HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1051 IIAWAH LATITUDE 19 °00' TO 19 °30' LONGITUDE 155 ° 30' TO 156 ° 30' DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KEET SOUTH BASE STATE:

HAWAII COUNTY: HAWAII

NOTE,	PARTY: L. C. WI		YEAR: 5.2	1948 METERS.1		icribed by: C.		DEPPI	EL ME
2	Surface-station mark, Underground-station mark Underground-station mark					ERENCE MARKS OUND AT THE S	AND PRO	MINENT	OBJEC
	OBJECT			BEARING	DIST	ANCE			
					foot	meters		DIRECTION:	
12a 12a	PALEMANO Sub Station A R M 1 R M 2 Boundary Monume	ent		NE 8	29.918 19.696	21.30 9.120 6.004 33.375	00 04 82 207 342	00 00 57 55 52	00

The station is located on a flat lava bed about 1 mile north of Honaunau Bay, about 0.4 mile east of the beach, 70 feet southeast of the center of a sattle guard, 69 feet south of a rock wall, 17.3 feet east of the centerline of the highway which runs between Napoopoo and Honaunau Bay and about 3 feet higher than the highway.

To reach from the post office at Napoopoe, go south on the road which leads to Honaunau Bay for miles to the station on the left hand side of the read.

The station is a standard disk, stamped KEEI S BASE 1948, set into a drill hole in flat lava bedrook.

Reference mark number 1 is a standard disk, stamped KEEI S BASE 11948, set into a drill hole in flat lava bedrock. It is located 14.7 feet east of the centerline of the highway and is about the same elevation as the station.

Reference mark number 2 is a standard disk, stamped KEEI S BASE No 2 1948, set into a drill hole in flat lava bedrock. It is located 14 feet east of the centerline of the highway and is about 2 feet lower than the station.

Substitute Station 'A' is the center of the intersections of the highway and the cattle guard. It is 1.33 meters lower than the station.

The boundary monument is a 1 inch iron pipe which projects about 1 foot from the top of a square concrete post. The concrete post is stamped J B M NEAME 1920. It is located on the south side of a rock wall, 27.4 feet west of the centerline of the highway and is about 2 feet lower than the station. This mark is believed to be a boundary marker for the Bishop Estate.

lefers to notes in manuals of triangulation and state publi

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION KEET SOUTH BASE

STATE HAWAII

YEAR 1948

SECOND

SOURCE G- 9279

GEODETIC LATITUDE: 19 26 14.852 GEODETIC LONGITUDE: 155 55 03.083	ELEVATION	42.7 140	METERS FEET
-------------------------------------------------------------------	-----------	-------------	----------------

STATE COORDINATES (Feet)							
STATE & ZONE	CODE	х	¥	P OR A BLANGLE			
HI 1	5101	356,151.26	219,554.54	- 0 08 20			
		712334		5.7			

COSTATION ON NOITATE OF	GEODETIC AZIMUTH (From waith)	PLANE AZIMUTH * (From south)	CODE
KALAPA	293 43 51.2	293 52 11	5101

JUN 1978

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

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

KEEI SOUTH BASE (continued)

FORM 5264

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEEI SOUTH BASE ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii YEAR: 1968 Hawaii RECOVERED BY: R.C. Munson COUNTY: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.64 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 DISTANCE DIRECTION OBJECT METERS FEET οó 00.0 _____1948 DISTANCE and DIRECTION----KALAPA 67 44 19 19.696 6.004 R.M. No. 2 41 58 Boundary Monument 33.375 202 NE 29.918 302 19 9.120 R.M. No. 1 KALAPA (HGS) 1884 -----1968 DISTANCE and DIRECTION------R.M. No. 2 Reawe (JEM) 1920 WANW 76.547 23.332 00 00 00.0 05 67 42 Keawe (JEM) 1920 202 34 12.2 Napoopoo Light 1928 221 9.124 46 50 R.M. No. 1 NE 302

Station was recovered and all marks found in good condition, however discrepancy of 10.043 meters was noted in the distance to Keawe (JEM) 1920; it was double-checked and the 1968 distance is correct. A complete description follows:

Station is located about 2-1/2 miles west-southwest of Honaunau, 2-3/4 miles south of Napoopoo Bay and 1 mile north of the City of Refuge

National Park, along east side of the macadam road leading to Napoopoo Bay. To reach station from the post office in Honaunau, go south on State Highway 11 for 1.7 miles to junction; turn sharp right and go downhill on State Highway 16 for 3.5 miles to road junction at the City of Refuge. Continue ahead, northerly, on macadam road for 0.8 mile to station on right, at cattleguard and stone fence.

Station mark is a standard disk stamped "KEEI S BASE 1948", cemented in a drill hole in lava bedrock on low mound about 3 feet higher than road. It is 17 feet east of center line of road and 71 feet south-southeast of center of cattleguard.

Reference mark number one is a standard disk stamped "KEEI S BASE

NO 1 1948", cemented in a drill hole in bedrock at same elevation as station mark and 4 feet northeast of the base of a clump of large thorn

Reference mark number two is a standard disk stamped "KEEI S BASE NO 2 1948", cemented in a drill hole in the south end of the same lava rise the station is on . It is 14 feet east of center line of road and about 1 foot lower than station mark.

Keawe (JEM) 1920 is a 1-inch iron pipe, projecting 14 inches from a 10 x 10-inch concrete block with "KEAWE.S JBM 1920", inscribed in it. It is 16 inches south of stone wall, 9 feet north of a metal gate, 27 feet west of center line of road, and at same elevation as station mark.

uty should be inserted here. The officer who actually visited the station should sign his name at the end *Name of ch. of the recove.

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

STATION 1051 QUAD 191553 TO LONGITUDE TO

DIAGRAM

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1052 I IAWAH LATITUDE 19 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5 HAWAII

Keokea (Hawaii Island, E. R. Hand, 1928).—On western coast of Hawaii, in the district of Keokea, Kona, by the sea, about I mile south of Honaunau Bay (City of Refuge), at the head of an indentation sometimes known as Pukakio Bay, 150 meters east-northeast from the point where the ancient but well-marked trail climbs the low cliff on the way south from the City of Refuge, and 50 meters back southeast from the same cliff that trends north and south. Station is on top of a prominent lave bubble which rises abruptly from the surrounding flat to an elevation of 120 feet. Marked by a standard disk station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEOKEA ESTABLISHED BY: E.R. Hand RECOVERED BY: R.C. Munson YEAR: 1968

YEAR: 1928 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

STATE Hawaii BENCH MARK(S) ALSO COUNTY: Hawaii 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 in good condition. Located about 2-1/2 miles southwest of the post office at Honaunau and 3/4-mile southeast of Honaunau Bay and the City of Refuge, above the cliff at Alahaka Bay and about 600 feet east of the sea, at about 125 feet elevation, on a brokenup lava mound about 10 feet higher than surrounding area.

To reach station from the City of Refuge Headquarters Building, go southerly on track road along beach for 0.3 mile to end of road at stone fences. Pack southeast along good trail for about 1/4-mile to where trail goes up onto south end of cliff. Leave trail and go northeast along rim about 150 yards, then go right about 50 yards to station.

about 150 yards, then go right about 50 yards to station.
Station mark is a standard disk, unstamped, cemented in a drill hole

at southwest side of the lava mound, about 40 feet from highest point.

FORM C&G\$-\$26 (1-65)

U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION KEOKEA

STATE HAWAII

YEAR 1928

THIRD

- DADEA

SOURCE G-SP156

GEODETIC LONGITUDE 155 54 26-478		 	
7.22	19 25 02.649 155 54 26.478	45	WETERS FEET

STATE COORDINATES (Feet)							
STATE & ZONE	CODE	х	٧	H IOR A DI ANGLE			
HI-1	5101	359,637.27	212,262.56	- 0°08'08			

PLANE AZIMUTH HAS BEEN COMPUTED BY THE B OR A FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH	FLANE AZIMUTH *	CODE
· · · · · · · · · · · · · · · · · · ·	* *	(8)	
		1	

Q3 275

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1053
HAWAII
LATITUDE 15 00' TO 15 05'
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE U. S. COAST AND GEODETIC SURVEY FORM \$25 DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KEOPUKA . STATE:

HAWAII COUNTY: HAWAII

NOTE,	PARTY: L. C. WI		1948 METERS.1		escribed by: O.		EPP	EL.
2	Surface-station mark, Underground-station mark	DISTANCES AND DIRE	CTIONS TO AZIM	IUTH MARK, RE EN FROM THE C	FERENCE MARKS ROUND AT THE	AND PROSTATION	MINENT	OBJECTS
	OE	JECT	BEARING	DIS	TANCE		DIRECT	towa .
				foot	meters	DIRECTIONS		
12a	PUU OHAU R. M. 1 KEAWEKAHEKA R. M. 2	0.2 mile	n SSE SSE	15.835 42.049	4.828	00 23 162 169	00 27 38 07	00 26 04.12

The station is located on the summit of a low lava mound about 2.5 miles south of Keikiwsha Point, about 2.5 miles west northwest of Napoopoo, about 2 miles south of the North and South Kona boundary line and about 300 feet east of the westernmost edge of Keawekaheka Point.

The station is best reached, by boat, from Napoopoo. A calm landing can be made at the Captain Cook Monument. From the monument pack westerly along the beach for about 1.5 miles, then northerly for about 0.2 mile to the station. Four trees are in a small depression about 0.1 mile north of the station. The last water is at a house near the Captain Cook Landing.

The station is a standard disk, stamped KEOPUKA 1946, set into a drill hole in bedrock which projects about 7 feet.

Reference mark number 1 is a standard disk, stamped KECPUKA 1 1948, set into a drill hole in bedrock which projects about 6 feet. It is located about 1 foot lower than the station.

Reference mark number 2 is a standard disk, stamped KEOPUKA 2 1945, set into a drill hole in flat bedrock. It is located 7.46 feet lewer than the station.

*Refers to notes in manuals of triangulation and state publications of triangulation.

| To nearest meter only, when ne trigenement is leveling is being done.

| 10 - 4000-1 | 1. a. command reasons one

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION. KEDPUKA

STATE HAWAII

YEAR 1948

SECOND

SOURCE. G- 9279

GEODETIC LATITUDE: GEODETIC LONGITUDE:		25.746 09.162	ELEVATION:	12.8	METERS:

STATE COORDINATES (First)						
STATE & ZONE	CODE	х	¥	8 ONA GLANGLE		
HI 1	5101	344,135.68	238,841.92	- 0 09 04		

PLANE AZIMUTH HAS BEEN COMPUTED BY THE |g| (OR Δ | FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZINUTH* (From south)	CODE
PUU OHAU	172 43 31.4	172 52 35	510 1

HORIZONTAL CONTROL DATA

by the NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM-

KEOPUKA (continued)

FORM \$260 (9-18-50)

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEOPUKA ESTABLISHED BY: L.C. Wilder ' YEAR: 1948 STATE: RECOVERED BY: R.C. Munson . YEAR: 1968 Hawaii COUNTY: Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.63 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 DISTANCE DIRECTION BEARING OBJECT FEET and DIRECTION ---о́о _____1948 DISTANCE PUU OHAU 27 38 07 162 15.835 4.828 R.M. No. 1 04.1 SSE KEAWEKAHEKA 12.817 169 13 42.049 SSE R.M. No. 2 PUU OHAU (HGS) 1883 -----1968 DISTANCE and DIRECTION----R.M. No. 1 15.822 4.822 00 00.0 23 55 12 R.M. No. 1 08.5 Kealakekua, Radio KONA, mast KEAWEKAHEKA (HGS) 1891 NE 38 09 05.8 169 06 42.045 12.816 R.M. No. 2

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

Station is located about 2-3/4 miles southwest of Kealakekua and 6000 feet west-northwest of the Captain Cook Monument; on Keawekaheka Point, on a prominent lava knoll about 42 feet above sea level. It is 50 feet east of old heeiau, about 250 feet south of a sand area with a

clump of kiawes on it, and about 350 feet east of sea bluff.

To reach station from the post office in Kealakekua, go south on State Highway 11 for 0.75 mile to power pole 135. Turn sharp right and go down grade on macadam track road for 0.3 mile to board gate on left. Pass through gate and go 0.15 mile to locked gate; pass through gate and continue on field road for 0.65 mile to gate; pass through gate, take left fork, and go 0.25 mile to fork. Take left fork, go 30 yards to gate, pass through gate and go 0.55 mile to gate; pass through gate and go 0.3 mile to gate in stone wall. Pass through gate and continue ahead on old track road for 0.3 mile to T-junction. Go left along coast for 0.25 mile to board gate. Pass through gate and continue for 0.2 mile to side road right. Go right, along edge of laws flow, for 0.2 mile to end of truck

poard gate. rass through gate and continue for 0.2 mile to side road right. Go right, along edge of lava flow, for 0.2 mile to end of truck travel at trees. Pack southerly about 1/2-mile to station.

Station mark is a standard disk stamped "KEOPUKA 1948", cemented in a drill hole in bedrock on top of mound, the highest point in vicinity. Reference mark number one is a standard disk stamped "KEOPUKA 1 1948", cemented in a drill hole in bedrock about 10 inches lower than station mark. Reference mark number two is a standard disk stamped "KEOPUKA 2 1948",

cemented in a drill hole in a large, flat, smooth, lava area, 7.3 feet lower than station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KEOPUKA

STATE: Hawaii BENCH MARK(8) ALSO COUNTY: Hawaii YEAR: 1948-ESTABLISHED BY: L.C. Wilder YEAR: 1972 . RECOVERED BY: GEH -

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station mark and Reference marks 1 and 2 were recovered as described by R.C.Munson (1968) in good condition.

QUAD 191553

STATION 1053

LATITUDE LONGITUDE DIAGRAM

TO TO

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1054
HAWAII
LATITUDE 19 00' TO 19 030'
LONGITUDE 155 30' TO 156 00'
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

Kipaepae (Hawaii Island, Hawaiian Government Survey, 1898; E. R. Hand, 1914).—On the southern coast of Hawaii, on southern Ka-u, on the slope, 3½ miles south by west from Honuapo Wharf, 780 meters in from the edge of the 180-foot cliffs, and 1,450 meters N. 17° E. from the point where these cliffs turn inshore, north of a lava flat, and about 90 meters north of a stone wall on the upper or mauka side of a pasture. Marked by a cross cut in the solid rock, over which is a 10-foot cairn with 12-foot base, terraced, and painted white.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Kipaepae ESTABLISHED BY: H.G.S. YEAR: 1898 LOCALITY: Kau, Hawaii RECOVERED BY: Chas.L. Murray YEAR: 1938 R

Detailed statement as to the fitness of the criginal description:
Location of station: In the southern part of Hawaii about 3 1/2 miles southwest of Honuapo wharf and about 2 miles below or southeast from Naalchu
Village. Best approach is by taking the road that goes down from the plantation store and theatre. This road stops at a point about 1/2 mile from the
station.

Old mark found: Drill hole in + cut in pahoehoe in terraced stonepile 10-feet high.

New station mark: 10-foot 2 1/2" pipe set in concrete over mark with standard metal target. The stonepile was rebuilt as follows: First terrace 16 feet in diameter about 4 feet high; Second terrace, 8 feet in diameter and about 5 feet high completely plastered with mortar and co-crete platform on top.

DEPARTMENT OF COMMERCE U. 1. COMMERC

R

NAME OF STATION: KIPAEPAE

ESTABLISHED NY: HAWAIIAN GOVT. YEAR: 1898 STATE:
RECOVERED NY: **L. C. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description: In 1939 the original station was reported to have been recovered by the Territory Survey Department. Also in 1939 a 2 1/2 inch pipe was reported to have been centered over the original station and the cairn was plastered with mortar and a concrete platform was built on top. The center of this pipe was used as the 1949 station. A new description follows—

The station is located about 4 miles south southwest of Honuapo, about 2 miles south southeast of Naalehu, about 0.7 mile north of the sea, about 100 yards west of a rock wall and at the end of a dim track road. Higher ground is to the north.

To reach from the post office at Naalehu; go south, on the paved road, for 0.15 mile to the end of the pavement; continue straight ahead, on a dirt road, for 0.05 mile; pass through a board gate and follow the dirt road southerly, passing through the village dump, for 1.7 miles; pass to the left hand side of a large wooden tank and continue southerly, on a dim track road, for 0.2 mile; pass to the left hand side of a steel boiler and continue southerly for 0.4 mile to the end of the road and the station.

