaii

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 with the exception of the two reference marks which were not recovered. The station mark was found in good condition.

A new to reach follows:

To reach the station from the intersection of State Highways 25 and 19, in the center of the town of Waimea, go north on State Highway 25 for 1.0 mile to the intersection of State Highways 25 and 26. Continue right on State Highway 25 for 3.7 miles to the center one of three track roads on the left. Turn left and follow the track road up the side of a hill to the north of a gravel pit for .3 miles to the west side of the hill. From this point follow a dim track road across the side of the hill for about 100 yards and the end of two-wheel drive travel. From this point cross a short saddle and continue up a dim track road for about 100 yards to the top of the southeasterly one of two hills and the station.

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

COSE-177

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAWAIWAI 2

STATE: HAWAII

YEAR: 1948

THIRD

ORDER

SOURCE: G- 9279

GEODETIC LATITUDE	20 °02'43.691	ELEVATION	982.0 METERS
GEODETIC LONGITUDE	155 44 15.359		3222 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE*
HI 1	5101	418,449.71	440,243.97	- 0 °04'53"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUU PA HGS	331 05 38.5	331 10 31	5101

QE 195

(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 201553 STATION 1033

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

KAWAIWAI 2 (continued)

FORM 526a  
(10-18-69)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

R

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAWAIWAI 2  
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		1.5 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				
PUU PA (HGS) 1873	NNW			00 00 00.0			
R.M. No. 4		9.465	2.885	184 31 30			
KAWAIWAI (old)		17.759	5.414	229 59 32.0			
R.M. No. 3	SSW	28.109	8.568	266 41 09			

Station mark was recovered in good condition. Although the old description states that 2 reference marks were established none could be found, so two new marks, No. 3 and No. 4, were established. A complete description follows:

Station is located about 4-1/2 miles west-northwest of Kamuela and 1400 feet south-southwest of State Highway 25, on the summit of Puu Kawaiwai, on the southeast one of the two similar hills about 500 feet apart, at about 3222 feet elevation. There is a cinder quarry at the base of the hill between station and the highway.

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

Highway 25 for 2.4 miles to junction with State Highway 26. Take right fork, continuing on State Highway 25, for 2.7 miles to top of grade and side road left. Turn left and go 0.1 mile to locked chain gate. Pass through gate and follow track road up around right side of hill for 0.3 mile to end of road. Walk southeast about 150 yards up slope to top and station. (Key for locked gate may be obtained at the State Highway Dept. in Kamuela).

Station mark is a standard disk stamped "KAWAIWAI 2 1948", cemented in a drill hole in a small boulder projecting 2 inches above ground. There is an 8-foot-square, wire fence surrounding the station.

Reference mark number three is a standard disk stamped "KAWAIWAI 2 1948 NO 3 1967", cemented in a drill hole in the top of a 2-foot boulder projecting 1 foot above ground. It is 0.86 foot higher than station mark.

Reference mark number four is a standard disk stamped "KAWAIWAI 2 1948 NO 4 1967", cemented in a drill hole in a 16-inch boulder that projects 4 inches above ground. It is 6 inches higher than station mark.

KAWAIWAI (old) is a 12-inch, chiseled triangle, with a slight hole at the center, in the top of a 20-inch square boulder setting in the center and top of an 8-foot-diameter rock pile. It is 2 feet higher 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.

USCOMM-DC 27175-P89

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 201553 STATION 1034  
HAWAII  
LATITUDE 20° 00' TO 20° 30'  
LONGITUDE 155° 30' TO 156° 00'  
DIAGRAM NE 5-1.5 HAWAII

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION KAWELA

STATE HAWAII

YEAR 1877

THIRD

ORDER

SOURCE G-SP156

GEODETIC LATITUDE:	20 05 58.666	ELEVATION	METERS
GEODETIC LONGITUDE:	155 30 20.083		FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ ANGLE
HI 1	5101	498,085.94	455,855.49	- 0° 00' 07"

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

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

QD 366

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

0 201553 STATION 1035  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
Form 1300  
(Rev. Feb. 1965)

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KAWELA**  
ESTABLISHED BY: **H.T.S.** YEAR: **1881** STATE: **HAWAII**  
RECOVERED BY: **L.C. Wilder** YEAR: **1948** COUNTY: **HAWAII**

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

The original circular concrete block was found as described in H.T.S. records. An old U.S.G.S. disk is cemented in the middle of the concrete block but no records are available to indicate the date of the disk.

A cemented cairn of rocks about four feet in diameter and three feet high surrounds the concrete monument.

The station is located in the northern part of Hawaii about 2.5 miles west of Honokaa Village and about 1.2 miles inward from the sea.

To reach the station proceed westerly along the road from Honokaa Village to Waipio Valley a distance of about 2.5 miles. Turn right and proceed down the Kawela Camp Road a distance of 0.3 mile to the Lower Hamakua Ditch. Go west 200 feet along the ditch and down about 100 feet to the station which is located on a prominent rise that overlooks the seacoast.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KAWELA**  
ESTABLISHED BY: **HTS** YEAR: **1881** STATE: **Hawaii** BENCH MARK(S) ALSO ☐  
RECOVERED BY: **D.M. Whipp** YEAR: **1966** 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 found destroyed. A triangular block of concrete, 3 feet on each side, with an unstamped U.S. Geological Survey disk in an 8-inch-diameter concrete block projecting from the center of it, was found laying on top of the ground on its side, apparently pushed out by machinery. Remains of the cemented cairn are laying in the vicinity.

NAME OF STATION: **KAWELA**

STATE: **HAWAII**

YEAR: **1881**

SECOND ORDER

SOURCE: **G- 9279**

GEODETIC LATITUDE:	20 °05' 58.117	ELEVATION:	267.7 METERS
GEODETIC LONGITUDE:	155 30 20.014		544 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ (ON $\Delta$ AT ANGLE °)
HI 1	5101	458,092.51	459,800.11	- 0°00'07"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  (ON  $\Delta$  AT) FORMULA NEGLECTING THE SECOND TERM.

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

QE 183

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 201553 STATION 1036  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

SEE STATION KEALAHWEA 2

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KEALAHWEA

STATE HAWAII

YEAR 1948

SECOND

ORDER

SOURCE: G- 9275

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 16 04.431	ELEVATION:	16	METERS
GEODETIC LONGITUDE:	155 52 15.062	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	R OR Δ or ANGLE *
HI 1	5101	372,854.40	521,109.44	- 0 07 43

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION KEALAHWEA 2

QE 288

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 201553 STATION 1037  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-15 HAWAII

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FORM 555  
Rev. Aug. 1968

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KEALAHEWA 2 STATE: HAWAII

COUNTY: HAWAII

CHIEF OF PARTY: L. C. WILDER YEAR: 1948

Described by: G. L. MURRAY

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.			
2	1.40					
OBJECT	BEARING	DISTANCE		DIRECTION:		
		feet	meters	0	1	2
Puu ULA (metal target)	SSE			00	00	00
KEHONI (metal target)	SSE			06	15	02.9
Kealahewa (old sta)	NW	64.660	19.710	124	46	13
12a R. M. No. 1, 1948	E	16.082	4.902	230	13	28
12a R. M. No. 2, 1948	SE	16.610	5.064	294	50	42

Station is located about 1/4 mile northwesterly of the terminal building, within Upolu Airport, north end of Hawaii Island, about 50 feet from the fence marking the westerly boundary of same and about 125 feet south of the sea cliffs. On easterly edge of a gentle rise about 400 feet easterly of Kohala Sugar Co. pump house.

Station is reached by proceeding westerly from Hawi Village on main road, and turning into side road to the north leading to Upolu Airport.

Station mark is set in outcropping rock. Reference mark No. 1 in a rock about 3 feet square, which projects one foot above the ground. Reference mark No. 2 is set on top of an elongated solid rock projecting about 2 1/2 feet above the ground and 2 feet higher than the station.

This station was established due to the old station KEALAHEWA being on the edge of an eroding ledge near the sea bluff. The old station mark is a circular 4-inch concrete monument set in the ground.

Form 526  
(11-8-55)

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

NAME OF STATION: KEALAHEWA 2

ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: HAWAII  
RECOVERED BY: H.O.F. YEAR: 1958 COUNTY: HAWAII

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

The station, the two R.M.s, and the old Kealahewa mark were all recovered in good condition as described in 1948, except for the following:

Station is located 0.8 mile northwest of the Upolu Airport terminal; about 0.15 northwest of the westerly end of the runway; 370 feet easterly of the Kohala Sugar Co. pump house; about 55 feet west of an old stone fence, now barely visible, and about 45 feet south of the erosion line of the sea cliffs.

To reach go 1.25 miles west along the highway from the road junction in Hawi; turn right and go north 2.0 miles to Upolu Airport; turn left and go 0.8 mile along dirt road to old pump house. Station is 370 feet to eastward near erosion line along beach.

\* 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

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NOS

NAME OF STATION: KEALAHEWA 2

OBS BY CGS

STATE: HAWAII

YEAR: 1948

SECOND

ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	20 16 04.16000	ELEVATION:	16.4 METERS
GEODETIC LONGITUDE:	155 52 14.44600		54 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	8 OR Δ BY ANGLE *
HI 1	5101	372,952.99	521,081.97	- 0°07'42"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE 8 OR Δ BY FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KEHONI HTS	356°28'44.2	356°36'26"	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

3M 087

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553 STATION 1037

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

KEALAHEWA 2 (continued)

Form 526  
(11-8-55)  
U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEALAHEWA 2  
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii  
RECOVERED BY: C.A. Burroughs YEAR: 1962 COUNTY: Hawaii

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

Second-order astronomic observations were performed at this station. The "to reach" is adequate.

Form 526  
(11-8-55)  
U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEALAHEWA 2  
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii  
RECOVERED BY: D.G. Bartoo YEAR: 1963 COUNTY: Hawaii

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

USC2GS Marker, set in rock, found as described, in good condition. R.M. 1, 16 feet to the east, recovered in good condition. At present a dirt road passes the station 80 feet to the south. The pump house still stands, is operating and is in a good state of repair. The fence no longer exists. Original description adequate.

Form 526  
(11-8-55)  
U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEALAHEWA 2  
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		1.5	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				
KEHONI (HTS) -----1948		DISTANCE and DIRECTION-----		00	00	00.0	
Kealahewa (old sta)	NW	64.660	19.710	118	31	10	
R.M. No. 1	E	16.082	4.902	223	58	25	
R.M. No. 2	SE	16.610	5.064	288	35	39	
KEHONI (HTS) 1948-----1967		DISTANCE and DIRECTION-----		00	00	00.0	
KEALAHEWA (old station)	NNW	64.673	19.713	118	30	45.2	
R.M. No. 1	NE	16.082	4.902	223	59	26	
R.M. No. 2	ESE	16.605	5.062	288	35	49	

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

Station is located about 3 miles northwest of Hawi, 1-1/2 miles north-east of the U.S. Coast Guard Loran Station, 800 feet west-northwest of the west end of the Upolu Point Airport runway, and on a grassy area bordering the sea.

To reach station from the post office in Hawi, go north on State Highway 25 for 0.1 mile to T-junction. Turn left and go west on State Highway 27 for 1.25 miles to T-road right. Turn right and go north on State Highway 271 for 2.0 miles to Upolu Point Airport. Turn left and go west along airport for 0.75 mile to fork after rounding end of airport. Take right fork and go 0.05 mile to station.

Station mark is a standard disk stamped "KEALAHEWA 2 1948", cemented in a drill hole in a bedrock knob that projects 6 inches above a flat bedrock outcrop. It is at west end of a group of bedrock outcrops; 42 feet south from edge of beach bank, 48.0 feet north of center line of track road, and about 150 yards east of a pumphouse at edge of cane-field.

Reference mark number one is a standard disk stamped "KEALAHEWA 2 1948", cemented in a drill hole in a 3 x 3-foot, bedrock outcrop projecting 8 inches from ground, and is 14 inches lower than station mark.

Reference mark number two is a standard disk stamped "KEALAHEWA 2 1948", cemented in a drill hole in the top of a 6 x 9-foot bedrock outcrop that projects 30 inches above ground and is the highest and largest of the group. It is 2 feet higher than station mark.

KEALAHEWA (old station) is the center of a 5-inch-diameter, concrete cylinder 1 foot below ground level and 2 feet lower than station mark. It is on edge of grassy beach bank, at south edge of the pile of sugar cane rubble that has been dumped along bank to stop erosion. There are a few boulders piled on top of the mark.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEALAHEWA 2  
ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: C.A.A. YEAR: 1969 COUNTY: Hawaii  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3 miles northwest of Hawi

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

The station mark, both reference marks and KEALAHEWA (old station mark) were recovered as described in the 1967 recovery note. All marks were found to be in good condition and the "to reach" was adequate. The station was used in an attempt to geodimeter the distance to station KOLEKOLE (HGS) 1950, but fog prevented it. The distance and direction to the reference marks and the old station mark was not checked at this time.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEALAHEWA 2  
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: L.A. Critchlow YEAR: 1977 COUNTY: Hawaii  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3 miles west of Hawi.  
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 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	
KEHONI HTS 1948				00 00 00.0
LOAN C TOWER 1964	SW	1.4 mi.		47 06 30.5
LOAN A TOWER 1964	SW	1.4 mi.		56 18 32.6
TM 1	NE	16.09	4.903	224 00 42
TM 2	E	16.61	5.063	288 36 13

The station mark and reference marks 1 and 2 were recovered in good condition. The direction and distances to the reference marks measured on this date compared favorably with the 1949 and 1967 measurements. The 1967 recovery description is adequate, except the old station KEALAHEWA was found destroyed.

(R.B. Melby, 1978)--The station and the reference marks were recovered in good condition.

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1038  
HAWAII  
LATITUDE 20° 00' TO 20° 30'  
LONGITUDE 155° 30' TO 156° 30'  
DIAGRAM NE 5-15 HAWAII

## NO ORIGINAL TEXT

Keawanui (Hawaii Island, Hawaiian Government Survey, 1881; E. R. Hand, 1913).—On northwest coast of Hawaii, west coast of Kohala, on a rocky promontory just inside a prominent point (Malaea Point) which is midway between Kawaihae Light and Mohukona Light, and at a place where the shore line runs northeast for almost 300 meters. Out on this point is a high rock pinnacle touched up with paint; the next paint spot to the southeast along the shore is the symbol, cross inside circle, and is 700 meters distant; 360 meters southeast of this symbol is paint on a cairn. The station is directly east 330 meters from pinnacle on point. Marked originally by three lines of bottles radiating from center and three coral blocks marked with triangles, over which was a large stone cairn inside a small stone inclosure. In 1913 bottles were found disarranged and mostly broken. The three coral stones were apparently undisturbed, forming a triangle a little less than 1 meter on a side.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FOURTH EDITION

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Keawanui STATE: Hawaii COUNTY: Hawaii  
ESTABLISHED BY: H.G.S. YEAR: 1881 LOCALITY: N. Kohala, Hawaii  
RECOVERED BY: Chas. L. Murray YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of station: On a rocky promontory about 0.2 mile inshore from a prominent point of land called Malaea Point which is about 5 1/2 miles from both Kawaihae and Mahukona Light houses.

Old Station found: U.S.G.S. bronze tablet set in center of  $\Delta$  cut in rock. 101 feet elevation marked on tablet.