The station is the center of a 2 1/2 inch pipe which projects about 2 feet from the top of a circular stone and concrete platform which is about 7.5 feet in height and about 8 feet in diameter. The stone and concrete platform rests on a circular base of stones which is about 16 feet in diameter and about 3 feet high.

Object

Direction

Distance

KAMILO (metal target) AKIHI (metal target) KAMEHAME 1939 (metal target)

93 30 59.8 NW 196 47 12.3 NE

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KIPAEPAE

MANAII

YEAR 1898

SECOND

0005

SOURCE G- 9279

19 02 16.794 DECODETIC LONGITUDE 155 34 20.973	ELEVATION	141.7	METERS FEET
---------------------------------------------------	-----------	-------	----------------

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	×	· ·	PIORA DI ANGLE
HI 1	5101	474,963.93	74,324.90	- 0 01 25
		or consider		4.5.2

PLANE AZIMUTH HAS BEEN COMPUTED BY THE | heta| OF $|\Delta|$ 4 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KAMILO	25 05 53.6	25 07 19	5101

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

STATION 1054 QUAD 191553 ' TO LATITUDE

TO LONGITUDE DIAGRAM

KIPAEPAE (continued)

RECOVERY NOTE, TRIANGULATION STATION

KIPAEPAE NAME OF STATION:

HGS ESTABLISHED BY:

D.M. Whipp

YEAR: 1898 YEAR: 1967 AIRLINE DISTANCE AND DIRECTION PROM NEAREST TOWN

Hawaii BENCH MARK(S) ALSO STATE: COUNTY: Hawaii

Island: Hawaii

Detailed statement as to the titness of the original deactiption; including marks found, stampings, changes made, and other pertinent facta;

Station was recovered in good condition. A complete description follows:

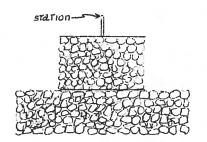
Station is located in the southern part of the island, about 2 miles south-southeast of Naalehu and 1/2-mile northwest from coast-line, at

about 465 feet elevation, in brushy pasture land.
To reach station from the post office in Naalehu, go east on State
Highway 11 for 0.1 mile; turn right, go 50 yards, then take left fork
and go 0.15 mile to fork. Take left fork and go 0.5 mile to locked gate and go 0.1) mile to fork. Take left fork and go 0.5 mile to focked gave after passing dump. Pass through gate and continue for 0.25 mile; take left fork and go 0.4 mile to board gate. Pass through gate and go 0.5 mile to board gate on right fork. Pass through gate and continue, on right side of stone wall, for 0.55 mile to dim left fork. Take left fork and go 0.2 mile to board gate. Pass through gate, turn right, along fence, and go O.1 mile to station.

Station is the center of a 2-1/2-inch iron pipe that projects 2 feet from the center of a circular, stone and concrete platform 8 feet in diameter and extending 5 feet above a larger stone and concrete base that is 16 feet in diameter and extends 4 feet above ground. A removable, red and white metal target 8 feet tall sets in the station pipe Station is 30 feet southwest of track road, 400 feet southwest of a stone wall and 60 yards southeast of a fence line.

NOTE: Key for locked gate was obtained at the Hawaiian Ranch Co.

office in Naalehu.



'	U.S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY FORM 9-1165 (Rev. 12-74)	REPORT ON						OFFICE
	STATE Hawaii	C	OUNTY Hawai	1	QUADRANG	£		
	STATE Hawaii Quote PRIMARY REFEREN	CE Station i	s located a	Dout 4 mi.	S. SW. O	f Honuar	00	
	_ (Listed							
	DESIGNATION STAMPED			TYPE OF MAR	K: BM	. TT	TRIANG	. X
	REMARKS OR REVISED DE	20.973" 465 feet	Destroyed Not Found	ondition.	USGS USC&GS USNPS USGLO USBLM		USBR State GS USNFS	
	SUBMITTED BY YUK10 TITLE CARLO AGENCY USGS. Marks found in good condition	grapher		INFORMATION	DATE 1/2	6/78		

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 151553 STATION 1055
HAWAI I
LATITUDE 15 °00' TO 19 °30'
LONGITUDE 155 °30' TO 156 °00'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION KIPAHOEHOE

STATE HAWAII

YEAR 1884

THIRD

ORDER

SOURCE G-SP156

GEODETIC LATITUDE: 15 %15 / 13-153 GEODETIC LONGITUDE: 155 53 17-122	ELEVATION.	METERS FEET
----------------------------------------------------------------------	------------	----------------

STATE COORDINATES (Frei)				
STATE & ZONE	CODE	×	· ·	B OH A G ANGLE
Hī 1	5101	360,142.34	152,781.64	- 0 07 41

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE ~ heta~ I or $\Delta~$ at formula neglecting the second term,

TO STATION OR OBJECT	GEODETIC AZIMUTH (From seath)	PLANE AZIMUTH *	CODE
		5. 7.	

QO 264

HORIZONTAL CONTROL DATA

National Ocean Survey Old Hawaiian Datum QUAD 191553 HAWAII STATION 1056 LATITUDE 19 ° 00' TO 19 ° 30' LONGITUDE 155 . 30 TO 156 . 00

NOAA FORM 76-39 (12-70) (FORMERLY CAGS FORM 525)

NAME OF STATION: KUKU

NEAREST TOWN: Kealia -

GEH ·

SURFACE-STATION MARK NDERGROUND-STATION MARI

RM NO. 1

RM NO. 2

HEIGHT OF TELESCOPE ABOVE STATION MARK

CHIEF OF PARTY

U.S. DEPARTMENT OF COMML. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DESCRIPTION OF TRIANGULATION STATION

coast of Hawaii Island about 11.5 miles south Kealakekua

Pack easterly to the lava protrusions and the station.

and is surrounded on the south and east by low brush.

protrusion at about the same elevation as the station.

four feet lower than the station.

HOOKENA, PUIWA, AND WAIKAKUU 4.

To reach station from Assis, travel south on State Highway 11 to Alae School, continue south for about 1.1 miles to the Pebble Beach Estates road on the right. Turn right and travel down the paved sideroad, the beach and the end of truck travel. Pack southerly across the end of a small bay and continue along the shoreline for approximately 2 mile to

a point west of twin lava protrusions rising about 3 feet above the surrounding lava flow and 200 feet inshore to the sea bluff.

Reference mark No. 2 is a standard disk stamped "NO. 2 1972" cemented in a drill hole atop the eastern lava

Station is a standard traverse disk stamped "KUKU 1972" cemented in a drill hole atop the western lava protrusion,

Reference mark No. 1 is a standard disk stamped "NO. 1 1972" cemented in a drill hole in lava rock approximately

This station was located by intersection from stations

Bay and 6.5 miles south of the town of Kealia.

STATE; Hawaii -COUNTY:

Hawaii -

QUADRANGLE NO. 191553 -YEAR: 1972 - D

BEARING

WSW

Station is located in a lava flow on the western

To reach station from Kealia, travel south on State

SE

DESCRIBED BY: RDB

5.088

2.464

METERS, 1 HEIGHT OF LIGHT ABOVE STATION MARK

DISTANCE

FEET METERS

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEM FROM THE GROUND AT THE STATION

16.69

8.08

NAME OF STATION

ADJUSTED HORIZONTAL CONTROL DATA

DIAGRAM NE 5-1.5

OBS BY NGS

IIAWAH STATE

1972

SECOND

G-14950

19°18'34:12009 SCALED GEODETIC LATITUDE 155 53 24.20427 FEET GEODETIC LONGITUDE

		STATE COORDINATES (Feet)		
STATE & ZONE	CODE	×	¥	HIGH A GI ANGLE
HĪ 1	5101	365,509.36	173,055.66	- 0 07 44
		10.00		

PLANE AZIMUTH HAS BEEN COMPUTED BY THE | heta| FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From smith)	coo€
	8: / M		

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

Refers to notes in manuals of trinagulation and state publications of trinagulation. Direction-angle menaused clockwise, referred to initial station 170 nearest neter only, when no trigonometric leveling is being done.

RL 185

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 151553 STATION 1057

HAWAII
LATITUDE 15 000' TO 15 030'
LONGITUDE 155 30' TO 156 000'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION LA ULA

IIAMAH HAMAII

YEAR 1890

THIRD

oente

SOURCE G-SP156

DEODETIC LATITUDE: 19 14 25.049 DEODETIC LONGITUDE: 155 46 22.915	ELEVATION	METERS FEET
-------------------------------------------------------------------	-----------	----------------

STATE COORDINATES (FWI)				
STATE & ZONE	CODE	×	· ·	H OR A H ANGLE
HI 1	5101	405,820.00	147,853.72	- 0 05 24
	1 1			

 $^{\circ}$ PLANE AZIMUTH HAS BEEN COMPUTED BY THE $~\theta~$ IOR $\Delta~$ of FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From worth)	CODE
		1	

Q3 285

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1058 TIAWAH LATITUDE 19 °00' TO 19 °30' LONGITUDE 155 030' TO 156 00' DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Lae Loa (Hawaii Island, Hawaiian Government Survey, 1884; E. R. Hand, 1913).—On west coast of Hawaii, Kona District, on the outermost part of the great rounding point 1½ miles south of Honaunau Bay, 1½ miles northwest from Hookena, and about 25 meters from waters edge on west. Marked by an iron bolt driven into a crack in the rock, and sourrounded by four equidistant crosses, the lines connecting these crosses diagonally intersecting at the station. A large cairn was erected over the station and painted white.

DEPARTMENT OF COMMERCE
U.E. COLUMN ON COCCUMENTAL
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U.E. COLUMN ON COCCUMENTAL

NAME OF STATION: LAE LOA

ESTABLISHED BY: Hawaiian Govt. YEAR: 1884 STATE: RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the Sinces of the original description: The original station, consisting of an iron bolt driven into a crack in the rock, was not recovered. The station

which was found is a badly rusted iron pipe projecting from the top of a mound of concrete and rock. A new description follows—

The station is located near the outermost point of a great, rounding, point which lies about 2 miles south of Honaunau Bay, about 1.5 miles northwest of Hookena and about 75 feet east of the beach. Area to the west of the station is solid rock while the area to the east is brush and

To reach the station from the stone wharf in the village of Hookens; go north, on the graded road for 0.1 mile; turn left and go west for 0.1 mile; turn right and follow beach road for 0.1 mile; pass old stone church and continue northerly for about 0.5 mile to an old rock wall and the end of truck travel. From this point pack northerly, along the rocky coast line for about 1.0 mile to the station.

The station is the center of a rusted pipe which projects about 1 foot from the top of a mound of concrete and rock which is about 2 feet high.

Reference mark number 1 is a standard disk, stamped LAE LOA NO 1 1948, set into a drill hole in solid, lava, bedrock which is flush with the surrounding rock. It is located about 50 feet east of the sea and is 4.29 feet lower than the station.

The Azimuth Mark is a standard disk, stamped LAE LOA 1948, set

into a drill hole in solid bedrock which is flush with the surrounding rock. It is located about 0.25 mile south of the station, about 80 feet east of the sea and about 50 feet west of the edge of the brush.

Object	Distance	Direction
PUU OHAU (metal target) Napoopoo Lighthouse Azimuth mark R. M. 1 SW	About 6 miles NNW About 0.25 mile 8	00 00 00 02 34 56.1 179 53 06.6

An early recovery note reports: In 1923 J.B. Mann recovered the bolt undisturbed and remarked the station with a 2 inch pipe set in concrete.

SECOND

SOURCE G- 9279

STATE HAWAII

NAME OF STATION LAE LOA

19 24 03.665 SEODETIC LATITUDE ELEVATION 8.2 METERS 155 54 47.264 GEODETIC LONGITUDE 27

ADJUSTED HORIZONTAL CONTROL DATA

STATE COORDINATES (Feet)					
A AF ANGLE					
08 14					
)					

PLANE AZIMUTH HAS BEEN COMPUTED BY THE & ICR & & FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (Fiem south)	PLANE AZIMUTH * (From south)	CODE
AZIMUTH MARK	540 16 50.1	340 25 04	5101
			- 77

QE 065

(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

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

QUAD 191553

STATION 1058

' TO LATITUDE / TO LONGITUDE DIAGRAM

LAE LOA (continued)

FORM 5264 (8-18-89)

ESTABLISHED BY:

RECOVERED BY:

HGS

RECOVERY NOTE, TRIANGULATION STATION

Teland: Hawaii

NAME OF STATION: LAE LOA YEAR: 1884 Hawaii STATE: COUNTY: Hawaii R.C. Munson ' YEAR: 1968

	T-0-T	arra b reasons	-				
		EIGHT OF LIGHT				METERS	4-
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, FROM THI	REFERENCE MAP E GROUND AT TH	KS AND PROMINE E STATION	NT OBJECTS WH	ICH CAN	BE SEI	žN	
		DIST	HCE		DIRECT		
OBJECT	BEARING	PEET	METERS	'	DIRECT	ION	4
PUU OHAU (HGS) 18831948	DISTANCE	and direct	ion	oô	oó	00.0	
Napoopoo Light, 1928	NNW			02	34	56.4	П
Azimuth Mark	S	about O	25 mi.	179	53	08.0	П
R.M. No. 1	SW	49.206	14.998	259	53	46	
PUU OHAU (HGS) 18831968	DISTANCE	and DIREC	rion	00	00	00.0	H
Napoopoo Light, 1928	NNW			02	34	54.0	•
RM No. 2	NNW	40.014	12.197	13	48	54	
Asimuth Mark	SSE	about 1	/4-mile	179	53	22.9	
RM No. 1	WSW -	49.191	14.994	259	52	49	-

Station was recovered; RM No. 1 and the azimuth mark were found in good condition, but the stone and concrete dome in which the station pipe was set was found to be cracked, although still solid. It was repaired and re-enforced with additional stones and concrete, and a station disk was set in the center of the pipe. The angle to the azimuth mark failed to check by 15 seconds. A complete description follows:

Station is located about 3-1/2 miles southwest of the post office at Honaunau, 1-1/2 miles south of the City of Refuge and 1-1/2 miles northwest of Hookena village, near the sea, on a low rock mound on Loa Point, at west edge of brush line.

To reach station from the post office at Honaunau, go south on State Highway 11 for 3.9 miles to Hookena School; continue on the highway for 0.4 mile to fork and sign "HOOKENA". Take right fork and go 2.25 miles to track crossroad, just before reaching Hookena. Turn right and go through trees and along beach road for 0.35 mile to board gate at house, and end of truck travel. Pack northerly along seacoast about 1-1/4 miles and end of truck traver. Fact notherly along seatcast of the care to station. (NOTE: A key may be obtained for the gate from Mc Candless Ranch, however the old road shown on maps is overgrown with large brush, and station is best reached by following coast and avoiding brush.)
Station mark is a standard disk stamped "LAE LOA HGS 1884 1968", set in concrete in top of the original 2-1/2-inch iron pipe, in the top of a

3-foot-diameter, stone and concrete mound that projects 2 feet above ground. It is about 125 feet east of sea bluff, at edge of brush, and about 27 feet above sea level.

Reference mark number one is a standard disk, unstamped, cemented in a drill hole in smooth lava, about 75 feet east of sea and 6 feet lower than station mark.

Reference mark number two is a standard disk stamped "LAE LOA HGS 1884 NO 2 1968", cemented in a drill hole in bedrock, 3 feet lower than station mark.