New Station mark: H.T.S. Type D monument (Triangular concrete monument 7 1/2 feet on each side with 2 1/2" pipe 2 feet long set on steel legs over the old mark which is left exposed to view. A standard metal target is set in the 2 1/2" pipe.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FOURTH EDITION

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEAWANUI  
ESTABLISHED BY: Haw. Govt. Survey YEAR: 1881 STATE: HAWAII  
RECOVERED BY: L. O. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

On "Malaea" Point which is six miles northwestward of Kawaihae Light. On a small rise 101 feet in elevation, 400 to 500 yards from the end of the point. There is a slightly higher knoll about 200 yds. eastward. There is a small rock wall around the station.

Landing was made on the south side of the point in a bight, the nearest place from the shoreline to the station. The head of this bight is rock and gravel. There is another small bight on the north side of the point.

The station was recovered in 1938 and monumented with a concrete platform, metal pole and target. They recovered a USGS disk set in a triangle which was probably an old RM. Elevation 101 stamped on the disk. This recovery was by the Hawaii Territory Survey. The USGS disk was recovered in 1948, surrounded by concrete.

A reference mark stamped "R. M. No. 1" was set in ledge in a southerly direction, distant 30.65 feet (9.343 m).

OBJECT	DISTANCE	DIRECTION
PUAKO NEW		00 00 00
R. M. No. 1, 1948	9.343m 30.65ft.	13 51 38
Kehena (metal target)		191 44 34.3
Puu Loa (metal target)		306 59 14.2

\* 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.

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KEAWANUI

STATE: HAWAII

YEAR: 1881

SECOND

ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	20° 06' 34.731	ELEVATION:	52.5 METERS
GEODETIC LONGITUDE:	155° 53' 00.813		108 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ ANGLE
HI 1	5101	368,405.80	463,642.19	- 0 07 55

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUAKO NEW	337 38 43.6	337 46 39	5101

QE 140

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553 STATION 1038

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

KEAWANUI (continued)

FORM 526a  
(2-12-65)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KEAWANUI  
ESTABLISHED BY: HGS YEAR: 1881 STATE: Hawaii  
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii  
Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.72 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	
FUAKO NEW-----1948 DISTANCE and	DIRECTION-----	00	00	00.0
R.M. No. 1		30.65	9.343	13 51 38
FUAKO NEW 1948-----1967 DISTANCE and	DIRECTION-----	00	00	00.0
R.M. No. 1	S	30.611	9.330	13 52 02
R.M. No. 2	NE	37.452	11.416	236 31 03

Station was recovered and both marks found in good condition. A new reference mark was established. It is now possible to drive almost to station. A complete description follows:

Station is located about 6 miles northwest of Kawaihae, about 0.4 mile southwest of the new Coast highway, 1100 feet east of Malae Point, and 475 feet northeast of an old jeep road along coast, on a small hill of about 108 feet elevation, in the north end of a stone-walled enclosure about 24 x 45 feet in size.

To reach station from the post office in Kawaihae, go northwest on

the highway towards Mahukona for 5.4 miles to a track crossroad. Turn left and go downgrade for 0.35 mile; take side road right, along coast-line, for 0.7 mile to point of small cove in dip of road. Continue ahead for 0.15 mile to top of low grade and end of truck travel. Walk northeast up along ridge for about 475 feet to top of hill and station.

Station mark is a U.S. Geological Survey disk, stamped "101", set in the bottom of a 4-inch-diameter, 6-inch-deep recess in the center of a triangular, concrete platform about 7 feet on each side. A 2-1/2-inch iron pipe 2 feet long is centered over the mark and supports a red and white metal target.

Reference mark number one is a standard disk stamped "1 1948", cemented in a drill hole in a 16-inch boulder that projects 3 inches from ground. It is 6 feet northwest from southeast end of the rock enclosure and 1.5 feet lower than station mark.

Reference mark number two is a standard disk stamped "KEAWANUI HGS 1881 NO 2 1967", cemented in a drill hole in lava bedrock that projects 3 inches from ground. It is 0.2 foot higher than station mark.

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KEAWANUI  
ESTABLISHED BY: H.G.S. YEAR: 1881 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: R.L. Newsom YEAR: 1968 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 and both reference marks recovered in good condition as previously described by D.M. Whipp.  
A 16' wooden tripod was constructed over the station in November, 1968.



# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1039  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1,5 HAWAII

## NO ORIGINAL TEXT

Kehena (Hawaii Island, Hawaiian Government Survey, 1881; E. R. Hand, 1913).—On northwest coast of Hawaii, west coast of Kohala District, in the land of Kaiholena, between Keawanui and Mahukona, and ½ mile from the sea. Point may best be found in the following manner: Identify the most prominent point, about 4 miles south of Mahukona south beacon, and here will be found a paint spot on an old house with domelike appearance; go north along the coast to another paint spot (white paint on round boulder), immediately east of which is a small mound, from which the cairn over the station will be seen, N. 68° E., 640 meters distant. Center marked by a rock with ½-inch drill hole in top. Three stones, each marked with cross, are each distant about 1 meter from station.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Kehena STATE: Hawaii COUNTY: Hawaii  
ESTABLISHED BY: H.G.S. YEAR: 1881 LOCALITY: N. Kohala, Hawaii  
RECOVERED BY: Chas.L.Murray YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of Station: On the northwest coast of Hawaii and west coast of Kohala about 3 1/2 miles south of Mahukona and 0.4 mile inshore.

Old station mark found: Drill-hole in rock surrounded by 3 Δ's cut in rock and covered by a pile of stones alongside of which was found a U.S.G.S. bronze tablet marked 268 feet elevation.

New mark: H.T.S. Type D monument (Triangular concrete monument 7 1/2 feet each side with 2 1/2" pipe 2 feet long set on steel legs over the old mark which is left exposed to view. A standard metal target is set in the 2 1/2" pipe.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEHENA  
ESTABLISHED BY: Hawaiian Govt YEAR: 1881 STATE: HAWAII  
RECOVERED BY: L. O. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description: The original station was recovered in good condition. A triangle carved in a flat rock with a hole in its center was found about 1 meter south of the station although this mark was not mentioned in the original or any subsequent description. The original description mentions three reference marks consisting of crosses in rocks about 1 meter distance. Apparently the reference marks were still crosses when the station was recovered in 1913 by E. R. Hand. In 1938 this station was recovered by the Hawaii Territory Survey and reported having found three triangles carved in rock which served as reference marks. Also, in 1938, the Hawaii Territory Survey surrounded the original station drill hole with a triangular slab of concrete which is 7 feet on each side and projects about 10 inches. They reportedly centered a 2 1/2 inch iron pipe over the original station. A U. S. Geological Survey disk was found 4 feet north of the station. An additional reference mark was established for this station. A new description follows—

The station is located about 5 miles southwest of Hawi, about 4 miles south southeast of Mahukona, about 2 miles north of Keawanui Bay, about 0.3 mile east of the west shore of the island and on the crest of a low, brush covered ridge. Higher ground to the east of the station.

The station is best reached by boat from either Mahukona or Kawaihae.

\* 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.

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KEHENA

STATE: HAWAII

YEAR: 1881

SECOND

ORDER

SOURCE: G- 9275

GEODETIC LATITUDE:	20 °08' 20.570	ELEVATION:	76.2 METERS
GEODETIC LONGITUDE:	155 53 21.815		250 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ 01 ANGLE *
HI 1	5101	366,429.22	474,527.35	- 0 °08' 03"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ FOR Δ 01 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
RIDGE	171 22 16.1	171 30 19	5101

QE 142

LATITUDE      ° ' TO      °  
LONGITUDE    ° ' TO      °  
DIAGRAM

Reference mark number two is a chiseled triangle, 8 inches on each side, with a drill hole in center, 16 inches southwest of the southwest corner of the platform and is at about same elevation as station mark. BM 258 (USGS) is a U.S. Geological Survey disk, stamped "258 1911", cemented in a drill hole in bedrock flush with ground, 1-1/2 feet northeast of northeast edge of the platform and at about same elevation as station mark.

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

NAME OF STATION: KEMENA  
ESTABLISHED BY: HGS  
RECOVERED BY: \*R.L. Newsom

YEAR: 1981 STATE: Hawaii  
YEAR: 1968 COUNTY: Hawaii

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

1 Station recovered in good condition as described by D.M. Whipp, 1967 -  
wooden Hydrographic Survey Signal (tripod) built over station November, 1968.

The station is the center of a 2 1/2 inch iron pipe which projects about 2 1/2 feet from the top of a triangular slab of concrete which is about 7 feet on each side and projects about 10 inches.

Reference mark number 1 is a standard disk, stamped 1 1948, set into a drill hole in a boulder which projects about 6 inches and is about 3 feet lower than the station.

Reference mark number 2 is drill hole in the center of a chiseled triangle in a flat rock which is flush with the surface of the ground and is about the same elevation as the station.

The U. S. Geological Survey disk is a standard bench mark, stamped 258 DATUM 1911, set in a drill hole in a flat rock which is flush with the ground and is about the same elevation as the station.

Object	Distance		Direction		
RIDGE (metal target)			00	00	00
B. M. (USGS) ENE	1.245 m	4.080 ft.	78	01	
R. M. No. 1 SE	7.183 m	23.562 ft	148	44	11
R. M. No. 2 S	1.074 m	3.520 ft	184	11	
PUU 0 NAIE			40	49	13.0

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

NAME OF STATION: KEHENA  
ESTABLISHED BY: HGS  
RECOVERED BY: D.M. Whipp

YEAR: 1881  
YEAR: 1967

STATE: Hawaii  
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			
RIDGE 1910-----1948 DISTANCE	and	DIRECTION-----		00	00	00.0
B.M. (USGS)	ENE	4.080	1.245	78	01	
R.M. No. 1	SE	23.562	7.183	148	44	11
R.M. No. 2	S	3.520	1.074	184	11	
RIDGE 1910-----1967 DISTANCE	and	DIRECTION-----		00	00	00.0
BM 258 (USGS)	ENE	4.102	1.251	79	06	21
R.M. No. 1	SE	23.552	7.179	148	43	08
R.M. No. 2 (chiseled triangle)	SSE	3.524	1.074	182	51	57

Station was recovered and all marks found in good condition. The 1967 angles to BM 258 (USGS) and R.M. No. 2 are considered correct because with the type of instrument used (Wild T-2) it was possible to focus and obtain accurate pointings. It is now possible to drive to the station. A complete description follows:

A complete description follows:  
Station is located about 8 miles northwest of Kawaihae and 2000 feet east-northeast of the sea, on a rise along the southwest side of the new

coast highway running between Kawaihae and Mahukona, and is at about 250 feet elevation. From the post office at Kawaihae, go northwest on

To reach station from the post office at Kawaihae, go northwest on the highway for 8.2 miles to top of grade and station on left.

Station is marked by a 1/2-inch drill hole in a rock, at the bottom of a 5-inch-diameter, 7-inch-deep hole in the center of a triangular concrete platform about 7 feet on each side and projecting 6 inches above ground. It is 176 feet west-southwest of center line of highway.

Reference mark number one is a standard disk stamped "1 1948", cemented in a drill hole in a 2 x 3-foot rock outcrop projecting 4 inches from ground, and is 0.3 foot higher than station mark.

AREA OFFICE

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

STATE Hawaii COUNTY Hawaii QUADRANGLE 73

QUOTE PRIMARY REFERENCE on the crest of a low brush-covered ridge about 2 mi N. of  
Kauwani Bay (Direction and distance)

DESIGNATION { LISTED KEHENA  
STAMPED \_\_\_\_\_ TYPE OF MARK: BM \_\_\_\_\_ TT \_\_\_\_\_ TRIANG. X

Lat. 20° 08' 20.570"	CONDITION	ESTABLISHED BY
Long. 155° 53' 21.815"	Disturbed <input type="checkbox"/>	USGS <input type="checkbox"/> USBR <input type="checkbox"/>
Elev. 250 feet	Destroyed <input type="checkbox"/>	USCAGS <input checked="" type="checkbox"/> State GS <input type="checkbox"/>
	Not Found <input type="checkbox"/>	USNPS <input type="checkbox"/> USNFS <input type="checkbox"/>
		USGLO <input type="checkbox"/>
		USRLM <input type="checkbox"/> (Other) <input type="checkbox"/>

REMARKS OR REVISED DESCRIPTION:

Station was recovered as described in recovery note by D. M. Whipp in 1967. Description adequate.

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

AGENCY .....  
 Marks found in good condition need not be reported

**FILL IN ALL AVAILABLE INFORMATION**

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1040  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
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: KEHONI (H.T.S.) STATE: HAWAII COUNTY: HAWAII

CHIEF OF PARTY: L. C. WILDER YEAR: 1948

Described by: L. C. WILDER

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK 1.53 METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION	
			METERS.	
			DISTANCE	
			feet	meters
			DIRECTION:	
			° ' "	
	Surface-station mark,			
	Underground-station mark			
	OBJECT	BEARING		
	Puu O Hale (metal target)	E		00 00 00
	Sta. Kahai (metal target)	SE	14.415	300 34 44.4
12a	R. M. No. 1 1948		4.394	330 15 02

This station was established by the Hawaii Territory Survey. It was recovered by them in 1938 and monumented with a concrete platform, metal pole and target. The old mark was a triangle set in a cement block. Station exists in 1948 as it was recovered in 1938.

Located on a very prominent hill named Kahone on topographic maps, 1/4 mile west of Hawi and about 1/4 mile north of the Hawi-Mahukona road. Station is at the top of this hill, to which a truck can be driven by passing through a gate just before abreast of the station. This hill is about 1 mile northwestward of Puu Ula.

Form 526  
(11-8-55)

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

NAME OF STATION: KEHONI (HTS)

Established by: L.C.W. YEAR: 1948 STATE: Hawaii

Recovered by: H.O.F. YEAR: 1958 COUNTY: Hawaii

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 1948, except for the following:

The steel legs have rusted off and the metal pole and target are gone. The R.M. was searched for but not found.

To reach go 2.1 miles west along the highway from the junction in Hawi; turn right on a black top road and continue northwest for 0.7 mile up and around to the west side and top of Kahone Hill to the white C.A.A. Omi Range Station. The mark is directly underneath a boundary fence line and 18.7 ft. east of the VOR north-south fence line extended.

Form 526  
(11-8-55)

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

NAME OF STATION: KEHONI (HTS)

Established by: L.C.W. YEAR: 1948 STATE: Hawaii

Recovered by: H.J.S. YEAR: 1962 COUNTY: Hawaii

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

The station and the reference mark were recovered in good condition as described except that the metal target is gone. The station is in a fence line at the east edge of the property fence around the now abandoned VOR site at Upolo Point. The old building still stands. A paved road leads to the top and the station site.

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: KEHONI HTS

OBS BY CGS

STATE: HAWAII

YEAR: 1948

SECOND

ORDER

SOURCE: U- 9279

GEODETIC LATITUDE:	20 14 43.27600	ELEVATION:	203.4
GEODETIC LONGITUDE:	155 52 09.17300		667
			METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE °
HI 1	5101	373,436.81	512,920.82	- 0°07'40"

\* 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
KAHEI HTS	273°10'48.6	273°18'29"	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553 STATION 1040  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

KEHONI (HTS)(continued)

Form 526  
(11-8-65)

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

R

NAME OF STATION: KEHONI (HTS)  
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: HAWAII  
RECOVERED BY: D.G. Bartoo YEAR: 1967 COUNTY: HAWAII

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

Concrete platform, with hole in center exposing original mark, set by Hawaiian Territory Survey in 1938, recovered in good condition. Metal pole and target are gone. The station lies on a property line and now has a 4 foot wooden fence directly over it.

An abandon FAA installation-building, paved parking and road, and fence-lies 100 feet SSW of the mark.

One R.M. was found 14 feet SE along the fence; a disc in 3" pipe, top 5" above ground. Its condition was good. A single wooden pole is set over the mark as target.