Azimuth mark is a standard disk, unstamped, cemented in a drill hole in bedrock, 80 feet east of sea and 50 feet west of edge of brush. *Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end

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

RECOVERY NOTE, TRIANGULATION STATION

BLISHED BY: HG; IVERED BY:* GE		1972 · COUNT	r: Hawaii			
	DIRECTION FROM NEARES					
	OVE STATION MARKTripo		HEIGHT OF LI	GHT ABOVE STAT	TION MARK	FEET
DISTANCES AND D	IRECTIONS TO AZIMUTH MAR	K, REFERENCE MAR	KS AND PROMI	NENT OBJECTS W	HICH CAN BE	SEEN
	PROMI	HE GROUND AT THE		TANCE		
	OBJECT	BEARING	FEET	METERS	DIRE	CTION
	Trade Language			was and		. "
Azimuth	Mark .				00 00	00.0-
LAE MAMO					1 07	26.8
RM 1 ·	-/-		49.55	15.104	79 57	40.2
RM 2			40.19	12.251	193 55	33.2
FORM 9-1165 (Rev. 12-76)	lt o	PERMANENT		OHADRA NATE 3	31	ea Office
FORM 9-1165 (Rev. 12-76)	REFERENCE near the	COUNTY Hawaii		QUADRANGLE 3	31	EA OFFICE
FORM 9-1165 (Rev. 12-76)	LI CONTRACTOR OF THE CONTRACTO	COUNTY Hawaii outermost poi	nt 2 mi S. Direction and dis	QUADRANGLE 3 of Honauna	1 Iu Bay	
FORM 9-1105 (Ret. 12-76) STATE HAWAS QUOTE PRIMAR	REFERENCE near the	COUNTY Hawaii Outermost poi	nt 2 mi S. Direction and dis	QUADRANGLE 3 of Honauna	1 Iu Bay	EA OFFICE
FORM 9-1105 (Rev. 13-14) STATE Hawa: QUOTE PRIMAR: Designation {	LI CONTRACTOR OF THE CONTRACTO	COUNTY Hawaii Outermost poi	nt 2 mi S. Direction and dis	QUADRANGLE 3 of Honauna tance) BM TT ESTABI	LISHED BY	
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation {	LISTED LAE LOA STAMPED	CONDITION Disturbed	nt 2 mi S. Direction and dis	QUADRANGLE 3 of Honauna tance) BM TT Estable USGS	iu Bay	ANG. X
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED	COUNTY Hawaii Duttermost poi	nt 2 mi S. Direction and dis	QUADRANGLE 3 of Honauna tance) BM TT Establi	TRIL	ang. X
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED 24 03.665	CONDITION Disturbed	nt 2 mi S. Direction and dis	QUADRANGLE 3 of Honauna tanes) BM TT ESTABL USGS USCAGS USNPS USCAGS	Tau Bay Tau Lished by USBR State G USNFS	ang. X
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED 24 03.665	COUNTY Hawaii Duttermost poi	nt 2 mi S. Direction and dis	QUADRANGLE 3 of Honauna tanes) BM TT ESTABL USGS USCAGS USNPS USCAGS	TRU LISHED BY USBR	ang. X
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED 24 03.665	COUNTY Hawaii Duttermost poi	nt 2 mi S. Direction and dis	QUADRANGIE 3 of Honauna tanes) BM TT ESTABI USGS □ USCAGS USNPS □ USGLO	Tau Bay Tau Lished by USBR State G USNFS	ang. X
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED • 24 • 03.665 • 54 • 47.264 27 feet	COUNTY Hawaii Outermost poi	nt 2 mi S. Direction and dis	QUADRANGLE 3 Of HONAUMA ABRON BM TT ESTABLE USGS USGAGS USGAGS USGLO USBLM	TRU LISHED BY State G USNFS	s D
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED • 24 . 03.665" • 54 . 47.254" 27 . feet EVISED DESCRIPTION:	COUNTY Hawaii DULTERMOST POINT CONDITION Disturbed Destroyed Not Found	nt 2 mi S. Direction and dis	QUADRANGLE 3 Of HONAUMA ABRON BM TT ESTABLE USGS USGAGS USGAGS USGLO USBLM	TRU LISHED BY State G USNFS	s D
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED • 24 • 03.665 • 54 • 47.264 27 feet	COUNTY Hawaii DULTERMOST POINT CONDITION Disturbed Destroyed Not Found	nt 2 mi S. Direction and dis	QUADRANGLE 3 Of HONAUMA ABRON BM TT ESTABLE USGS USGAGS USGAGS USGLO USBLM	TRU LISHED BY State G USNFS	s D
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED • 24 . 03.665" • 54 . 47.254" 27 . feet EVISED DESCRIPTION:	COUNTY Hawaii DULTERMOST POINT CONDITION Disturbed Destroyed Not Found	nt 2 mi S. Direction and dis	QUADRANGLE 3 Of HONAUMA ABRON BM TT ESTABLE USGS USGAGS USGAGS USGLO USBLM	TRU LISHED BY State G USNFS	s D
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED • 24 . 03.665" • 54 . 47.254" 27 . feet EVISED DESCRIPTION:	COUNTY Hawaii DULTERMOST POINT CONDITION Disturbed Destroyed Not Found	nt 2 mi S. Direction and dis	QUADRANGLE 3 Of HONAUMA ABRON BM TT ESTABLE USGS USGAGS USGAGS USGLO USBLM	TRU LISHED BY State G USNFS	s D
FORM 9-116 (Rev. 13-1) STATE Hawa: Quote Primar Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED • 24 • 03.665. • 54 • 47.264. 27 • feet EVISED DESCRIPTION: on mark and RM's we intion by R. C. Muni	COUNTY Hawaii DULTERMOST POINT CONDITION Disturbed Destroyed Not Found	nt 2 mi S. Direction and dis	QUADRANGLE 3 Of HONAUMA ABRON BM TT ESTABLE USGS USGAGS USGAGS USGLO USBLM	TRU LISHED BY State G USNFS	s D
Poem 9-1166 (Rev. 13-10) STATE Hawa: Quote Prinale Designation { Lat. 19 Long. 155	LISTED LAE LOA STAMPED • 24 . 03.665" • 54 . 47.254" 27 . feet EVISED DESCRIPTION:	COUNTY Hawaii DULTERMOST POINT CONDITION Disturbed Destroyed Not Found	nt 2 mi S. Direction and dis	QUADRANGLE 3 Of HONAUMA LABOR) BM TT USGS USCAGS U	Tau Bay Tau LISHED BY USBR USBR USBR Cother)	s D
CRW. 18-70 STATE Hawa: Quote Primare Designation { Lat. 19 Long. 155 Elev	LISTED LAE LOA STAMPED • 24 • 03.665. • 54 • 47.264. 27 • feet EVISED DESCRIPTION: on mark and RM's we intion by R. C. Muni	COUNTY Hawaii DULTERMOST POINT CONDITION Disturbed Destroyed Not Found	nt 2 mi S. Direction and dis	QUADRANGLE 3 Of HONAUMA ABRON BM TT ESTABLE USGS USGAGS USGAGS USGLO USBLM	Tau Bay Tau LISHED BY USBR USBR USBR Cother)	s D

* 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

FORM C&GS-5260 (12-00)

U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY DEC 1979

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

HORIZONTAL CONTROL DATA

National Ocean Survey Old Hawaiian Datum QUAD 191553 IIAWAH

STATION 1059

LATITUDE 19 ° 00' TO 19 ° 30' LONGITUDE 1550 30 TO 1560 00

DIAGRAM NE 5-1,5 HAWAII

40AA FORM 76-39 12-70) FORMERLY CAGS FORM 825)

TRAVERSE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL GEODETIC SURVEY

U.S. DEPARTMENT OF COMM....

NAME OF STATION: LAE MAMO NEAREST TOWN: Kealia CHIEF OF PARTY: GEH

STATE; Hawaii COUNTY: Hawaii QUADRANGLE NO. 191553

YEAR: 1972 DESCRIBED BY: JRF -

SURFACE-STATION MARK, UNDERGROUND-STATION MARK	DISTANCES AND DIRECTIONS TO OBJECTS WHICH CAN E	AZIMUTH MAR	K, REFERENCE THE GROUND AT	MARKS A	ND PRO	MINENT
OBJECT	BEARING	DIST	ANCE	T		
OBJECT	BEARING	PEET	METERS	1	HECTI	ONI
HOOKENA 1972 RM 1 RM 2	N. ENE.	23.48 - 40.48-	7.156 12.338	00 207 293	00 51 10	00.0- 06.2- 18.4-

| miles | Station is located approximately 1.8 $^{\vee}$ south of the City of Refuge and 1.2 miles NNW of the town of Hookena on the Kona Coast of Hawaii Island. Station is atop a low lava bluff approximately 17 feet above sea level and approximately 15 feet east of the edge of the bluff.

To reach station from post office at Monaunau, travel south on State Hwy 11 for 3.9 miles to Hookena School; continue on Highway 11 for 0.4 mile to fork and sign "Hookena"; take right fork and go 2.25 miles along paved road to gravel track road, just before reaching Hookena Beach; turn right and travel through trees and along beach for 0.35 mile to iron gate and house at end of truck travel. Pack northerly along the beach for 0.8 mile and the station.

Station mark is a standard disk stamped LAE MAMO 1972 set in a drill hole atop the lava bluff. Station is on Hoopalakamaia Point, approximately 0.3 mile northwest of Lae Mamo and is located about 10 feet inshore of a solitary large lava boulder near the edge of the bluff.

Reference mark 1 is a standard disk stamped NO. 1 1972, approximately 2 feet north of a crevasse separating it from the station.

Reference mark 2 is a standard disk stamped NO. 2 1972, on the lava bluff inshore of and at the same elevation as the station.

ADJUSTED HORIZONTAL CONTROL DATA

LAE MAMO

OBS BY NGS

HAWAII

1972

SECOND

G-14950

GEODETIC LATITUDE GEODETIC LONGITUDE:	19°23'46:09202 155 54 41.03592	ELEVATION	5.0 METERS

STATE COORDINATES (Feet)					
STATE & ZONE	CODE	×	٧	P ERA 4 ANGLE	
HI 1	5101	358,225.43	204,543.08	- 0 08 12	

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From sauth)	CODE
HOOKENA	327°19'22"4	327°27'34"	5101
		- inx	

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 177

*Refers to notes in stanuals of triangulation and state publications of triangulation.

*Direction-angle measured clockwise, referred to initial station

To nearest meter only, when no trigonometric leveling is being done. # U.S. GOVERNMENT PRINTING OFFICE: 1871-760-031

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

0 191555 STATION 1060 LONGITUDE 19 00' TO 19 30' LONGITUDE 155 30' TO 156 00' DIAGRAM NE 5-1,5

Lae o Heku (Hawaii Island, Hawaiian Government Survey; E. R. Hand,

1913).—On west coast of Hawaii, Kona District, on Heku Point, about 4½ miles north of Hoopuloa, and ½ mile southwest from the former shipping point called north of Hoopuloa, and γ mile southwest from the former shipping point called Kaapuna. Kaapuna may be recognized from offshore by the large 2-story house, unpainted, and the great piles of corded firewood, and behind, on the slope, the traces of the slide by which the wood was brought down. Marked by a copper triangle in the loose "aa" (lava) clinkers γ foot below the surface, with four beach-worn stones placed around it at distances of 2 feet. It is 25 feet from the edge of the "pali." In 1913 the stones were recovered; triangle not dug for. A start was placed over the station; it shows above a well which was built expend it. cairn was placed over the station; it shows above a wall which was built around it, the wall being nearly circular with vertical sides, 2½ feet high and 11 feet across. RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION LAE O HEKU ESTABLISHED BY: E.R. Hand Hawaii BENCH MARK(S) ALSO STATE: YEAR: YEAR: 1968 RECOVERED BY: R.C. Munson Hawaii COUNTY: Island: 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 and found to be marked with a rusted iron pin, set in the center of 4 smooth, rounded stones set on a 4 x 4-foot square. Located about 13 miles south of Honaunau and 5 miles north of Milolii, on Lae O heku Point, about 1/4-mile south of the south edge of the Kaapuna

Lava Flow of 1950, at edge of sea bluff, on a low knoll about 100 yards south of a sightly higher and more prominent boulder-covered knoll.

To reach station from the post office in Honaunau, go south on State Highway 11 for 9.6 miles to power pole No. 142, at north edge of the 1950 lava flow. Turn right and follow bulldozed road along right side of lava flow for 1.6 miles to end of road at sea. Walk south over rough lava along coast for about 1-1/4 miles to station.

Station mark is a 1/2-inch iron pin set 6 inches below ground level, in the center of 4 smooth, rounded stones. A 4-foot cairn is built over the mark and a 12-foot-diameter stone wall about 3 feet high surrounds station.

FORM C&G5-526 (1-68)

 \Box

ADJUSTED HORIZONTAL CONTROL DATA

LAE O HEKU NAME OF STATION

STATE HAWAII

THIRD

SOURCE G-SP156

GEODETIC LATITUDE	19 15 36.085 155 54 05.246	S CALED	15	METERS FEET
GEODETIC CONGITODE				

STATE & ZONE	CODE	×	•	# CH A BI ATIGLE
HI 1	5101	362,527.03	155,105.89	- 0 07 57

PLANE AZIMUTH HAS BEEN COMPUTED BY THE BORD OF FORMULA NEGLECTING THE SECOND TERM.

GEODETIC AZIMUTH (From touth)	PLANE AZIMUTH (From insth)	coo
	(Fram touth)	(Fram south) (Fram south)

Q3 265

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

R

Q 191553 STATION 1061
HAWAII 1
LATITUDE 15 00' TO 15 03'
LONGITUDE 15 030' TO 156 00'
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

Lae o Kanoni (Hawaii Island, Hawaiian Government Survey, 1884; E. R. Hand, 1928)—On the west coast of Hawaii, South Kona District, north of Honaunau Bay, 1,200 meters north-northwest from the "City of Refuge" which is on the south side of the bay, and 330 meters from the water on the west. A bolt referred to in original description as being 4 meters southwest of station was not found in 1913. At that time the station was marked by a drill hole and triangle cut in the solid rock and surrounded by four crosses equidistant from it. The whole surmounted by a large cairn, painted white. In 1928 the cairn had been removed, and the mark consisted of a 2½-inch pipe set in a concrete dome rising about two feet above base of original cairn. Name of station is marked in the concrete.

DEPARTMENT OF COMMERCE

1. S. COMPT AND SECONTE MANYST

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: LAE O KANONI
ESTABLISHED BY:Hawaiian Govt. Year: 1884 STATE:
RECOVERED BY:*L. C. Wilder Year: 1948 COUNTY: HAWAII

HAWAII

Detailed statement as to the fitness of the original description: The original station was not recovered. The station is now the center of a 2 inch iron pipe which projects about 3 inches above the rock. The station used for this survey is the center of a 2 1/2 inch pipe which projects from the top of a concrete platform which has been erected over the lower pipe. A new description follows—

The station is located on the summit of a low lave mound about 5 miles south of Napoopoo, about 0.8 mile north of Honaunau Bay, about 0.2 mile east of the beach and about 0.2 mile west of the highway which runs between Napoopoo and Honaunau.

To reach from the post office at Napoopoo, go south, on the road which leads toward Honaunau, for 3.1 miles to a point where the straight road makes a turn to the left at a small highway cut and the end of truck travel. From this point pack westerly for about 0.2 mile to the summit of a low lava mound and the station.

The station is the center of a 2 1/2 inch pipe which projects about 4 inches from the top of a square concrete platform which is about 6 feet on each side and is about 4 feet high.

Reference mark number I is a standar disk, stamped KANCNI I 1948, set into a drill hole in lava bedrook which is about level with the surrounding rock. It is in a small depression 6.59 feet lower than the station.

Object

Distance

Direction

KEAWEKAHEKA				00	00	00
Napoopoo Lighthouse	WNW	4 miles			01	
Napoopoo Spire	N	3 miles		31		11.5
R. M. No. 1	E	44.291 ft	13.500 m	128	56	05

ADJUSTED HORIZONTAL CONTROL DATA

LAE O KANONI

STATE HAWAII

VEAR 1884

SECOND

-080

SOURCE G- 9279

GEODETIC LATITUDE GEODETIC LONGITUDE.		03.091 11.517	ELEVATION	35.7 117	METERS FEET

STATE COORDINATES (Feet)						
ANGLE "	∉ он∆ ата	Ψ	×	CODE	STATE & ZONE	
23	- 0 Эь	218,370.09	355,341.20	5101	H1 1	

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ (OR $\Delta\,$ 4) FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (Fram south)	PLANE AZIMUTH * (From soidh)	CODE
PALEMANO	160 16 29.2	160 24 52	5101

QE 155

(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

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

QUAD 191553 STATION 1061 TΩ LATITUDE LONGITUDE TO DIAGRAM

LAE O KANONI (continued)

PORM 526e (8-18-89)

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

LAE O KANONI NAME OF STATIONS

YEAR: 1884 HGS Hawaii ESTABLISHED BY: STATE: R.C. Munson YEAR: 1968 RECOVERED BY: COUNTY: Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 2.24 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 OBJEÇT METERS FEET PALEMANO (HTS) -----1948 DISTANCE and DIRECTION----00 E 44.291 13.500 119 35 25 PALEMANO (HTS) 1948 ----1968 DISTANCE and DIRECTION----00 00 00.0 R.M. No. 1 KALAPA (HGS) 1884 ESE 44.305 13.505 119 34 53 09 42 KEOKEA 1928 34.5

Station mark and RM No. 1 were recovered in good condition. A com-

plete description follows:

Station is located about 3 miles south of Napoopoo, 2-1/2 miles west-southwest of Honaunau post office and 3/4-mile north north-northwest of Honaunau Bay and the City of Refuge, on a broken-up lava mound in brushy lava land, 950 feet west of macadam road, 1000 feet east of sea and 1435 southwest of KEEI SOUTH BASE 1948. Station elevation is 117 feet.