Original description adequate.

Form 526a  
(8-15-67)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KEHONI (HTS)  
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 1.73 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	
PUU ULA (HTS) 1913				00 00 00.0
R.M. No. 2	W	48.787	14.870	71 24 08
R.M. No. 1	SE	14.418	4.395	323 31 05

Station mark and reference mark one were recovered in good condition. A new reference mark, number two, was established. A complete description follows:

Station is located about 2-1/2 miles west of Hawi and 1400 feet north of State Highway 27, at about 667 feet elevation, on the summit of a bare hill named Kehoni, that has an old radio range station building on it.

To reach station from the post office in Hawi, go north on State Highway 25 for 0.1 mile; turn left and go west on State Highway 27 for 1.25 miles to junction with State Highway 271 on right. Continue ahead on Highway 27 for 0.8 mile to macadam side road right, at telephone pole 42.

Turn right and follow the macadam road northwest for 0.6 mile to board gate. Pass through gate and continue for 0.1 mile to summit of hill and station.

Station is located in a northwest-southeast fenceline, and is marked by a hole in the center of a chiseled triangle, in the top of a 4-inch-diameter, concrete post set in the center of a triangular, concrete platform about 7 feet on each side and flush with the ground. It is 81 feet northeast of the old radio range building and is surrounded by boulders.

Reference mark number one is a standard disk stamped "KEHONI 1948", set in the top of a 2-inch, iron pipe projecting 6 inches from the ground. It is 14 inches northeast of the fence and 0.55 foot lower than station.

Reference mark number two is a standard disk stamped "KEHONI HTS 1948 NO 2 1967", cemented in a drill hole near the center of a 24-inch-diameter concrete block that has 4 large bolts projecting from the top. It is 38.5 feet northeast of the edge of the building, 10 feet northwest of a 3-inch pipe projecting 4 feet from the ground, and is 0.7 foot lower than station.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KEHONI HTS  
ESTABLISHED BY: L.C.W. YEAR: 1948 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: L.A. Critchlow YEAR: 1977 COUNTY: Hawaii  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 1/2 miles west of Hawi.  
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 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	
FAHEI HTS 1948				00 00 00.0
RM 1	SE	14.445	4.405	29 46 51
RM 2	SW	48.80	14.372	137 33 51
LORAN C TOWER 1964	ENE	about 1 1/2 miles		192 20 25.4
LORAN A TOWER 1964	HW	about 1 3/4 miles		201 21 12.0
HAWAII UPOLU AIRPORT ECH	N	about 1 3/4 miles		278 23 04.9
RM 1 to RM 2		54.98	16.757	

The station mark and reference marks 1 and 2 were recovered in good condition. The angle between the reference marks was found smaller by 01 minute and 03 seconds. The distance to reference mark 1 was found longer by 0.010 meter and the distance to reference mark 2 was found longer by 0.002 meter. The to reach and write up of the 1967 recovery note is good.

\* 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.

NOAA FORM 76-96 SUPERSEDES CGS FORM 526A WHICH MAY BE USED  
(1-72)

U.S. DEPARTMENT OF COMMERCE  
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# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1041  
HAWAII  
LATITUDE 20 ° 00' TO 20 ° 30'  
LONGITUDE 155 ° 30' TO 156 ° 00'  
DIAGRAM NE 5-1,5 HAWAII

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION KEPUHI  
STATE HAWAII

YEAR 1913

SECOND

-ORDER

SOURCE G- 9279

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	20 16 03.176	ELEVATION	22	METERS
GEODETIC LONGITUDE	155 50 01.115	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ $\theta$ ANGLE *
HI 1	5101	385,646.79	520,955.67	- 0 ° 06 ' 56 "

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION KEPUHI 2

QE 287

**Kepuhi** (Hawaii Island, E. R. Hand, 1913).—On north point of Hawaii, on Hoea Point (Kepuhi Point?) which is the headland seen to the westward from Kauhola Point Light; it is directly east from Hoea Mill of the Hawi Mill & Plantation Co. Station is not out on end of point, which consists of a flat rock about 30 to 40 feet high, but is back from the outermost end about 80 meters, up a terrace of earth, showing a distinct bluff line behind the regular cliffs. From the station Hoea Mill stack bears S. 64° W. Station is about 6 meters southeast from the cliff edge and about 3 meters southwest from the terrace bluff. Mark is a cylinder of concrete about 5 inches in diameter, projecting 8 inches above the surface. Traces of the iron pipe in which it was cast still show. In top of the cylinder is a triangle with small hole. This mark placed by the Territorial Survey; its position determined independently by the United States Coast and Geodetic Survey.

U. S. DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
PORTAL 020

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Kepuhi STATE: Hawaii COUNTY: Hawaii  
ESTABLISHED BY: E. R. Hand YEAR: 1913 LOCALITY: North Kohala, Hawaii  
RECOVERED BY: Chas. L. Murray YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of station: On the seacoast about 3000-feet east of Hoea Mill which is being dismantled. This station can be approached by taking the road leading from the Mill to the Hoea Pumping station.

Old Mark:  $\Delta$  on concrete-filled cylinder.

New Mark: H.T.S. Type D-1 Monument (Triangular concrete monument 7-1/2-feet on each side with 1-7/8" steel bar 2-feet long set on steel legs over the station mark which is left exposed to view. A standard metal target is set over the steel bar).

U. S. DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
PORTAL 020

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEPUHI  
ESTABLISHED BY: E. R. Hand YEAR: 1913 STATE: HAWAII  
RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

Recovered the cylinder of concrete showing a triangle formed in same. This station has a concrete platform built by the Hawaii Territory Survey. Erosion is taking place and the station will drop over the side of the bluff in a few years. For this reason station Kepuhi 2 was established inshore.

Located at the edge of the earth bluff near the end of Kepuhi Point, one mile east of Upolu Point and  $\frac{1}{4}$  miles northwestward of Kauhola Pt. Light.

This station was located by direction and distance from Kepuhi 2.

\* 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.

16-5218-3

(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 201553

STATION 1041

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

KEPUHI (continued)

Form 526  
(11-8-55)

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

R

NAME OF STATION: KEPUHI  
ESTABLISHED BY: E.R.H. YEAR: 1913 STATE: Hawaii  
RECOVERED BY: H.O.F. YEAR: 1958 COUNTY: Hawaii

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

The mark was recovered as described in 1913, 1938 and 1948, except for the following corrections. The mark is on Alanahihi Point instead of Kepuhi Point. The steel bar and the standard metal target as mentioned in the 1938 description are now both gone. Although still being undermined, the station appears to be quite stable. See how to reach from Kepuhi 2 description.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KEPUHI  
ESTABLISHED BY: E.R. Hand YEAR: 1913 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 is destroyed. The concrete platform has been undermined by erosion and is tilted and beginning to break up.

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1042  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
PORTS 625  
Rev. Aug. 1968

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **KEPUHI 2** STATE: **HAWAII** COUNTY: **HAWAII**

CHIEF OF PARTY: **L. C. WILDER** YEAR: **1948** Described by: **L. C. WILDER**

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK	1.5 METERS.	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.
1A	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
	PUU O MALE (metal target)	S		06 00 06
	PUU ULA (metal target)	SW		29 34 32.9
11a	Kauhola Point Lighthouse (top)	ESE		277 11 38.2
11a	R. M. No. 1, 1948	S	30.030	16 10 29
	R. M. No. 2, 1948	W	23.572	76 44 54
	KEPUHI (old station)	N	59.270	18.070 179 55 08.6

Station is near the extreme end of Kepuhi Point which is the north end of Hawaii Island. This point is about one mile east of Upolu Point and 4 1/2 miles northwestward of Kauhola Point Lighthouse. Station is about 18 meters from the edge of the earth bluff and station Kepuhi 1913, which is being undermined and will be lost in a few years. Marked by a standard disk set in a concrete monument. There are two reference marks similarly established.

To reach the station turn north off the main highway about 1/2 mile west of Hawi and proceed in a general northerly direction over third class roads and roads bordering cane fields, to Kepuhi Point.

(11-B-55)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KEPUHI 2**  
ESTABLISHED BY: **L.C.W.** YEAR: **1948** STATE: **Hawaii**  
RECOVERED BY: **H.O.F.** YEAR: **1958** COUNTY: **Hawaii**

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

The station and the two R.M.s were recovered in good condition. Old KEPUHI I, 1913 was also recovered, and the distance checked. A new description follows.

Station is near the highest part of the extreme end of Alanahihi Point, about 1 1/2 miles east of Upolu Point, and 4 miles northwest of Kauhola Point Lighthouse. Station is 18 meters south from the edge of the earth bluff and station Kepuhi 1913, which is being undermined by erosion and will be lost in the future. The marks is a standard disc set on a concrete truncated monument. The two R.M.s are cemented in the top of 3" iron pipes, driven in the ground.

To reach from the junction in Hawi go 0.15 mile west along the highway; turn right and go 2.1 miles in a N.N.W.'ly direction along various dirt roads through the village of Hoesa; at north edge of village turn right and go 0.25 mile to the old Hoesa Pumping station; pass through gate and go 0.35 of a mile in a Easterly direction across open pasture land to the corner of a fence on Alanahihi Point; walk to end of point and stations.

\* 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.

COMB-DC 34314

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KEPUHI 2**

STATE: **HAWAII**

YEAR: **1948**

SECOND

ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	20 16 02.598	ELEVATION	21.9 METERS
GEODETIC LONGITUDE:	155 50 01.229		72 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE
HI 1	5101	385,655.82	520,897.38	- 0 06 5c

\* 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
KAUHOLA	287 45 47.7	287 52 44	5101

QE 149



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 201553

STATION 1042

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

KEPUHI 2 (continued)

FORM 326a  
(8-18-69)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEPUHI 2  
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		1.53 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			
KAUHOLA (HGS) 1881		ESE SSW W			00	00	00.0
Kauhola Point Light 1948					00	02	12.2
R.M. No. 1			30.041	9.157	99	02	12
R.M. No. 2			23.569	7.184	159	35	20

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

Station is located about 1-3/4 miles due north of Hawi and 1-1/4 miles southeast of Upolu Point, in pasture land on Alanahihi Point, about 800 feet southwest from the extreme rocky tip of the point, and is 60 feet south from edge of grass area and beginning of wind-eroded area.

To reach station from the post office in Hawi, go north on State Highway 25 for 0.1 mile; turn left and go west on State Highway 27 for 0.2 mile to dirt side road right, across highway from the Catholic Church. Turn right and go north for 0.95 mile to the second main crossroad. Con-

tinue ahead for 0.15 mile to fork. Take left fork, straight ahead, and go 0.4 mile; turn sharp right on T-road and go 0.2 mile to wire gate on left at T-fence intersection. Pass through gate and go north down along fence for 0.2 mile to corral. Go left along fence for 0.1 mile to gate on right. Pass through gate and go north across pasture for 0.2 mile to station.

Station mark is a standard disk stamped "KEPUHI 2 1948", set in the top of a 12-inch-square concrete monument projecting 2 inches above ground.

Reference mark number one is a standard disk stamped "KEPUHI 1 1948", set in the top of a 2-inch, iron pipe projecting 1 inch above ground.

Reference mark number two is a standard disk stamped "KEPUHI 2 2 1948" set in the top of a 2-inch, iron pipe projecting 1 inch 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.

USCOMM-DC 27178-P88



# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1043  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

SEE STATION KAUHOLA

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KOHALA LATITUDE STATION  
ESTABLISHED BY: H.G.S. YEAR: 1881 STATE: HAWAII  
RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

This station is a brick and cement pier about 2 feet by 3 feet by 3 feet high, with a cross chiseled in the top. It is in good condition.

To reach the station pass the Kohala Sugar Co. mill and proceed to Kauhola Pt. Lighthouse. Station is about 10 feet from the lighthouse and 14.77 feet from station Kauhola. It was located by direction and distance from Station Kauhola.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KOHALA LATITUDE STATION  
ESTABLISHED BY: H.G.S. YEAR: 1881 STATE: HAWAII BENCH MARK(S) ALSO ☐  
RECOVERED BY: R. B. MELBY YEAR: 1978 COUNTY: HAWAII  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 4 MILES ENE OF HAWI

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 IN THE RECOVERY NOTE FOR STATION KAUHOLA (HGS), 1881 IN THE YEAR 1987.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KOHALA LATITUDE STATION

STATE: HAWAII

YEAR: 1881

SECOND

-ORDER

SOURCE: G- 9279

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 °14'57.875	ELEVATION:	9	METERS
GEODETIC LONGITUDE:	155 46 27.097	SCALED		FEET

STATE COORDINATES (Fwt)				
STATE & ZONE	CODE	X	Y	S FOR Δ #1 ANGLE °
HI 1	5101	406,011.78	514,330.35	- 0°05'42"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S FOR Δ #1 FORMULA NEGLECTING THE SECOND TERM

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

POSITION DETERMINED BY TRAVERSE FROM STATION KAUHOLA

QE 286



## HORIZONTAL CONTROL DATA

0 201553 STATION 1045  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-15 HAWAII

NO TEXT.

### ADJUSTED HORIZONTAL CONTROL DATA

STATE HAWAII

YEAR 1873

THIRD

-OR-

SOURCE: G-SP156

GEODETIC LATITUDE:	20 05 '20.636	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 43 11.716		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ or ANGLE °
HI 1	5101	424,538.34	456,068.65	- 0° 04' 32"

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

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

QO 241

Q0 241

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1046  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-1.5 HAWAII

## NO ORIGINAL TEXT

Kuilei (Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1913).—On the northern coast of Hawaii, in the northern part of Kamakua, land of Kawela, a little west of Kuilei Gulch, and a short distance above the trail to Waimea, on a not very pronounced hill directly inshore from Kamakamaka Point; the point, station *Kamakamaka*, and this station are about in line on bearing N. 6° W. Station is 3,150 meters from the point, about ¼ mile above the government road, and about midway between the post offices of Honokaa and Kukuihaele. From the station the inshore (left) tangent of the island off Kohala coast, about 15 miles distant, and the base of the cliffs between Waipio and Waimanu are on range, and bear N. 70° W. Also Honokaa mill and plantation camp "New Stables" on main road west of Honokaa post office are on range, and bear N. 61° E. To reach station start at plantation camp and go west along government road a short distance, turning up hill at first road, a private plantation road, into "Field 10," which name is marked on gate. Keep to this road for 200 meters, then turn to the right along the first trail branching off, following it for about 375 meters, or until the island range previously described is reached, then turn left into the cane field, 100 meters to top of hill. Station marked by an equilateral triangle of white concrete about 2.8 feet on side; in its center is a tablet of the United States Geological Survey, alongside of which a cast-iron pipe 5 inches in diameter and 2 feet high is set in the concrete. Station was covered by a large pile of stones. The old mark was a copper triangle underground and cylindrical block of concrete with drill hole in center, and the letters "H. G. S. 1881" in its top.

DEPARTMENT OF COMMERCE  
U. S. OCEANIC AND ATMOSPHERIC SURVEY  
Form 520

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: *Kuilei* STATE: *HAWAII* COUNTY: *Hawaii.*  
ESTABLISHED BY: *Hwa Govt Survey* YEAR: *1877* LOCALITY: *Northern Coast of Hawaii.*  
RECOVERED BY: *O. W. Swainson,* YEAR: *1932*

Detailed statement as to the fitness of the original description:

Station not visited, but signal erected by Hawaiian Government survey plainly visible.

\* 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.