To reach station from the post office in Honaunau, go south on State Highway 11 for 1.8 miles to junction with State Highway 16. Turn sharp

right and go downhill on State Highway 16 for 3.5 miles to road junction at the City of Refuge; continue ahead on road towards Napoopoo for 0.6

walk west across rough, brushy land about 950 feet to station.

Station is marked by a 2-inch iron pipe, flush with the top of a 3-foot-diameter, concrete dome projecting 16 inches above ground. There is a Type "A" signal over the mark, with the 6-foot-square, concrete platfrom setting on 2 stone and concrete walls, 4 feet above ground. A red and white metal target extends 7 feet above the platform.

Reference mark number one is a standard disk stamped "KANONI 1 1948",

cemented in a drill hole in a smooth lava area between the station mound and the lava mound a short distance east. It is 6.9 feet lower than station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: LAE O KANONI

ESTABLISHED BY: HGS -

RECOVERED BY: * GEH

YEAR: 1884 STATE: Hawaii YEAR: 1972 COUNTY: Hawaii

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

HEIGHT OF TELESCOPE ABOVE STATION MARK 3.0 FEET.

HEIGHT OF LIGHT ABOVE STATION MARK

FEET.

BENCH MARK ALSO

OBJECT	DISTAN		ANCE			
003221	BEARING	FERT	METERS		DIREC	TION
KALAPA 1884 · RM 1		44.30°	13.504	00 351	00 41	00.0 39.5

Station and Reference mark No. 1 were recovered as described by R.C. Munson in 1968 in good condition. Current to-reach is adequate.

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM Q 191553 STATION 1062
HAWAII 1 19 00' TO 19 030'
LONGITUDE 155 030' TO 156 00'
DIAGRAM NE 5-1.5 HAWAII

U. S. COAST AND GEODETIC SURVEY
FORDS ASS

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LIII CHIEF OF PARTY: K. T. Adams Surface-station mark, Note.* 4. · Note,* Underground-station mark, Reference mark, No. 1.Note,*12c. No. 2Note,* 12c. Reference mark, Witness mark. Note,* Witness mark, Height of signal above station mark 6. meters. Height of telescope above station mark 1.8meters.

STATE: Hawaii County: Hawaii.

YEAR: 1929 LOCALITY: SOUTheast Coast of Hawaii.

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS

DISTANCE DIRECTION

AZIMUTH

AND OO 00 00 00

R. M. No. 1. 18.3 210 30 12.5

R. M. No. 2. 15.9 305 56 12.5

Detailed description:

Standard bronze disc set in the top of a large lava b oulder about

200 feet inland from a long, narrow bight. Boulder in which mark is set
is about 6 feet above the general level of the lava field. A small foot
path runs to the station. The station is in the midst of a rough lava field.

Station is about 1520 meters S. 302 W. (true) from the dock at Punalum,
Hawaii.

R. M. No. 1 is in the top of a large lava boulder. R. M. No. 2 is in the top of a large lava boulder.

Norm.—The initial direction must be to a main scheme station.

**Refers to pages 48 and 49, Special Publication No. 26. G P O 11—4701

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION. LUU

STATE: HAWAII

YEAR: 1930

THIRD

SOURCE: G- 446

GEODETIC LATITUDE: GEODETIC LONGITUDE:	07 36.435 30 48.100	ELEVATION.	15.0 49	METERS

STATE COORDINATES (Fret)						
STATE & ZONE	CODE	×	¥	# OR A RI ANGLE		
HI i	5101	495,387.48	106,564.33	- 0°00 16		
	DOM:					

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ~ heta~ OR $\Delta~$ 4 FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (Fram routh)	PLANE AZIMUTH (From south)	CODE
HILL-PUEHUE	171 24 19.0	171 24 35	5101

QF 034

(continued on next page)

JUN 1978

LUU (continued)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANS GAND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY

OLD HAWAIIAN DATUM

FORM 5260

NAME OF STATION: T.IIII

RECOVERY NOTE, TRIANGULATION STATION

YEAR: 1929 ESTABLISHED BY: Adams Hawaii D.M. Whipp RECOVERED BY: YEAR: 1967 COUNTY: Hawaii Island: Hawaii

EIGHT OF TELESCOPE ABOVE STATION MARK 1.62 MET	TERS, HE	EIGHT OF LIGH	T ABOVE STATIO	N MARK		METERS.
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH FROM THE GROUND AT THE STATION						1
		DIST	DISTANCE			
OBJECT	BEARING	PEET	METERS	, P	RECTIO	ЭН
HILL (PUEHU)1929 DISTA	NCE and	DIRECTI	ON	- ôo	óo	00.0
R.M. No. 1			18.3	210	30	12.5
R.M. No. 2			15.9	305	56	12.5
HILL (PUEHU HTS) 1914 -1967 DISTA	NCE and		7.	- 00	00	00.0
Punaluu, Hokuloa Church Spire, 196		about 3	4 mile	26	27	07.2
RM No. 1	SSW	59.795	18.226	210	29	10
RM No. 2	WNW	52.129	15 .889 -	305	59	08

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

Station is located along the south coast of the island, about 1 mile southwest of Punaluu Village, on Kohaahw Point, about 100 feet west, inland, from the end of a narrow channel, on top of a large rock which is on the highest and most prominent point in the vicinity, and is at about 49 feet elevation.

To reach station from the post office in Pahala, go southeast on Pi-

kake St. for 0.2 mile; turn right on State Highway 15 and go 0.85 mile to junction with State Highway 11. Turn right and go southwest on State Highway 11 for 3.8 miles; turn left on the Punaluu Road and go southeast 1.1 miles to Punaluu Black Sand Beach. Follow track road southwest along power line for 0.7 mile to end of road. Walk south on old roadway up along beach bluff for about 200 yards to where roadway bears right, away from beach. From here follow trail across rock areadout 1/4-mile to station.

Station mark is a standard disk stamped "LUU 1929", cemented in a drill hole in the top of a large chunk of rock about 7 feet high and 10 feet in diameter at the base.

Reference mark number one is a standard disk stamped "1 1929", cemented in a drill hole in a 10 x 14-foot chunk of rock that projects 4 feet above the general level of rocks. It is 9.9 feet lower than

Reference mark number two is a standard disk stamped " 2 1929", cemented in a drill hole in a large, round, lava chunk 14 feet in diameter. It projects 5 feet above general level of rocks and is 8.7 feet lower than station mark.

Punaluu, Hokuloa Church Spire 1967 is a sharp, copper spire 4 feet long, mounted on top of a square, red cupola on small, stone church 12 x 15 feet in size.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: LUU STATE: HAWAII BENCH MARK(S) ALSO ESTABLISHED BY: K. T. ADAMS YEAR: 1929 YEAR: 1978 COUNTY: HAWAII RECOVERED BY R. B. MELBY AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 1 MILE SOUTHWEST OF PUNALUU

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

THE STATION, REFERENCE MARKS AND THE PUNALUU, HOKULOA CHURCH SPIRE WERE RECOVERED IN GOOD CONDITION. THE DISKS ARE ALL STAMPED WITH THE 1929 DATE.

QUAD 191553

STATION 1062

LATITUDE LONGITUDE ' TO TO

DIAGRAM

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1063
HAWAII LATITUDE 155 °30' TO 156 °30' LONGITUDE 555 °30' TO 156 °30' DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORTH \$25

DESCRIPTION OF TRIANGULATION STATION

HAWAII COUNTY: HAWAII

KAU DISTRICT

NAME OF STATION: MAKANAO 2 (HSSD)STATE:

CHIEF OF PARTY: L. C. WILDER YEAR: 1949 Described by: C. J. HOEPPEL

NOTE, REIGHT OF TELESCOPE ABOVE STATION MARK 3.2 METERS.! HEIGHT OF LIGHT ABOVE STATION MARK MET

Surface-station mark. I DISTANCES AND DISECTIONS TO AZIMITE MARK PROPERTY MARK AND RESERVED.

	OBJECT	BEARING DISTANCE		DIRECTION			
		DEARTHO	feet	meters		DIRECT	ION I
pipe	EANEHANE NEW 1939 R M 1 Honuapo Stack R M 2	SE S NW	18.266 4 mile 48.740		00 46 85 234	00 15 42 10	00 58 06.8 02

The station is located on a rock pile on the summit of a rounded hill, planted in case, which lies about 5 miles north of Honape, about 3 miles northwest of Punaluu, about 2 miles northwest of Hilea, about 200 yards west of a graded road and 40 feet southeast of the corner of a rock wall.

To reach from the post office in Naalehu; go north and east on a good einder road for 6.6 miles; cross over a small creek and continue east for about 200 feet; take the left hand fork and go easterly for about 150 feet; pass through a board gate and follow the steep road east and north for 0.6 mile to a point where the road, after passing around the east side of the hill, starts to break away to the west and the end of truck travel. From this point pack westerly, through the cane field, for about 200 yards to the high ground and the station. A slightly higher hill, which is brush covered, lies about 0.7 mile northwest of the station.

The station is the center of a 1 1/2 inch iron pipe which projects about 5 inches from the top of a triangular stone and concrete platform which is about 5 feet above ground and about level with the rock pile.

Reference mark number 1 is a standard disk, stamped MAKANAO 2 NO 1 1949, set in the top of a 3 inch pipe which projects about 8 inches above the ground and is about the same elevation as the station.

Reference mark number 2 is a standard disk, stamped MAKANAO 2 NO 2 1949, set in the top of a 3 inch pipe which projects about 7 inches above the ground and is about the same elevation as the station.

This station was established by the Hutchinson Sugar Company Survey Department efter they could not locate the old H.T.S. station MAKANAO.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION MAKANAU 2 HSSD

STATE HAWAII

SECOND

....

SOURCE G- 9279

GEODETIC LATITUDE: GEODETIC LONGITUDE:	19 09 03.204 155 33 13.934	ELEVATION	5c0.2 1838	METERS

STATE CODRDINATES (Feet)					
STATE & ZONE	CODE	×	·	# OHA BI ANGLE	
HI 1	5101	481,407.83	115,323.56	- 0 01 04	
		100			

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE | heta| FORMULA NEGLECTING THE SECOND TERM.

51 01

JUN 1978 U.S. DEPARTMENT OF COMMERCE

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

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

MAKANAO 2 HSSD (continued)

U.S. DEPARTMENT OF COMMERCE RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: MAKANAO 2 (HSSD)

RM No. 3

RM No. 4

ESTABLISHED BY: L.C. Wilder RECOVERED BY: D.M. Whipp

STATE: Hawaii YEAR: 1949 COUNTY: Hawaii YEAR: 1967

Island: Hawaii HEIGHT OF TELESCOPE ABOVE STATION MARK 1.57 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 OBJECT METERS FEET 00 00.0 KAMEHAME NEW 1914 Honuapo, Hutchinson Sugar Co. 85 35 42.7 S Mill, stack 39 SW 10.443 57.005 3.184 150 20 14 17.375 233 NW

Station pipe was recovered in good condition. Both reference marks have been destroyed. Two new reference marks, numbers 3 and 4, were established and the station was marked with a standard disk set in the

pipe. A complete description follows:
Station is located about 6 miles north-northeast of Naalehu and 5
miles north of Honuapo, at about 1838 feet elevation, on the south end of
a prominent hill with nearly sheer sides that rises above the surrounding
cane fields. The top of the hill is planted in sugar cane and station is at west edge of field and about 50 yards north of a clump of large trees.

To reach station from the post office in Naalehu, go northeast on

State Highway 11 for 3.4 miles to fork 0.1 mile before sugar mill at Honuapo. Take left fork and go upgrade 3.0 miles; take right fork and go 0.55 mile; take right fork and go 0.15 mile to fork just after crossing cattleguerd. Take right fork and go 0.1 mile; take the center 1 of 3 forks and go up along steep side of hill for 0.45 mile to top of grade; continue through cane fields for 0.3 mile; take dim left fork and go 0.15 mile to hairpin curve on top of hill; go sharp left, south, along top of hill for 0.2 mile to station or right 0.2 mile to station on right.

0.2 mile to station on right.

Station mark is a standard disk stamped "MAKANAO 2 HSC 1949 1967",
cemented in the top of a 1-1/2-inch iron pipe projecting 3 inches from a
stone and mortar platform which is the squared-up, and re-enforced, southeast end of a very large stone wall about 6 feet high. 15 yards northwest
of the station the wall curves off to right and becomes smaller.

Reference mark number 3 is a standard disk stamped "MAKANAO 2 NO 3

1949 1967", set in concrete in a depression boulders on top of the stone wall, 3 feet northeast of edge of wall and at same elevation as station. Reference mark number four is a standard disk stamped "MAKANAO 2 NO 4 1949 1967", set in the top of a concrete-filled, 3-inch, iron pipe that is set in the stone wall and re-enforced with concrete. It projects 6 inches from top of wall, is 0.5 foot higher than station, and is hidden by sugar cane.

"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.

STATION 1063 OUAD 191553 LATITUDE

LONGITUDE DIAGRAM

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1064
HAMAII
LATITUDE 19 000' TO 15 030'
LONGTUDE 155 030' TO 156 000'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

DEPARTMENT OF COMMERCE RECOVERY NOTE, TRIANGULATION STATION DOCES 386

NAME OF STATION: MAKOLEHALE

ESTABLISHED STHEW.GOVT.SUTVEYEAR: 1883 STATE: HAWAI

RECOVERED BY:* L.C.Wilder YEAR: 1948 COUNTY: HAWAI

Detailed statement as to the fitness of the original description:

A thorough search was not made for this station as there was nothing to identify the immediate locality of the station and a place was found for a new station without clearing out numerous trees. The old station was a copper shell in a circle carved in a stone, over which was another stone with a triangle carved on same. There were three tie points within a meter, crosses on stones.

The old station can probably be located by distance and direction from Makolehale 2. A line will have to be cleared through an abandoned coffee field.

* 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.
a. oversener reserves server. Norm.—One of these forms must be used for every station recovered.

NA.

R

NAME OF STATION. MAKGLEHALE

STATE. HANAII

YEAR. 1883

THIRD

CROFA

SOURCE: G-SP15c

GEODETIC LATITUDE:	19 ² 5 55.619	ELEVATION	METERS
GEODETIC LONGITUDE:	155 53 53.141		FEET

ADJUSTED HORIZONTAL CONTROL DATA

STATE COORDINATES (Feet)						
STATE & ZONE	CODE	и	· ·	9 OR A GI ANGLE		
HI 1	5101	362,896.34	241,838.97	- 0 07 58		

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE | heta| FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (Fram seath)	PLANE AZIMUTH * (From south)	COD
	0.90	10 17	
		ĺ	
V. C		1	
		! !	

QD 261

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1065 HAWAII LATITUDE 19 00' TO 19 30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5 HAWAII

NAME OF STATION: MAKOLEHALE 2

DESCRIPTION OF TRIANGULATION STATION

SOUTH KONA DISTRICT

STATE:	HAWAII COUNTY:	HAWA

NOTE,	F PARTY: L. C. WILDER HEIGHT OF TELESCOPE ABOVE STATION		1948 ERS.1		cribed by: C.		ioepp	EL METERS
la	Surface-station mark, DISTA	NCES AND DIRECTION	S TO AZIMU	JTH MARK, REF N FROM THE GR	ERENCE MARKS OUND AT THE S	AND PRO	MINENT	OBJECTS
	OBJECT		BEARING	DIST	ANCE		2100	
				foot	meters		DIRECT	10141
12e pipe	R. M. 1 R. M. 2 LAE O KANORI (metal	target)	e se	26.753 47.442	8.165 14.461	00 272 333 05	00 14 23 36	00 59 52 52.5

The station is located in a coffee field about 2.5 miles northeast of Napocopoe, about 2 miles southeast of Kealakekus, about 0.5 mile south of the North and South Kona boundry line, about 0.2 mile north of a paved road, 12 feet east of a wire fence and 12 feet west of the corner of a rock wall. Higher ground is to the eastward.

To reach from the post office in Kealakekua, go south, on the froad which leads toward Captain Cook, for 2.5 miles; turn left, at telephone pole number 931, and go easterly for 1.5 miles to a small iron shed to the aleft hand side of the road and the end of truck travel. From this point pack northerly, along the east side of a wire fence, for about 0.2 mile to the high ground and the station.

The station is a standard disk, stamped MOKULEHALE 2 1946, set in the top of a square concrete post which is about 6 inches below the surface of the ground.

Reference mark number 1 is a standard disk, stamped MOKULEHALE 2 1 1948, set into a drill hole in a boulder which projects about 6 inches. It is located 33 feet east of a wire fence, ll feet east of a rock wall and about 4 feet higher than the station.

Reference mark number 2 is a standard disk, stamped MOKULEHALE 2 2 1945, set in the top of 3 inch iron pipe which projects about 4 inches. It is lecated 5 feet east of a wire fence and is about 2 feet higher than the station.

> No azimuth mark was established for this station. Note discrepancy in spelling of station name and stamping.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION MAKOLEHALE 2

STATE: HAWAII

YEAR 1548

SECOND

CADER

SOURCE: G- 9279

GEODETIC LATITUDE:	19 °29 '55.892 155 53 54.960	ELEVATION	693.9	METERS
GEODETIC LONGITUDE:			2277	FEET

STATE COORDINATES (Fret)						
STATE & ZONE	CODE	×	· ·	PIOR∆ BI ANGLE		
HI 1	5101	362,722.50	241.656.51	- 0 07 59		

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ FOR $\Delta\,$ G $\,$ FORMULA NEGLECTING THE SECOND TERM.

GEODETIC AZIMUTH (From wealth)	PLANE AZIMUTH * (Fram south)	CODE
77 01 27.0	77 09 26	5101
	(From south)	(From south) (From south)

JUN 1978 U.S. DEPARTMENT OF COMMERCE U.S. DEPARTMENT OF COMMERCE ADMINISTRATION NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

FORM 5264 (8-18-89)

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: MESTABLISHED BY: L	C. Wilder	YEAR: YEAR:	1948 1968	STATE: COUNTY: Island:	Hawaii Hawaii Hawaii
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MAKOLEHALE 2 (continued)

DISTANCES AND	ABOVE ST	ATION MA	MILTH MARK, REF	TERS, HE ERENCE MARK OUND AT THE	S AND PROMINE	ABOVE STATION	CH CAN	BE SE	METERS.
					DIST	ANCE		DIRECT	ION
OBJECT			BEARING	BEARING FEET		DIRECTION			
KEAWEKAHEKA R.M. No. 1 R.M. No. 2 KEAWEKAHEKA R.M. No. 1 R.M. No. 2			1948 1968	DISTANCE E SE DISTANCE ESE SSE	26.753 47.442	ECTION 8.165 14.461 ECTION 8.118 14.429	206 268 00 206 268 268	00 56 05 00 47 05	00.0 19 12 00.0 30

Station was recovered and all marks found in good condition, but all are mis-stamped "MAKOHOHALE" instead of MOKULEHALE as described in 1948. Discrepancies were noted in the distance to both RMs. The coffee grove is at present abandoned and is overgrown with dense vegetation, and the fence mentioned in the 1948 description is covered with heavy grass and difficult to locate. A witness post was set at station. A complete description follows:

Station is located about 2 miles southeast of Kealakekua and 1-1/2 miles east of Captain Cook, at about 2277 feet elevation, in the southwest

end of an abandoned coffee grove, on a slight point extending southwest from general line of brow of hill, and is at the southwest side of an old

from general line of brow of hill, and is at the technical state of brow of hill, and is at the technical state of the state of the post office in Captain Cook, go southeast on State Highway 11 for 0.8 mile to macadam left fork, at telephone pole No. 930X. Go left, upgrade, for 0.65 mile to fork; take right fork, straight ahead, for 0.4 mile to side road left at power pole 19. Turn left and go 0.25 mile to wooden water tank and remains of buildings. From here walk southwest down coffee tree rows about 500 feet to brow of hill. Go right

southwest down coffee tree rows about 500 feet to brow of hill. Go right about 30 yards to where point begins to run out to southwest, then bear left and go 30 yards to station at edge of field.

Station mark is a standard disk stamped "MAKOHOHALE NO 2 1948", set in the top of an 8-inch concrete monument 6 inches below ground. It is 11 feet east of wire mesh fence, 12-1/2 feet west of northwest corner of stone wall, 14.5 feet west-northwest of a white witness post, 20 feet southeast of a large tree on edge of hill, 8 feet northwest of a small lone guaya tree, and about 6 feet lower than ton of stone wall. There lone guava tree, and about 6 feet lower than top of stone wall. There is a 3-foot cairn built over the mark.

Reference mark number one is a standard disk stamped "MAKOHOHALE NO 2 1948", cemented in a drill hole in a 2-foot boulder that projects 6 inches above ground. It is up on the flat area at same level as top of stone wall, 11 feet east of west face of the wall and 6.7 feet higher than station mark.

Reference mark number two is a standard disk stamped "MAKOHOHALE NO 2 1948", set in a 2-inch iron pipe projecting 1 inch. It is 5 feet east of fence and 0.4 foot lower than station mark.

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

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

QUAD 191553

STATION 1065

LATITUDE LONGITUDE

DIAGRAM

HORIZONTAL CONTROL DATA

National Ocean Survey OLD HAWAIIAN DATUM

0 191555 STATION 1066 19 °00' TO 15 °30' LONGITUDE 155 030' TO 156 00' DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: MANITCA

STATE:

HAWAII COUNTY: HAWAII

HIEF OF	PARTY: L. C. WILDER YEAR: HEIGHT OF TELESCOPE ABOVE STATION MARK 17.7	1948 7 NETERS.1		scribed by: ()		OEPF	EL METER
le	4141					MINENT	
	OBJECT	BEARING	DIST	TANCE		DIRECT	-
- 1			foot	metere	<u> </u>	DIRECT	ONI
12o 12o	KAHUKU NW BASE R. M. 1 R. M. 2 Azimuth mark	NNW NNE	77.144 59.100	23.514 18.014 168.	00 238 273 271	00 47 56 21	00 14 33 25.6

The station is located on a wooded slope about 9 miles southeast of Milolii, about 3 miles southeast of the southern boundary of the South Kona District, about 0.3 mile west of the highway which runs between Captain Cook and Naalehu and about 100 feet southeast of a track road. Higher ground is to the eastward.

To reach from the school house and church in Waiohinu; go west and north on the road which leads toward Captain Cook for 4.0 miles, continue straight ahead, northwesterly, for 10.7 miles; turn left, onto a track road, and go westerly, down grade, for 0.3 miles to the end of truck travel. From this point pack southeast for about 100 feet to lower ground and the station.

The station is a standard disk, unstamped, set into an irregular mass of concrete which is about 1 foot below the surface of the surrounding rock.

Reference mark number 1 is a standard disk, unstamped, set into a drill hole in a boulder which is about 5 feet in diameter, projects 5 feet and is about 6 feet higher than the station.

Reference mark number 2 is a standard disk, unstamped, set into a drill hole in a boulder which projects about 3 feet and is about 4 feet higher than the station.

A 22 x 22 black and white pole has been plumbed over this station and a cairn of rocks built around the pole.

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

R

NAME OF STATION: MANUKA

ESTABLISHED BY: L.C.W. RECOVERED BY:* U.S.G.S.

YEAR: 1948 STATE:

YEAR: 1958 COUNTY: Hawaii

Hawaii

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

Station recovered as described except the station lies about 250 feet southeast of the dim track road and about 270 feet southeast of an old lava channel. The station mark is stamped MANUKA 1948.

Reference mark 1 is stamped MANUKA 1 1948. Reference mark 2 is stamped MANUKA 2 1948.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION MANUKA

STATE HAWAII

1548

SECOND

SOURCE G- 9279

GEODETIC LATITUDE 19 05 52.597	ELEVATION	559.6	METERS
GEODETIC LONGITUDE 155 48 45.163		1836	FEET

STATE COORDINATES (Feet)							
STATE & ZONE	CODE	×	VIII VIII VIII VIII VIII VIII VIII VII	P OR A B ANGLE			
HI 1	5101	392,097.60	96,224.53	- 0 06 08			

PLANE AZIMUTH HAS BEEN COMPUTED BY THE BOOR OF FORMULA NEGLECTING THE SECOND TERM

GEODETIC AZIMUTH	PLANE AZIMUTH *	CODE
195 °17 '06.7	199 23 17	5101
	(From south)	(From worth) (From worth)

HORIZONTAL CONTROL DATA

by the NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

QUAD 191553 STATION 1066 LATITUDE LONGITUDE DIAGRAM

MANUKA (continued)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: MANUKA

STATE: Hawaii BENCH MARK(S) ALSO YEAR: 1948 ESTABLISHED BY: L.C. Wilder YEAR: 1968 Hawaii RECOVERED BY: R.C. Munson COUNTY: Island: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 and all marks found in good condition. Distance to reference marks was checked and found correct. A complete description follows:

Station is located about 9 miles southeast of Milolii, 1-1/2 miles east-southeast of Manuka State Park, 1450 feet south-southwest of State highway 11, and across highway from the southwest corner of the Hawaiian Ocean View Estates, in heavily-wooded area, about 180 feet southeast of a track road, and at the south end of a clearing through the timber between tracks and across not south end of a clearing through the timber between tracks. tween station and azimuth mark.

To reach station from the post office at Honaunau, go south on State Highway 11 for 24.5 miles to Manuka State Park on left; continue for 1.6 miles to power pole 345 on left, telephone pole 301 on right, and a track road going back sharp right, 0.2 mile before reaching Aloha Blvd. Turn right and follow track road into forest for 0.25 mile to azimuth mark on left. Continue southwest on the track road for 0.1 mile to end of truck travel. Pack southerly, slightly downgrade, for about 80 yards to end of cleared strip and station.

Station mark is a standard disk, unstamped, set in concrete at about same elevation as ground. There is a large, 7-foot-diameter cairn, 4 feet high, centered over the mark. Station elevation is 1835 feet, and

the azimuth mark is considerably higher than station.

Reference mark number one is a standard disk stamped "MANUKA 1 1948",
cemented in a drill hole in an 8-foot-diameter lawa knob that projects
4 feet above ground. It is about 7 feet higher than station mark.

Reference mark number two is a standard disk stamped "MANUKA 2 1948", cemented in a drill hole in a bedrock ledge that projects 3 feet above ground. It is in the middle of the cleared strip to azimuth mark, and is about 6 feet higher than station mark.

Azimuth mark is a standard disk, stamped "MANUKA 1948", cemented in a drill hole in the top of a knob on a bedrock ledge. It is 5-1/2 feet southeast of the southeast track of the road, 2-1/2 feet east of a white witness post and about 3 feet higher than the road. The clearing to the station is very noticeable, bearing off to left on a 20° angle from the

NOTE: The remains of an old pole tower are scattered around station.

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1067
HAWAII LATITUDE 15 000' TO 15 03'
DIAGRAM NE 5-1.5 HAWAII

U. S. COAST AND GEOGETIC SURVEY
FORM 828

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: MCCANDLESS

STATE:

SOUTH KONA DISTRICT

MOTE,	HEIGHT OF TELESCOPE ABOVE STATION MARK 1.6 METE Surface-station mark, Underground-station mark WHICH C	S TO AZIMU	HEIGHT OF	SCRIBED BY: O. LIGHT ABOVE STAT ROUND AT THE S	AND PRO		MET
	OBJECT	BEARING		FANCE meters		DIRECT	ION:
120	LAE LOA R M 1 Sub Station 'A' Hookena Spire	NE W	21.916	6.681 16.37 3 miles	00 143 169 335	00 17 36 58	00 14 01.2

The station is located in the front yard of an abandoned shack on property belonging to the McCandless Ranch. It is about 4 miles southeast of Honaunau Bay, about 3 miles northeast of Hookena, about 1 mile east of the highway which runs between Captain Gook and Waiohinu, 36.3 feet south of the center of a graded road, 33.3 feet southeast of a fence corner, 16.3 west of the northwest corner of an old shack and 12.7 feet east of a fence.

To reach from the post office at Kai Malino; go south on the road atoward Waiohinu for 0.15 mile; turn left, onto a track road, and go easterly, up grade, for 1.15 miles to the old shack and the station on the right hand side of the road.

The station is a standard disk, stamped MCCANDLESS 1948, set into a drill hole in a boulder which projects about 1 foot.

Reference mark number 1 is a standard disk, stamped NO 1 1948, set into a drill hole in a boulder which projects about 10 inches. It is located 34.3 feet east of a wire fence, 26.5 feet south of the center of a graded road, 11.5 feet north of the northwest corner of an old shack and is about the same elevation as the station.

Substitute station 'A' is the northwest corner and base of an old shack. It is 0.24 meter higher than the station.

*Refers to notes in manutals of triangulation and state publications of triangulation.

17c measured meter only, when no trigomenactric leveling is being done.

13-4889-1 8. 6. comment repressionations.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION MC CANDLESS

STATE HAWAII

YEAR 1548

SECOND

SOURCE G- 9279

GEODETIC LATITUDE: 19 23 41.773 GEODETIC LONGITUDE: 155 52 02.704	ELEVATION	525.7 1725	METERS
-------------------------------------------------------------------	-----------	---------------	--------

		STATE COORDINATES (Feet)							
CODE	×	٧	B OR A SI ANGLE						
1016	375,581.25	204,073.18	- 0°37′19						

PLANE AZIMUTH HAS BEEN COMPUTED BY THE # IOR A BI FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From tauth)	PLANE AZIMUTH * (From sauth)	CODE
KEEI SOUTH BASE	131 49 04.2	131 56 23	5101

QE J68

HORIZONTAL CONTROL DATA

by the

NATIONAL GEODETIC SURVEY

OLD HAWAIIAN DATUM

QUAD 191553 STATION 1067

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

2

FORM 526s

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: NC CANDLESS

ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: HAWAII RECOVERED BY: R.C. MUNSON YEAR: 1968 COUNTY: HaWAII ISLand: HAWAII HAWAII HAWAII

MC CANDLESS (continued)

IGHT OF TELESCOPE ABOVE STATION MARK DISTANCES AND DIRECTIONS TO AZIMUT	1.49 METE H MARK, REFER	ENCE MAR	KS AND PROMINE	NT OBJECTS WH	MARK ICH CAN	BE SEE	METERS
	777		DIST	ANCE		HECT	
OBJECT		BEARING	PEET	METERS	'	HECT	OH .
KEEI SOUTH BASE R.M. Po. 1 KEEI SOUTH BASE 1948 KEEI NORTH BASE 1948	-1948 DI 1968 DI	NE	and DIRE 21.918 and DIRE	CTION 6.681 CTION	00 109 00 12	00 27 00 59	00.0 26 00.0 53.6
R.M. No. 1 R.M. No. 2		NE SE	21.985 35.010	6.702 10.671	181 348	30 32 29	59 10 47.6

Station was recovered and both marks found in good condition, however the old shack and fences are gone. A small discrepancy was noted in the distance to RM No. 1; it was double-checked and the 1968 distance is correct. A new reference mark, No. 2, was established. A complete description follows:

Station is located about 3-1/2 miles south-southeast of Honaunau and 1 mile east-southeast of Kealia village, on a small, open, grassy plot surrounded by trees and brush, up on a bank along the south side of a

steep, graded road, O.1 mile west from a large, red, corrugated iron water tank and T-junction of track roads.

water tank and 1-junction of track roads.

To reach station from the post office at Honaunau, go south on State Highway 11 for 3.2 miles to the store in Kealia village; continue on the highway for 0.25 mile to gravel side road left. Turn left and go upgrade for 0.3 mile to a chain gate; continue for 0.8 mile to station on right.

on Fight.

Station mark is a standard disk stamped "MC CANDLESS 1948", cemented in a drill hole in an 8 x 10-inch boulder that projects 6 inches above ground. It is 43 feet south of center line of road, 3 feet west of a white witness postand about 15 feet higher than the road. "NO 1 1948", Reference mark number one is a standard disk stamped "NO 1 1948",

Reference mark number one is a standard disk stamped "NO 1 1948", Reference mark number one is a standard disk stamped "NO 1 1948", cemented in a drill hole in the top of a 2-foot, triangular, pointed rock that projects 8 inches above ground. It is located on the highest point of the grassy bank along road, under a tree, 35 feet south of the center line of the road and 16 inches higher than station mark.