11-7002

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: *KUILEI*

STATE: *HAWAII*

YEAR: *1877*

SECOND

ORDER

SOURCE: *G- 9279*

GEODETIC LATITUDE:	20 °05' 14.050	ELEVATION:	437.6 METERS
GEODETIC LONGITUDE:	155 30 12.025		1436 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	H OR Δ or ANGLE *
HI 1	5101	458,853.83	455,354.51	- 0 °00' 04 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PAAUHAU	290 57 34.9	290 57 39	5101

QE 131

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553 STATION 1046

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

KUILEI (continued)

## RECOVERY NOTE, TRIANGULATION STATION

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KUILEI

ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 STATE: HAWAII  
RECOVERED BY: L. O. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description: In 1881 the original station, consisting of a cylindrical concrete block, encased in corrugated iron, stamped H. G. S. 1881, was established. The subsurface mark was a copper triangle. In 1899 J. S. Emerson reset this post and made note that some uncertainty exists whether this post is in the exact spot it originally occupied. In 1913 E. R. Hand of the U. S. Coast & Geodetic Survey reported the station as being a U. S. Geological Survey Disk set in the top of a concrete triangle which was 2.8 feet on each side. In 1929 the Hawaii Territory Survey surrounded this station with a square slab of concrete which is 5 1/2 feet on each side and projects about 18 inches above the soil. A 2 1/2 inch iron pipe was reported to have been centered over the Geological Disk. The center of this pipe was used as the 1948 station; A new description follows--

The station is located on the summit of a small knoll in a sugar cane field about 7 miles east southeast of the mouth of Waipio Canyon, about 1.3 miles west of Honokaa, about 2 miles south of Kamakamaka Point, about 0.6 mile south southwest of The New Stables Camp, about 0.3 mile southeast of a line of trees and about 100 meters southwest of a dirt road.

To reach from the post office in Honokaa; go north on the road which leads toward Kukuihaele for 2.2 miles; turn left, onto a dirt road and go up grade, westerly, for 0.15 mile; take the right hand fork and go westerly for 0.5 mile to the top of a small hill and the end of truck travel. From this point pack southerly, through the cane field, for about 100 meters to the high ground and the station.

The station is the center of a 2 1/2 inch iron pipe which projects about 18 inches from the top of a square concrete platform which is about 5 1/2 feet on each side and projects about 18 inches above the ground.

Object	Distance	Direction
PAAUHAU (metal target)		00 00 00
Honokaa Stack, Honokaa Sugar Co.	3 miles NE	322 17 37.2
Paaubau Stack, Paaubau Sugar Co.	5 miles ENE	336 14 23.7
Honokaa Steeple, Catholic Church	1.5 miles E	350 51 32.5

An early recovery note reports; Original station recovered by A.O. Burkland in December 1911. Remarkd by bronze centered over mark in original rock marking station. Stamped Elev. 1431.

In 1899 J.S. Emerson found the concrete post and reset it in concrete. Some uncertainty existed as to wheather it was set exactly in the position of the old station.

NAME OF STATION: KUILEI

ESTABLISHED BY: H.G.S. YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: D.M. Whipp YEAR: 1966 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 in good condition. A complete description follows:

Station is located about 2 miles west of Honokaa, on a rise at about 1436 feet elevation in a cane field and about 175 feet north from the east end of a macadam landing strip.

To reach station from the post office in Honokaa, go west on Mamane St. for 2.4 miles to crossroad. Turn left and go upgrade for 0.55 mile; take right fork and go 0.25 mile to east end of the landing strip just after crossing Keaakaukau Gulch, and end of truck travel. Walk north down along crest of rise about 60 yards from edge of cutbank to station.

Station mark is a U.S. Geological Survey disk, no stamping is visible, set in concrete. A Type B-1 signal is centered over the mark, with the 6-foot-square, concrete platform extending 1 foot above ground. Sugar cane is planted nearly up to the station on all sides and no reference marks are set.

FORM C&G  
USC&G

181  
-P65

U.S. DEPARTMENT  
COAST AND GEODETIC SURVEY



# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

Q 201553 STATION 1048  
HAWAII  
LATITUDE 20° 00' TO 20° 30'  
LONGITUDE 155° 30' TO 156° 00'  
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
Form 532  
Rev. Aug. 1968

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LAHIKIOLA EAST STATE: HAWAII COUNTY: NORTH KOHALA DISTRICT HAWAII

CHIEF OF PARTY: L. C. WILDER YEAR: 1948 Described by: G. J. HOEPEL  
HEIGHT OF TELESCOPE ABOVE STATION MARK 1.4 METERS.1 HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE*	OBJECT	BEARING	DISTANCE		DIRECTION:
			feet	meters	
Pipe	PUU O NALE (metal target)				00 00 00
Pipe	R M 1	N	18.323	5.585	48 48 25
	Kauhola Staok	NE			50 50 19.8
	KAUHOLA POINT LIGHT	NE			53 54 20.36
Pipe	R M 2	ENE	18.169	5.538	157 17 54

The station is located on the eastern summit of a prominent volcanic knoll named Lahikiola, about 7 miles south southeast of Hawi, about 7 miles southeast of Mahukona, about 6 miles east of the west shore of the island and about 0.5 mile east of the road which runs between Hawi and Waimea.

To reach from the post office in Waimea; go north on the road which leads toward Hawi for 13.9 miles to the end of truck travel at the western base of the hill. From this point pass over the wire fence and peak easterly, up the steep slope, for about 0.3 mile to the western summit of the hill and triangulation station LAHIKIOLA. Then peak easterly along the south rim of the crater about 0.2 mile to the eastern summit and the station.

Reference mark number 1 is a standard disk, stamped 1 1948, cemented in the top of a 2 1/2 inch iron pipe which is driven into the ground. The mark is about the same elevation as the station and is flush with the surface of the soil.

Reference mark number 2 is a standard disk, stamped 2 1948, cemented in the top of a 2 1/2 inch iron pipe which is driven into the ground. The mark is about the same elevation as the station and is flush with the surface of the soil.

The station is the center of a 1 1/2 inch iron pipe, set in an irregular mass of concrete, which projects about 10 inches above the ground.

This station was remarked. by James B. Mann, a private surveyor. It is located near the old H.T.S. station called EAST LAHIKIOLA.  
OFFICE NOTE: See also LAHIKIOLA.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LAHIKIOLA EAST

STATE: HAWAII

YEAR: 1948

SECOND

ORDER

SOURCE: G- 9275

GEODETIC LATITUDE	20° 09' 03.354	ELEVATION	1031.0 METERS
GEODETIC LONGITUDE	155° 47' 59.790		3383 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ ANGLE
HI 1	5101	397,121.13	478,580.01	- 0° 06' 12"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
NUNULU 2	157 52 55.7	157 59 08	5101

QE 189

\* Refer to notes in manuals of triangulation and state publications of triangulation. 1 Direction-angle measured clockwise, referred to initial station.  
(To nearest meter only, when no trigonometric leveling is being done.) 10-58832-1 U. S. GOVERNMENT PRINTING OFFICE

(continued on next page)

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201553

STATION 1048

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

LAHIKIOLA EAST (continued)

FORM 326a  
(9-18-69)

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

R

NAME OF STATION: LAHIKIOLA EAST  
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		1.3 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				
NUNULU 2 -----1948 DISTANCE and					00	00	00.0
R.M. No. 1	N	18.323	5.585		31	12	54
Kohala Mill, stack	NE				33	14	48.8
R.M. No. 2	ESE	18.169	5.538	139	42	23	
NUNULU 2 1948 -----1967 DISTANCE and					00	00	00.0
R.M. No. 1	NNE	18.321	5.585		31	14	30
Kohala Mill, stack, 1948	NNE				33	14	49.7
R.M. No. 2	ESE	14.860	4.530	139	41	20	
LAHIKIOLA WEST (HTS) 1948	SW			260	12	20.2	

Station was recovered and all marks found in good condition, however a discrepancy of 1 meter was found in the distance to RM 2. A complete description follows:

Station is located about 12 miles northwest of Kamuela, 6-1/2 miles south-southeast of Hawi, 1-3/4 miles northwest of the Kahua Ranch Headquarters, 1/2-mile northeast of State Highway 25, and 1300 feet north-

west of the boundary fence between Parker Ranch and Kahua Ranch property, on the northeast rim of Lahikiola, an old volcanic crater of about 3383 feet elevation.