Reference mark number two is a standard disk stamped "MC CANDLESS and 20 2 1066" company and the content of the content of

neigrence mark named the last scale in a flat, 20-inch-diameter, blue-rock boulder that projects 4 inches from ground. It is at about same elevation as station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: MC CANDLESS

NAME OF STATION OF STATE: HAWRII BENCH MARK(6) ALSO RECOVERED BY: CEH - YEAR: 1972 COUNTY: HAWRII COUNTY:

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station mark recovered in good condition as described by RCM in 1968. Reference marks one and two were also recovered in good condition as described. R

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1068
HAHALI I
LATITUDE 15 00' TO 19 030'
LONGITUDE 155 30' TO 156 00'
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

Milolii (Hawaii Island, Hawaiian Government Survey, 1884; E. R. Hand, 1913).—On western coast of Hawaii, South Kona District, land of Hoopuloa, high up on the slope, at the edge of the woods, east of a point midway between the villages of Milolii and Hoopuloa. The wharf at Hoopuloa is 2,100 meters N. 70° W., and the church at Milolii is 2,100 meters, S. 66° W. from the station. Marked by an iron bolt set into solid rock, on the highest point available, commanding an extensive view. Four crosses were cut 0.7 meter (2 feet) from it on a large jagged "aa" (lava) rock. A large cairn, about 8 feet high, was erected over the station and painted white.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION! MILOLII
ESTABLISHED BY: H.G.S. YEAR: 1884 STATE: HAWAII BENCH MARK(S) ALSO ARRUME DISTANCE AND DIRECTION FROM NEAREST TOWN: ISLAND.

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

Station mark was recovered, however the old crosses were not found. Located about 17 miles south of Honaunau and 1-1/2 miles east of Milolii, at about 931 feet elevation, on brush-covered slopes, about 1000 feet south of south edge of the Hoopuloa Lava Flow of 1926, 1-1/2 miles west of State Highway 11 and at the T-junction of old, brush-covered, track roads.

To reach station from the post office in Honaunau, go south on State Highway 11 for 16.8 miles to the Milolii road on right; continue ahead on the highway for 1.3 miles to graded crossroad at power pole 229. Turn right and go west along south side of lava flow for 0.5 mile to fork. Take right fork and continue along edge of flow for 1.0 mile to end of road. Walk west along edge of lava flow about 150 yards, then go left into brush, pick up old track road and go about 1000 feet to station at T-junction. Station is marked by a 1-inch-square iron bolt head in drill hole in

Station is marked by a l-inch-square iron bolt head in drill hole in rock, on a small knoll, 15 yards southeast of T-junction of track roads and about 1500 feet south of a telephone line. A large, 10-foot-diameter, stone pier about 4 feet high, with a tall signal in the center has been reputative built around the station mark.

FORM CEGS-526 (1-68) DULLE Around the station mark.

D

DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION MILDLII

STATE HAWAII

YEAR 1884

THIRD

ORDER

SOURCE G-SP156

0EODETIC LATITUDE: 19 11 23-136 EL 0EODETIC LONGITUDE: 155 53 21-637	EVATION.	284.0 932	METERS FEET
--------------------------------------------------------------------------	----------	--------------	----------------

STATE COORDINATES (Feet)							
STATE & ZONE	CODE	×	٧	HIOHA dI ANGLE			
HI 1	5101	365,657.84	129,579.65	- 3 37 41			
	l i						

PLANE AZIMUTH HAS BEEN COMPUTED BY THE & OR A 4 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From sauth)	PLANE AZIMUTH	CODE
		F 15 1251	
		l i	

QO 268

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1069 19 °00' TO 19 °30' LATITUDE LONGITUDE 155 ° 30' TO 156 ° 00' DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORTH 585

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: MOUNTAIN

STATES

HAWAII COUNTY: HAWAII

OTE,	HEIGHT OF TELESCOPE ABOVE	STATION MARK	MET	ER8.†	HEIGHT OF	F LIGHT ABOVE STA	ATION MARK METE
4	Surface-station mark, Underground-station mark	DISTANCES AN				FERENCE MARK ROUND AT THE	S AND PROMINENT OBJECTS STATION
	OB	JECT		BEARING	DISTANCE		DIRECTION:
	UMPDC:		BEARING	foot	meters	- DIRECTION!	
.2a .2a	R. M. No. 1 R. M. No. 2 Nail in a cross Nail in a cross				40.07 25.42 19.33 5.36	12.215 7.748 5.89 1.634	Magnetic Beari N 15 E S 60 E S 75 E S 45 E

The station is located in the land of Pahoehoe in the South Kons District, in dense forest about four miles above the Government road and about two miles northwest of the Kache Ranch House.

The station is located on a high rise of land that breaks steeply to the southwest and northwest. The station mark is a standard disk cemented in drill hole in a boulder set in the ground 25 feet northwest of and about four feet lower than the highest ground nearby. It is about 60 feet directly below the top of a large chia tree denuded of its branches. A small pile of stones covers the station mark.

To reach the station proceed east and up the hard surfaced track road leading to the Ohia and Koa Mills south of the Alika Lava flow of 1919. This road commences at the Government main road, about 1/4 mile south of the Alika lava flow and is marked by a chained gateway with a cattle guard. After reaching the Kos Mill about 5 miles above the main road, turn north along a rough road which crosses the many branches of the Alika lava flow.

Keep to the right at first fork in the road, a little north of the Kos Mill. From this point on take left forks of all junctions. This road ends at Kache Ranch House about 10 miles beyond the Koa Mill. Continue along a trail that runs northwest 1/4 mile through a narrow corral, thence due north along trail through forest a little over a mile, following near the west along trail through forest a little over a mile, following near the west side of a fence, to high ground about 300 feet west of the fence at which point the trail turns northwest. Continue a distance of about 3/4 mile. From this point go west through dense forest for a mile to station. Without a guide the station is difficult to locate. The location of the station was first located by going due west 4800 feet from the paddock corner la miles north of Kache Ranch House.

R. M. No. 1 is a disk in drill hole in solid rock 5 feet east of an uprooted ohia tree NNE of station.

R. M. No. 2 is a disk in drill hole in solid rock 3' x 1.5' by 1'

high SE of station, on highest ground nearby.

A 20 penny nail in cross in north face of chia tree bears SSE. A 20 penny nail in cross in west face of chia tree bears ESE.

d clackwise, referred to initial at

(continued on next page)

MOUNTAIN NAME OF STATION

1948

SECOND

SOURCE G- 9279

19 19 49.186 GEODETIC LATITUDE 1419.5 ELEVATION METERS 155 49 20.690 GEODETIC LONGITUDE 4657 FEET

AUJUSTED HORIZONTAL CONTROL DATA

STATE COORDINATES (Feet)							
STATE & ZONE	CODE	×	· ·	8 OR A 41 ANGLE			
HI 1	5101	388,846.76	180,579.95	- 0 06 24			

PLANE AZIMUTH HAS BEEN COMPUTED BY THE B OR A B FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	FLANE AZIMUTH *	COD
		131 10 1	
	101		

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

FORM 5260

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

MOUNTAIN NAME OF STATION:

L.C. Wilder YEAR: 1948 STATE: Hawaii ESTABLISHED BY: RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Hawaii Island: Hawaii

MOUNTAIN (continued)

HEIGHT OF TELESCOPE ABOVE STATION MARK HEIGHT OF LIGHT ABOVE STATION MARK DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMIMENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION DISTANCE BEARING DIRECTION OBJECT METERS FERT Compass Azimuths) 205 NNE 40.07 12.215 R.M. No. 1 SE 19.33 5.89 7.748 300 Nail in cross on 2-ft. ohia tree SE 25.42 315 R.M. No. 2 Nail in cross on 45-foot snag SSE 5.36

Station was recovered and all marks found in good condition. Distance to reference marks was checked and found correct. The 45-foot-tall snag of the large ohia denuded of its branches, mentioned in 1948, still stands and has ladder steps nailed up the east side. A complete description

Station is located about 6 miles southeast of Kealia, 1-1/2 miles northwest of Kaohe Ranch and 3-1/2 miles east of Alae School, at 4659 feet elevation in dense forest country, 3200 feet south of the 1950 Honokua laya flow. It is located on a rather flat area, about 30 yards west, and lower, from the west end of a narrow-topped ridge which has a narrow

gully down its crest and a very deep blow-hole, or crater, hidden by ferns, at the end of the gully.

To reach station from the post office at Honaunau, go south on State To reach station from the post office at Honaunau, go south on State Highway 11 for 8.1 miles to Alae School; continue for 0.05 mile to track road left. Go up steep track road for 1.0 mile to board gate; pass through gate and continue for 0.45 mile to dim fork. Take left fork and go 0.3 mile to fork; take left fork, ahead, and go 0.65 mile to lava flow. Go up along south edge of lava flow on jeep road for 2.0 miles to end of road. Pack on up lava flow about 1/2-mile to 4660 feet elevation, then go due south about 3200 feet through forest to station. NOTE: An altimeter is of great help in finding station. A 4-wheel-drive truck is required.

Station mark is a standard disk stamped "MOUNTAIN 1948", cemented in a drill hole in a boulder flush with ground 5 feet north of the snag; there is a small cairn built over the mark.

there is a small cairn built over the mark.

Reference mark number one is a standard disk stamped "MOUNTAIN 1 1948", cemented in a drill hole in a 12 x 20-inch rock projecting 6 inches. It is 4 feet east of the roots of an uprooted ohia tree, which is still alive, and is at about same elevation as station mark.

Reference mark number two is a standard disk stamped "MOUNTAIN 2 1948", cemented in a drill hole in a brown boulder about 1-1/2 x 4 feet and projecting 16 inches. It is 24 feet west of a 2-foot onia stump and at the north side of the log from the stump, and about 2 feet higher than station.

Both 20-penny nails in crosses were recovered; the one in the station snag is head-high above ground and the other one is 7 feet above ground, on the west face of a 2-foot ohia tree.

NOTE: All lines are blocked by the tall trees.

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.

QUAD 191553

STATION 1069

LATITUDE LONGITUDE TO

DIAGRAM

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1070 19 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Na Puu a Pele (Hawaii Island, Hawaiian Government Survey, 1891; E. R. Hand, 1914).—On southwest coast of Hawaii, in the extreme southwest part of Ka-u District, in Manuka, on the largest and most westerly of a chain of cinder cones on the coast, and about 12 miles west-northwest from Ka lae, the south point of Hawaii. Marked by a cross cut in a beach-worn stone buried 1 foot below the surface of the ground. Above it is placed a similar stone marked with a triangle, and above all a large stone cairn.

DEPARTMENT OF COMMERCE RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: NA PUU a PELE Established BriHawaiian Govt. YEAR: 1891 STATE:

HAWATI

RECOVERED BY: *L. C. Wilder YEAR: 1949 COUNTY: HAWAII Detailed statement as to the fitness of the original description: The station was recovered, as described,

in good condition. A standard station disk was set into the original drill hole and two reference marks were established. A new description follows-The station is located on the summit of the higher of several, rounded, cinder cones which lie along the coast east of Awill Point. The station is about 4 miles west northwest of Pohue Bay, about 2 miles east southeast of Kauna Point Lighthouse and about 300 yards east of the beach.

The station is best reached, by boat, from the village of Milolii. A landing can be made in a small cove at the foot of the station hill. Station can also be reached, by trail, from the highway which runs between Naalehu and Captain Cook. The trail starts 14.7 miles northwest of the school house and church in the village of Waiohinu. This is about a 9 mile pack and horses can be obtained at the Kahuku Ranch. No water is obtainable after

The station is a standard disk, stamped NA PUU a PELE 1948, set in the center of a triangle which is carved into a flat rock which is flush with the surface of the ground.

A rock cairn was built over the station. Reference mark number 1 is a standard disk, stamped NA PUU a PELE 1 1948, set into a drill hole in a boulder which is flush with the surface of the ground and is about 3 feet lower than the station.

Reference mark number 2 is a standard disk, stamped NA PUU a PELE 2 1948, set into a drill hole in a boulder which projects about 4 inches and is about 4 feet lower than the station.

	Object			Dist	anc e	Dir	ecti	on
R.	M. No. 2 M. No. 1	n Se	27.083 16.869		8.255 m 5.142 m	00 79 225		00 32 11

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION, NA PUU A PELE

STATE! HAWAII

YEAR: 1891

SECOND

SOURCE: G- 9275

GEODETIC LATITUDE:	15 01 48.274 155 51 21.266	ELEVATION	74.7	METERS
SEGDETIC EGNGTTODE:	133 31 21.286		245	FEET

16		STATE COORDINATES (Feet	•	
STATE & ZONE	CODE	×	- v	e ION A AT ANGLE
HI 1	5101	377,377.19	71,567.40	- 3 36 58
		120		i

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\,\, heta\,$ (or $\Delta\,$ of Formula neglecting the second term

	THE SECOND TEN	м,	
TO STATION OR OBJECT	GEODETIC AZIMUTH (From louth)	PLANE AZIMUTH * (From instit)	CODE
PUU KI HGS	291 11 54.6	291 18 53	5101

QE 079

(continued on next page)

JUN 1978

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

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

NA PUU A PELE (continued)

FORM 3266 (9-18-89)

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: NA PUU A PELE ESTABLISHED BY: HGS YEAR: 1891 STATE: HAWAII RECOVERED BY: R.C. MUNSON YEAR: 1968 COUNTY! HAWAII Island: Hawaii

DISTANCES AND DIRECTION	S TO AZIMUTH MARK	, REFEI	RENCE MAR		ABOVE STATION ENT OBJECTS WHI		BE SEE	METERS.
				DIST	ANCE			
OBJECT			BEARING	FEET	METERS	U	IRECTI	JN
PUU KI (HGS) 1914 R.M. No. 1 R.M. No. 2 PUU KI (HGS) 1914 R.M. No. 1 HANAKEAUMOE (HGS) R.M. No. 2	1948 1968 1890		ANCE & SE N IANCE & SE -	md DIRECT 16.869 27.083 and DIRECT 16.624	ION 5.142 8.255 ION 5.068	253 - 00 253 - 00 214 253	00 31 43 00 32 51 42	00.0 29 50 00.0 15 55.3

Station was recovered and all marks found in good condition. It is now possible to drive near station with 4-wheel drive. A discrepancy was

now possible to drive hear search, and the possible to the distance to RM No. 1. A complete description follows:

Station is located about 11-1/2 miles south-southeast of Milolii, 10 miles northwest of South Point and 6 miles southwest of State Highway and the southwest corner of Hawaiian Ocean View Estates, at about 245 feet elevation, on the western and highest one of a group of low, bare hills. It is about 1600 feet north of the sea, 1600 feet northeast of a large, white, bombing target, and 1/2-mile northwest of Awili Point.

To reach station from the post office at Honaunau, go south on State Highway 11 for 24.5 miles to Manuka State Park on left; continue for 1.8 miles to sign on right "TO THE SEA DRIVE". Turn right and follow gravel road southwest for 3.2 miles to gate. Pass through gate and continue for 2.5 miles to side road right. Turn sharp right and go 0.1 mile; take side road left and go across rough lava area for 0.55 mile; take right fork and go 0.25 mile to end of truck travel between two low hills, just above sea. Pack westerly along base of hills about 3/4-mile to station. Station mark is a standard disk (no stamping is visible), cemented in a drill hole in rock flush with ground. There is a cairn with signal in center, built over the mark.

in center, built over the mark.

Reference mark number one is a standard disk stamped "NA PUU A PELE 1 1948", cemented in a drill hole in a smooth bedrock outcrop that projects 1 inch above ground. It is 2 feet lower than station mark.
Reference mark number two is a standard disk stamped "NA PUU A PELE neterence mark number 2 1948", cemented in a drill hole in a bedrock outcrop that projects 2 inches above ground. It is 3.75 feet lower than station mark.

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

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

USCOMM-DC 27178-P88

STATION 1070 OUAD 191553 TO LATITUDE TO LONGITUDE

DIAGRAM

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191555 STATION 1071
HAWAII
LATITUDE 15 000' TO 15 030'
LONGITUDE 255 030' TO 156 000'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME O	FSTATION	NAMANUIKEHAU				
STATE	HAWAII		YEAR	1890	THIRD	ORDER

SOURCE G-SP156

GEODETIC LATITUDE 19 12 44.833 ELEVATION 1996 125 46 21.256	METERS FEET
-------------------------------------------------------------	----------------

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	×	· ·	P OR A O ANGLE
HI 1	5101	405,965.12	137,744.06	- 0 05 23

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\,\, heta\,$ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH *	CODE
		0 / 0	
		[

QJ 286

Napohakuloloa (Hawaii Island, Hawaiian Government Survey; E. R. Hand, 1913).—On west coast of Hawaii, Kona District, 2½ miles north of Hoopuloa, and up on the 100-foot cliff, about 40 meters from the edge, and 360 meters S. 24° E.

from the great arched rock, 60 feet high, seen offshore. Station is on north edge of a decided lava mound about 5 meters in diameter and standing about 10 feet

above the general level. From up and down the coast this mound shows up well against sky, but from the west, on account of background, is not so easily

seen. Marked by two galvanized-iron bolts set in drill hole and four crosses cut in very conspicuous solid rock overlooking the surrounding "pahoehoe" flow.

RECOVERY NOTE, TRIANGULATION STATION

HORIZONTAL CONTROL DATA

by the National Ocean Survey DLD HAWAIIAN DATUM

1072 0 191553 19 °00' 10 19 °30 LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAPOHA KULOLOA NAME OF STATION

STATE HAWAII

SOURCE G-SP156

YEAR 1913

THIRD

R

NAME OF STATION: NAPOHAKULOLOA

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

ESTABLISHED BY: E.R. Hand RECOVERED BY: R.C. Munson

A large cairn was built over station and painted white.

YEAR: 1913 STATE: Hawaii BENCH MARK(S) ALSO YEAR: 1968 COUNTY: Hawaii

Island: Hawaii

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

Station was recovered, but the 4 crosses were not found. Located about 14 miles south of Honaunau and 3 miles north-northeast of Milolii, along coast, near north edge of the Alika Lava Flow of 1919, and about 1200 feet south of a prominent stone spire in the sea, just offshore (for-1200 feet south of a prominent stone spire in the sea, just offshore (formerly an arch but now broken off); on the top of a broken-up lava mound about 30 feet in diameter and extending 10 feet above general level, in an older, black, pahoehoe lava area that was surrounded by the 1919 flow.

To reach station from the post office in Honaunau, go south on State Highway 11 for 16.8 miles to side road right and sign "MILOLII". Turn right and go downgrade for 3.4 miles; turn right, into new sub-division, and go northwest for 0.5 mile to end of truck travel at north side, near sea. From here walk along searcest about 2 miles to station.

and go northwest for 0.7 mile to end of truck travel at north side, hear sea. From here walk along seacoast about 2 miles to station.

Station is marked by a rusted, 3/4-inch iron bolt in a drill hole, flush with surface, on north edge of mound. It is about 200 yards south from north edge of the 1919 lava flow and 50 yards east of sea bluff. A large cairn, with signal in center, is built over the station mark.

FORM C&GS-526 (1-68)

COAST AND GEODETIC STRVEY

GEODETIC LATITUDE	19 14 03.624	ELEVATION	38.0 125	METERS
GEODETIC LONGITUDE	155 54 10.457			

STATE & ZONE	CODE	×	٧	# OR A BI ANGLE
11 1	5101	361.016.02	145.779.57	- 5 07 58

TED BY THE \$ 108 A 4 FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH	PLANE AZIMUTH	CODE
		* *	

QU 267

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1073
HAWAII
LATITUDE 19 000' TO 15 030'
LONGITUDE 155 030' TO 156 000'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

NAPOOPOO KAHIKOLU CHURCH SPIRE

This is an intersection station.

(Hawaii Island, E. R. Hand, 1913; E. R. Hand, 1928).—On western coast of Hawaii, Kona District, at Napoopoo, the steeple of the large stone church. It is high up on a rise, faces the sea, and shows up white; very prominent.

RECOVERY
DESCRIPTION OF TRIANGULATION STATION DEPARTMENT OF COMMERCE U. S. COAST AND GEOGRIC SURVEY FORM 525 Boy. Aug. 1968 KAHIKOLU CHURCH, SOUTH KONA DISTRICT NAME OF STATION: NAPOOPOO, SPIRE STATE: HAWAII COUNTY: HAWAII Established Bw: E.R. Hand, 1913 CHIEF OF PARTY: L. C. WILDER YE YEAR: 1948 Described by: C. J. HOEPPEL NOTE, HEIGHT OF TELESCOPE ABOVE STATION MARK METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS. DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS
WHICH CAN BE SEEN FROM THE GROUND AT THE STATION Surface-station mark, Underground-station mark OBJECT DISTANCE DIRECTION:

The station is the top of the spire on the summit of the steeple of the Kahikolu Church in the village of Mapoopoo.

The church is constructed of stone and concrete and faces to the west. The steeple is on the west end of the structure and is about 40 feet in height.

The church lies about 0.5 mile east of the beach.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Napoopoo, Kahikolu Church, spire
ESTABLISHED BY: E. R. Hand YEAR: 1913 STATE:
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station was recovered; the church has been abandoned for a long time but is still in good condition.

Located about 1/4-mile southeast of Napoopoo Bay and 1100 feet east of the macadam road leading south to the City of Refuge, on the kiawe-covered slopes.

Station is the sharp, rust-colored spire, with a ball and wind vane on top, located on the west end of the large, rectangular, stone and mortar church bullding, which has a rust-colored, corrugated metal roof. Top of spire is about 60 feet above ground.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Napoopoo, Kahikolu Church, Spire
ESTABLISHED BY: E. R. Hand
year: 1913
YEAR: 1913
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

STATE: HAWAII
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 viewed from sea and no changes were noted from the recovery note by R. C. Munson dated 1968.

In Napoopoo'

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION NA POJPOO KAHIKOLU CHURCH SPIRE

STATE HAWAII

THIRD

SOURCE G- 9279

GEODETIC LATITUDE	19 28 21.182 155 55 05.755	ELEVATION	METERS FEET

STATE & ZONE	T			
STATE & ZONE	CODE	×	· ·	B OR A B ANGLE
HI 1	5101	355,922.70	232,298.95	- 0 08 22

PLANE AZIMUTH HAS BEEN COMPUTED BY THE | heta| formula neglecting the second term

TO STATION OR OBJECT	GEODETIC AZIMUTH	PLANE AZIMUTH (From sealth)	CODE
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HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 151553 STATION 1074
HAWAII LATITUDE 15 00' TO 19 30' LONGITUDE 155 30' TO 156 00' DIAGRAM NE 5-1.5 HAWAII

Napoopoo Light (Hawaii Island, E. R. Hand, 1928).—On western coast of Hawaii, north side of Kealakekua Bay, the usual type of unwatched light; a square structure, tapering, and painted white. There is a small railed platform about the lamp. Height about 33 feet. Must not be confused with old light, which was on a pole, determined in 1913. New light is 18 feet true south from position of old light.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

I

NAME OF STATION Napoodoo Light

ESTABLISHED BY: E.R. Hand YEAR: 1928 STATE: Hawaii BENCHMARK(S) ALSO
RECOVERED BY: R.C. MUNSON YEAR: 1968 COUNTY: Hawaii

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

ISland: Hawaii

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

Station was recovered. Located about 2-1/4 miles southwest of Kealakekua and 1 mile west-northwest of Napoopoo dock, on west side of Cook Point, about 1300 feet southwest from Captain Cook's Monument. Station is the center of the light tower, a square, white, concrete structure, 4-1/2 feet square at the base, tapering to 2 feet square at the top, supporting a 5-foot-square platform with the white 11ght extending above it. The light is about 22 feet above ground.

The point occupied by the old light is 18 feet north from center of tower, and is marked by a small brass pipe set in concrete block.

INTERSECTION
RECOVERY NOTE, TRIANGUEZING STATION

F

Name of Station: Napoopoo Light

ESTABLISHED BY: E.R. Hand YEAR: 1928 YEAR: 1972.

STATE: Hawaii BENCH MARK(S) ALSO 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 pettinent facts:

Station was recovered as described by R.C.Munson (1968) in good condition.

FORM C&GS-526 (8-66)

U.S. DEPARTMENT OF COMMERCE ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION COAST AND GEODETIC SURVEY ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION NAPOOPOJ LIGHT

IIAWAII

YEAR 1928

THIRD

-ORDER

SOURCE G- 9279

	19 28 55.877	ELEVATION	METERS
GEODETIC LATITUDE	155 56 21.592		FEET
GEODETIC LONGITUDE	155 50 21.572		

		STATE COORDINATES (Feet)		
STATE & ZONE	CODE	×	¥	₽ OR △ GI ANGLE
HI 1	5101	348,679.14	235,816.99	- 0°08'48
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*PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ IDR $\Delta\,$ GI FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (Fram south)	PLANE AZIMUTH (From santh)	CODE
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	A contract of the contract of		

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

HORIZONTAL CONTROL DATA

National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1075 LATITUDE 19 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Napoopoo School Flagpole

(Hawaii Island, E. R. Hand, 1913; E. R. Hand, 1928).—On western coast of Hawaii, Kona District, 1¼ miles east of wharf at Napoopoo, on the public school, a 1-story building, originally a dark red color, with galvanized roof. Building conspicuous because of large number of windows. In 1928 building no longer red but brown, and roof no longer shows up bright. Building no longer conspicuous because of color, painted roof, and numerous other buildings about. Station is flagpole on east side of building, midway between ends, and may be seen from the shore, showing over the roof. On school days a flag will be flying.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Napoopoo School, Flagpole ESTABLISHED BY: E.R. Hand YEAR: 1913 RECOVERED BY: R.C. Munson YEAR: 1913
RECOVERED BY: R.C. Munson YEAR: 1968 STATE: Hawaii BENCH MARK(S) ALSO

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. It is a slender pipe flagpole about 25 feet tall, set in a mass of concrete, at east side of abandoned school building, midway between ends.

Located about 2 miles southeast of Captain Cook and 1-1/4 miles east of Napoopoo, along west side of old macadam road leading down to Napoopoo from State Highway 11.

NOTE: Since school is abandoned a flag no longer flies, and large trees block view of the flagpole.

FORM C&G\$-526 11-051

U.S. DEPARTMENT OF COMMERCE

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION NAPOOPOJ SCHOOL FLAGPOLE

STATE HAWAII

YEAR 1913

THIRD

SOURCE G-SP156

GEODETIC LATITUDE	19 28 25,050		
GEODETIC LATITUDE	155 54 07.324	ELEVATION:	METERS
GEODETIC LONGITOBE	255 51 611524		PEET

STATE COORDINATES (Fee)				
STATE & ZONE	CODE	×	•	# IOH △ #I ANGLE
HI 1	5101	361,518.30	232.675.79	- 3°38′03

PLANE AZIMUTH HAS BEEN COMPUTED BY THE # CH A # FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
		0 / 7	

QD 272

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 191553 STATION 1076 LIAWAH LATITUDE 19 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: NIUOU

STATE:

HAWAII COUNTY: HAWAII

NOTE,	PARTY: L. C. W. HEIGHT OF TELESCOPE ABOVE Surface-station mark, Underground-station mark	STATION MARK 1.7 MET	ERS.1	HEIGHT OF	ECTION BY C. LIGHT ABOVE STATE ERENCE MARKS ROUND AT THE S	TION MARK METE		
	OI	UECT	BEARING	DIST	ANCE		DIRECTI	-
				foot	tnetera		DINGC 11	OKI
12e 12e	HANAMALO 2 Cairn B 1 1 R M 1 R M 2	mile	8	33.172 23.579	10.111 7.187	00 166 186 262	90 44 41 38	00 57.4 51 05

The station is located about 4.5 miles south of Milelii, about 2.5 miles south of Hanamalo Point, 0.6 mile north of Kanewaa Point, about 0.2 mile north of Niucu Goocanut Grove, about 100 feet east of the sea, about 100 feet west of a trail and on the summit of a low lava knoll.

The station is best reached, by boat, from the village of Milelii. A landing can be made on the reaky point about 100 feet west of the station. In rough weather the station can be reached from Milolii by packing southerly, on the good trail, for about 4.5 miles to the station on the right hand side of the trail.

The station is a standard disk, unstamped, set into a drill hole in a boulder which is about 1 foot in diameter.

Reference mark number 1 is a standard disk, unstamped, set into a drill hole in a boulder which projects about 3 feet and is located 1.53 meters lower than the station.

Reference mark number 2 is a standard disk, unstamped, set into a drill hole in a boulder which is about 10 feet long, 5 feet wide and projects about 8 feet from the surrounding rook. It is located 1.65 meters lower than the station.

A 2 x 2 black and white pole has been plumbed over this station and a cairn of rocks built around the pele.

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

R

NAME OF STATION: NIUOU ESTABLISHED DY

RECOVERED BY:* U.S.G.S.

YEAR: 1948 STATE: YEAR: 1958 COUNTY: Hawaii

Hawa11

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

To reach from the Hookena School; proceed southerly along main road for 17.2 miles to the main ranch buildings at Honomolino Ranch; turn right going past houses for 0.1 mile; take left fork thru gate for 1.8 miles to wire corral; turn into corral and continue out gate on west side of corral and continue down grade for 2.3 miles to coastline; take left fork and go southerly across lava along jeep trail for 1.0 mile to end of truck travel, from here pack southerly along good trail for about 0.5 miles to station on right hand side of trail.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION NI UOU

HAWAII STATE

YEAR 1948

SECOND

SOURCE G- 9279

GEODETIC LATITUDE	19 07 49.156 155 55 08.988	ELEVATION.	10.5	METERS FEET

STATE & ZONE				Г
STATE & ZONE	CODE	×	Y	P OH A BI ANGLE
HI 1	5101	355,316.65	108,018.76	- 0 08 15
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* PLANE AZIMUTH HAS BEEN COMPUTED BY THE # IOR A # FORMULA

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From jostli)	CODE
HANAMALO 2	182 11 03.2	182 19 18	510

QE 075

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

NIUOU (continued)

FORM 5264

U.S. DEPARTMENT OF COMMERCE

HORIZONTAL CONTROL DATA by the NATIONAL GEODETIC SURVEY

OLD HAWAIIAN DATUM

QUAD 191553

STATION 1076

TO LATITUDE LONGITUDE DIAGRAM

RECOVERY NOTE, TRIANGULATION STATION

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: NIUOU ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: COUNTY Hawaii Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.59 METERS. 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 DISTANCE DIRECTION OBJECT METERS FEET and DIRECTION ---00° 28 00 00.0 HANAMALO 2 -----1948 DISTANCE 43.0 34 OHEPUUPUU (HGS) 1890 33.172 10.111 186 41 R.M. No. 1 7.187 262 38 05 23.579 R.M. No. 2 00 00.0 HANAMALO 2 (HGS) 1890 --- 1968 DISTANCE and DIRECTION---34 28 42.2 OHEPUUPUU (HGS) 1890 10.099 186 12 R.M. No. 1 23.562 7.182 262 R.M. No. 2

Station was recovered and all marks found in good condition. It is now possible to drive to within 1/2-mile of station with 4-wheel drive vehicle. A complete description follows:

Station is located about 4-1/4 miles south of Milolii, 4 miles southwest of the Honomalino Agriculture Co. Office, and 3400 feet southsouthwest of the old Holua Slide, along the coast, southeast across a small cove from Niuou Point, about 250 yards north of a kiawe grove (there is no longer a coconut grove in the area), at about 34 feet ele-

vation, on a slight knoll in rough lava area, and 100 feet west of an old Hawaiian trail.

To reach station from the post office at Honaunau, go south on State Highway 11 for 19.7 miles to the Honomalino Agriculture Co. Office on right. From office go south on narrow macadam road for 0.25 mile to a dim road right. Turn right and go down through orchard for 1.1 miles to locked gate (key was obtained at the Honomalino office). Pass through gate and go 0.4 mile to T-junction. Turn left and go 0.8 mile; take right fork, inside wire corral, and go down through pasture land for 2.6 miles to T-junction at beach. Turn left and follow beach road south for 0.95 mile to end of road. Pack south on old trail about 1/2 mile to

station on right. Station mark is a standard disk, unstamped, cemented in a drill hole in rock flush with ground, about 175 feet north of the inner end of a narrow inlet. There is a large cairn with signal in center, over the mark.

Reference mark number one is a standard disk, unstamped, cemented in a drill hole in a 4-foot-diameter boulder projecting 3 feet above ground.

It is 4.9 feet lower than station mark. Reference mark number two is a standard disk, unstamped, cemented in a drill hole in a 9-foot-diameter lava rock that projects 6 feet above ground. It is 5.3 feet lower than station mark.