To reach station from the post office in Kamuela, go west on State Highway 25 for 2.1 miles; take right fork, State Highway 25, and go 9.3 miles to the Kahua Ranch driveway on right. Continue on the highway for 1.4 miles to a pipe gate on right, just past corrals. Pass through gate and follow field road north for 0.5 mile; turn left and go across pasture for 0.1 mile to fence and end of truck truck travel. Pack north up steep hill to top and station. A 20-minute pack.

Station mark is the center of a 1-1/2-inch, iron pipe that projects 1 foot from the top of a 16-inch-diameter, concrete monument flush with ground. "LAHIKIOLA 2 R" is inscribed in the top of the concrete. Station is about 75 feet north from highest point of the flat, grassy top, and about 2 feet lower.

Reference mark number one is a standard disk stamped "1 1948", cemented in the top of a 2-inch iron pipe flush with ground and about 2 feet lower than top of station pipe.

Reference mark number two is a standard disk stamped "2 1948", cemented in the top of a 2-inch iron pipe flush with ground and about 8 inches lower than top of station pipe.

Both reference marks are hidden by the heavy grass.

\*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 27172-P28



# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

0 201553 STATION 1049  
HAWAII  
LATITUDE 20° 00' TO 20° 30'  
LONGITUDE 155° 30' TO 156° 00'  
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
Form 825  
Rev. Aug. 1965

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LAHIKIOLA WEST STATE: HAWAII COUNTY: NORTH KOHALA DISTRICT  
(JBM)

CHIEF OF PARTY: L. G. WILDER YEAR: 1948 Described by: C. J. HOEPEL  
NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1.7 METERS.1 HEIGHT OF LIGHT ABOVE STATION MARK METERS.

Pipe	NOTE: Surface-station mark. Underground-station mark	OBJECT	BEARING	DISTANCE		DIRECTION:
				feet	meters	
Pipe		KEHENA				00 00 00
		R. M. 1	NNW	41.085	12.523	59 15 08
		Hawi, Stack (Hind)	NNW			79 51 23.8
		Kohala, Stack	NNE			109 34 02.9

The station is located on the summit and western rim of a prominent volcanic knoll by the name of Lahikiola, about 7 miles south southeast of Hawi, about 7 miles southeast of Mahukona, about 6 miles east of the west shore of the island and about 0.3 mile east of the road which runs between Waimea and Hawi.

To reach from the post office in Waimea; go north on the road which leads toward Hawi for 13.9 miles to the end of truck travel at the western base of the hill. From this point pass over the wire fence and pack easterly, up the steep slope, for about 0.3 mile to the western summit and the station.

The station is the center of a 2 1/2 inch iron pipe which projects about 2 inches from the top of a triangular slab of concrete. The triangular slab of concrete is about 7 feet on each side and projects about 1 foot above the ground.

Reference mark number 1 is a standard disk, stamped 1 1948, set into a drill hole in a boulder which is about 2 feet in diameter and projects about 1 foot. It is located about 3 feet lower than the station.

This station was remarked with a triangular concrete monument by H.T.S. in 1938. The mark found in 1938 was a 1-1/2-inch pipe put in by James B. Mann, a private surveyor. It was assumed in 1938 that the pipe replaced the original mark, a marked stone.

\* 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 the trigonometric leveling is being done.)  
16-6025-1 U. S. GOVERNMENT PRINTING OFFICE

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LAHIKIOLA WEST JBM

STATE: HAWAII

YEAR: 1948

SECOND

ORDER

SOURCE: G- 9279

GEODETIC LATITUDE	20 08 58.859	ELEVATION	1019.6 METERS
GEODETIC LONGITUDE	155 48 07.433		3345 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 1	5101	396,392.10	478,127.85	- 0 06 15

\* 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
KEHENA	82 40 01.3	82 46 16	5101

QE 147

(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 201553

STATION 1049

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

LAHIKIOLA WEST (JEM) (continued)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: LAHIKIOLA WEST (JEM)  
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

R

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 in good condition. The distance to the reference mark was checked and found to be correct. A complete description follows:

Station is located about 12 miles northwest of Kamuela, 6-1/2 miles south-southeast of Hawi, 1-3/4 miles northwest of the Kahua Ranch Headquarters, and 0.3 mile northeast of State Highway 25, on the summit of the southwest rim of Lahikiola, an old volcanic crater, and is at about 3345 feet elevation. Station LAHIKIOLA EAST, on the east rim of the hill, is at 3383 feet elevation.

To reach station from the post office in Kamuela, go west on State Highway 25 for 2.1 miles to fork. Take right fork, State Highway 25, and go 9.3 miles to the Kahua Ranch driveway on right. Continue on the highway for 1.4 miles to a pipe gate on right, just past corrals. Pass through gate and go north on field road for 0.5 mile; leave road and go northerly across pasture for 0.1 mile to end of truck travel at fence. Pack up steep hill to station on left rim. About a 20-minute pack.

Station mark is the center of a 1-3/4-inch iron pipe in the center of a triangular, concrete platform 7 feet on each side and projecting 4 inches above ground. The words "WEST LAHIKIOLA" are inscribed in the concrete platform. The station pipe has rusted off flush with the top of the platform.

Reference mark number one is a standard disk stamped "1 1948", cemented in a drill hole in the top of a 2-foot boulder projecting about 8 inches from ground, and is about 5-1/2 feet lower than station platform. It is 12.523 meters (41.085 feet) from the station, in azimuth 141° 55' 09".

AUG 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 201553 STATION 1050  
HAWAII  
LATITUDE 20 00' TO 20 30'  
LONGITUDE 155 30' TO 156 00'  
DIAGRAM NE 5-1.5 HAWAII

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: LORAN A TOWER

CHIEF OF PARTY: L.A. Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object:

The station is located about 3 miles northwest of HAWAII, about 1 mile west of Upolu Airport, and near Upolu Point.

The station is the top and center of a mast which belongs to the U. S. Coast Guard. The mast is painted red and white and is about 280 feet high.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: LORAN A TOWER

ESTABLISHED BY: L.A. Critchlow YEAR: 1977 STATE: Hawaii BENCH MARK(S) ALSO ☐

RECOVERED BY: R.B.M. YEAR: 1978 COUNTY: Hawaii

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 4 MILES WNW OF HAWAII

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

THE STATION IS LOCATED ABOUT 4 MILES WEST-NORTHWEST OF THE TOWN OF HAWAII, ON THE NORTHWEST SHORE OF THE ISLAND OF HAWAII AND AT THE U.S. COAST GUARD LORAN STATION.

THE STATION IS THE NORTH ONE OF TWO SKELETON STEEL TOWERS.

R

## ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: LORAN A TOWER

OBS BY NGS

STATE: HAWAII

YEAR: 1977

THIRD

-ORDER

G-16241  
SOURCE: OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 15 15.05651	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 53 22.95686		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ $\phi$ ANGLE *
HI 1	5101	366,418.61	516,143.12	- 0°08'06"

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

NOAA FORM 76-165  
(12-72)

OLD C&GS 5261 U. S. GOVERNMENT PRINTING OFFICE: 1976--665661/1133 REGION NO. 6

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

3M 106

## HORIZONTAL CONTROL DATA

Q 201553 STATION 1051  
HAWAII  
LATITUDE 20 °00' TO 20 °30'  
LONGITUDE 155 °30' TO 156 °00'  
DIAGRAM NE 5-15 HAWAII

NO ORIGINAL TEXT

### ADJUSTED HORIZONTAL CONTROL DATA

THE STATION IS THE SOUTH ONE OF TWO SKELETON STEEL RADIO TOWERS.

R

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

QF 482