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

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

USCOMM-DC 27178-P88

NAME OF STATION: NIUOU BENCH MARK(S) ALSO STATE: Hawaii YEAR: 1948 ESTABLISHED BY: L. C. Wilder COUNTY: Hawaii RECOVERED BY: C. A. Burroughs YEAR: 1973 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 and all marks found in good condition. The new to reach description is as follows: To reach station from the Post Office at Honaunau, go south on State Highway 11 for 19.7 miles to the Honomalino Agriculture Company Office on right. From the office continue south up hill and return to Hwy 11, at the highway turn right and proceed south for 0.2 miles to narrow asphalt road on right. Turn right and follow road for 0.3 miles to two Mango trees on the left and a narrow track road to the right leading through Macadamia Orchard. Follow this track road 1.3 miles to a locked gate (key was obtained at the Honomalino Office). Pass through gate for 0.2 miles and take right fork in road and continue 0.6 miles to a wire corral. Go through corral and take the left exit which makes a sharp U-turn and parallels the road that entered the corral. Continue for 2.3 miles where a road joins from the right and continue straight ahead for 0.1 mile to a T-junction at beach. Turn left and follow beach road south for 0.95 mile to end of road. Pack south on old trail about 1/2 mile to station on right.

FORM C&GS-526 19-86

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

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

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1077 LATITUDE 15 00' TO 15 30' LONGITUDE 155 30' TO 156 00' DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Ohepuupuu (Hawaii Island, Hawaiian Government Survey, 1890; E. R. Hand, 1914).—On southwest coast of Hawaii, in South Kona, land of Kapua, ½ mile south of the shacks at Kapua Bay, which is just south of Okoe Bay, and 430 meters east of the shingle beach cove which is on the north side of the great point. It is near the shore, south of Ahole cocoanut grove, 32 feet southwest of trail leading over the "aa" (lava), and 600 or 700 feet southeast of the ancient "holua" (slide) of Heeia. Marked by a triangle cut in a large stone on top of an ancient grave on highest point of the "aa." In 1914 a large cairn was erected over the station and painted white.

DEPARTMENT OF COMMERCE
U. S. COAST AND SESSETIC SURVEY
FORTH 594 RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: OHEPUUPUU

ESTABLISHED BY: Hawaiian Govt. YEAR: 1890 STATE: RECOVERED BY: L. C. Wilder YEAR: 1945 COUNTY: HAWAII

HAWAII

Detailed statement as to the fitness of the original description:

The station was recovered as described. A standard station disk and two reference marks were established. A new description followsThe station is located about 3.5 miles south of Milolii, about 1 mile northeast of the Niuou Cocoanut Grove, about 0.3 mile east of the beach, about 200 feet north of a well marked trail and about 50 feet south and west of a well marked side trail. The station is on the summit of a prominent lava knoll which projects about 20 feet above the surrounding lava.

The station is best reached, by boat, from the village of Milolii. A landing can be made in a small cove which lies about 500 feet south of the ancient Hawaiian slide. In rough weather the station can be reached by a good foot trail from the village of Milolii.

The station is a standard disk, unstamped, set into a drill hole in a boulder which is flush with the surface of the ground.

Reference mark number 1 is a standard disk, unstamped, set in a drill hole in a boulder which is about 25 feet long, 15 feet wide, and projects about 6 feet. It is located to the north of a trail and is 2.51 meters lower than the station.

Reference mark number 2 is a standard disk, unstamped, set into a drill hole in a boulder which is about 7 feet long, 4 feet wide and projects about 3 feet. It is located about 2 feet east of a trail and 1.43 meters

Object	Distance	Direction
HANAMALO 2 R. M. 1 NE R. M. 2 ESE Gairn SSE Boundary Monument 4 W	65.162 ft 19.862 m 47.546 ft 14.492 m 2 miles 0.3 mile	00 00 00 57 38 11 116 02 30 196 11 06.4 284 52 55.1

Boundary monument number 4 is a 1 inch pipe which projects about 6 inches above a square slab of concrete. It is located about 0.3 mile west of the station, about 100 feet east of the sea and just north of a number of scrub trees. It is the most northeasterly of four pipes.

ADJUSTED HORIZONTAL CONTROL DATA

OHEPUUPUU NAME OF STATION

HAWAII

SECOND

SOURCE G- 9279

ELEVATION	31.0	METERS
	ELEVATION	ELEVATION 31.0 102

		STATE COORDINATES (Feet	9	
STATE & ZONE	CODE	×	*	B IOR A A ANGLE
HI i	5101	356,910.79	110.682.27	- 0°08'09

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\,\, heta\,$ IOR $\Delta\,$ G $\,$ FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH *	CODE
HANAMALO 2	1 7 1 22 59.7	171 31 09	510

QE 077

(continued on next page)

HORIZONTAL CONTROL DATA

U.S. DEPARTMENT OF COMMERCE U.3. DEPARTMENT OF COMMERCE ADMINISTRATION NATIONAL OCEANS UNEVEY, NATIONAL GEODETIC SURVEY NATIONAL GEODETIC SURVEY

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

STATION 1077 QUAD 191553 TO LATITUDE TΩ LONGITUDE

OHEPUUPUU (continued)

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

OHEPUU PUU NAME OF STATION:

FUHM 349

ESTABLISHED BY:

RECOVERED BY:

YEAR: 1890 HGS STATE: YEAR: 1968 R.C. Munson

Hawaii COUNTY: Hawaii Island: Hawaii

HEIGHT OF LIGHT ABOVE STATION MARK METERS. HEIGHT OF TELESCOPE ABOVE STATION MARK 1.64 METERS. DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMIMENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION DISTANCE DIRECTION OBJEC1 METERS HANAMALO 2 -----1948 DISTANCE and DIRECTION-00 00.0 38 11 30 19.862 NE 65.162 R.M. 1 47.546 14.492 ESE R.M. 2 2 miles 196 11 06.4 SSE Cairn mile 284 55.1 Boundary Monument 4 00 57 HANAMALO 2 (HGS) 1891 ---- 1968 DISTANCE and DIRECTION-ÓÖ 00.0 19.859 38 NE -65.154 R.M. No. 1 47.530 03 ESE 14.488 R.M. No. 2 196 11 20.6 Cairn, 1948 52 284 53.9 Boundary Monument 4, 1948

Station was recovered in good condition. It is now possible to drive within 1/4-mile of station. A complete description follows:

Station is located about 3-1/2 miles south of Milolii, 1500 feet east of Kaupo Bay, 800 feet southeast of Holua Slide, an old Hawaiian slide built of stones, and 32 feet southwest of an old stone trail, on a knoll of about 102 feet elevation in rough lava land.

To reach station from the post office at Honaunau, go south on State Highway 11 for 19.7 miles to the Honomalino Agriculture Co. Office on right. From the office go south on narrow macadam road for 0.25 mile to dim road right. Turn right and go down through orchard for 1.1 miles to locked gate (key was obtained at the Honomalino office). Pass through gate and go 0.4 mile to T-junction. Turn left and go 0.8 mile; take right fork, inside wire corral, and go down through pasture land for 2.6 miles to T-junction at beach. Turn left and follow beach road for 0.8 mile to old slide on left. Pack southeast along stone trail about 400 yards to station.

Station mark is a standard disk, unstamped, cemented in a drill hole

in a boulder flush with ground. Reference mark number one is a standard disk, unstamped, cemented in a drill hole in the west end of a large rounded lava formation projecting 6 feet above ground, and is 8.3 feet lower than station mark.

Reference mark number two is a standard disk, unstamped, cemented in

a drill hole in a 4-foot boulder, 4 feet east of the trail and 4.8 feet lower than station mark.

RECOVERY NOTE, TRIANGULATION STATION

DIAGRAM

NAME OF STATION: OHEPUUPUU

YEAR: 1890 STATE: Hawaii ESTABLISHED BY: HGS COUNTY: Hawaii RECOVERED BY: C. A. Burroughs YEAR: 1973

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 was recovered and all marks found in good condition. The new to reach description is as follows: To reach station from the Post Office at Honaunau, go south on State Highway 11 for 19.7 miles to the Honomalino Agriculture Company Office on right. From the office continue south up hill and return to Hwy 11, at the highway turn right and proceed south for 0.2 mile to narrow asphalt road on right. Turn right and follow road for 0.3 mile to two Mango trees on the left and a narrow track road to the right leading through a Macadamia Orchard. Follow this track road 1.3 miles to a locked gate (key was obtained at the Honomalino Office). Pass through gate for 0.2 mile and take right fork in road and continue 0.6 mile to a wire corral. Go through corral and take the left exit which makes a sharp U-turn and parallels the road that entered the corral. Continue for 2.3 miles where a road joins from the right and continue straight ahead for 0.1 mile to a T-junction at beach. Turn left and follow beach road south for 0.8 mile to old slide on left. Pack southeast along stone trail about 400 yards to station.

FORM C&GS-526 18-66

BENCH MARK(5) ALSO

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 191553 STATION 1078
HAWAII
LATITUDE 19 °00' TO 15 °30'
LONGITUDE 155 °3C' TO 156 °00'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF	STATION OHIALELE				
STATE	HAWAII	YEAR	1914	THIRD	OADER

SOURCE G-SP156

GEODETIC LATITUDE	19 14 07.131 155 46 37.231	ELEVATION	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	×	¥	8 OH A A ANGLE
HI 1	5101	404,445.39	146,048.44	- 0°05′25
		i i		

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE ~ heta~ I or $\Delta~$ at Formula neglecting the second term

TO STATION OR OBJECT	GEODETIC AZIMUTH (From sealb)	PLANE AZIMUTH*	CODE
		E. 1 (10)	

QC 287

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 191553 STATION 1079
HAWAII 1 19 000' TO 19 030'
LONGITUDE 155 030' TO 156 000'
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

DEPARTMENT OF COMMERCE
We have to except worth
Worm 850

Name of Station: Olokulana

State: Hawaii County: Hawaii

Betallasted by: H.G.S. Year: 1914 Locality: Kau, Hawaii

Recovered by: Chas. J. Furray Year: 1938

Detailed statement as to the Stiness of the original description:

Location of station: On a prominent grassy hill surrounded by lava flows about 0.6 mile above the Waiohim.—Kona road and roughly

about 5 miles from Walchinu.
Old station mark found: Drill-hole in + cut in rock set in ground and stone-

Pile.

New station 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 statel berl.

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

NAME OF STATION OLOKUANA

STATE HAWAII

YEAR 1914

THIRD

ORDER

SOURCE G-SP156

ELEVATION	METERS .
	ELEVATION

ADJUSTED HORIZONTAL CONTROL DATA

STATE & ZONE	CODE	×	¥	# OH △ BI ANGLE
HI 1	5101	437,045.31	86,117.57	- 0 03 35

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\,\, heta\,$ IDR $\Delta\,$ 41 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From semib)	PLANE AZIMUTH (From santh)	COD
		0 , "	

QD 293

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 151553 STATION 1086
HAWAII
LATITUDE 19 °00' TO 15 °30'
LONGITUDE 155 °30' TO 156 °00'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PAHOEHOE

STATE HAWAII

YEAR 1884

THIRD

SOURCE G-SP156

GEODETIC LATITUDE	19 20 24.915 155 52 57.076	ELEVATION	METERS
GEODETIC ZONGITOBE.	>		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	×	٧	# ION A I ANGLE
HI 1	5101	366,132.35	184,226.32	- 0 07 36

PLANE AZIMUTH HAS BEEN COMPUTED BY THE ~ heta~ I OR $\Delta~$ all FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From with)	PLANE AZIMUTH *	CODE
	* .	V2 2 *	
		i j	
	j	[

90 277

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

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1081 HAWAII 15 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5 HAWAII

Palemano (Hawaii Island, E. R. Hand, 1928).—On western coast of Hawaii, on Palemano Point, south side of Kealakekua Bay, south of the low, flat extent of rock which forms this feature, and about 20 meters from the sea on the west. Point is almost as level as a floor, composed of "pahoehoe" or smooth lava, and is awash at storm high water, and is therefore free of all loose stones. Thirty meters true east from the station are the remains of an ancient "heiau" or temple. Marked by a prominent dome of concrete built up from the smooth lava to a height of 2 feet, with a 2-inch gas pipe protruding from its top. This is an old Territorial survey station.

EPARTMENT OF COMMERCE U. S. COAST AND SEDDETIC SURVEY FORTH 536 RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PALEMANO

Perablished BY: E.R. Hand YEAR: 1928 STATE: RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: HAWAII

HAWAII

Detailed statement as to the fitness of the original description: The station, as described in the 1928 survey, was recovered in good condition. A standard disk was set in the center of the 2 inch pipe and two reference marks were established. A new description follows-

The station is located on Palemano Point about 3 miles north of Honaunau Bay, about 1.3 miles southwest of Napoopoo, about 300 feet east of the westernmost point of Palemano Point, 96 feet southwest of a concrete slab which formed the foundation for the old lighthouse and on the top of a mound of concrete which is awash during stormy weather.

To reach from the post office at Napoopoo; go south on the road which leads toward Honaunau for 0.6 mile; turn right, onto a graded road, and go west and south for 0.5 mile; pass through the settlement at Keel and congo were and south for 0.5 mile; pass through the settlement at keel and continue southerly for 0.2 mile; pass through a board gate into the grounds of the Kona Maluhia Camp; turn right and go westerly for 0.3 mile to the station. The station is a standard disk, stamped PALEMANO RESET 1948, set in the top of a mound of concrete which projects about 2 feet.

Reference mark number 1 is a standard disk, stamped PALEMANO NO 1 1948, set into a drill hole in bedrock which is flush with the surrounding rock. It is located 34 feet southwest of the foundation of an old lighthouse and is about 2 feet lower than the station.

Reference mark number 2 is a standard disk, stamped PALEMANO NO 2 1948, set into a drill hole in flat bedrock. It is located about 3 feet lower than the station.

The distance between reference mark number 1 and reference mark number 2 is 98.760 feet.

Object		Dist	ance	Dir	ecti	on
REAWEKAHEKA Napoopoo Lighthouse R. M. No. 2 Napoopoo Spire R. M. No. 1	NAM N NE E	2.0 miles 72.378 ft 2.0 miles 63.994 ft	22.061 19.505	00 14 23 84 116	00 48 44 37 16	00 33.6 16 48.8

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PALEMANO

HAWAII

YEAR 1928

SECOND

SOURCE G- 9279

	10 07 10 7		
GEODETIC LATITUDE	19 27 42.810		
GEODETIC LONGITUDE	155 55 49.210	ELEVATION	Z.O WETERS
			FEET

STATE COORDINATES (Feet)					
STATE & ZONE	CODE	x	¥	# OH A dI ANGLE	
HI 1	5101	351,758.92	228,438.35	- 0 08 36	

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ OR $\Delta\,$ $\, heta\,$ FORMULA NEGLECTING THE SECOND

TO STATION OR OBJECT	GEODETIC AZIMUTH (Fram seuth)	PLANE AZIMUTH *	CODE
KEAWEKAHEKA	142 23 24.7	142 32 01	5101

QE 060

(continued on next page)

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

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

PALEMANO (continued)

FORM 5260

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PALEMANO YEAR: 1928 Hawaii ESTABLISHED BY: E.R. Hand STATE: Hawaii YEAR: 1968 RECOVERED BY: R.C. Munson COUNTY: Hawaii Island:

		DIST	ANCE		IRECTI	OH
OBJECT	BEARING	PEET	METERS		HECT	
KEAWEKAHEKA (HGS) 1891 R.M. No. 2 PALEMANO 2 R.M. No. 1	N E E	72.326 63.974	22.045	00 23 106 116	00 45 53 14	00.0 27 38.6 20

Station was recovered and both reference marks found in good condition; the stone and concrete mound in which the station mark is set is cracking and the soft bedrock ledge on which it is located is being broken up by wave action and it will not last long, so a new station, PALEMANO 2, was established, however the old station was not removed. A complete description follows:

Station is located about 3-1/2 miles west-northwest of the post office at Honsunau, 1 mile southwest of Napopoo, 1400 feet southwest of Keei village, and 800 feet west-northwest of Maluhia Boys' Camp, near the sea, on Palemano Point.

To reach station from the post office in Honaunau, go south on State Highway 11 for 1.8 miles to junction with State Highway 16. Turn sharp right and go downhill on State Highway 16 for 3.5 miles to the City of Refuge; continue north on the road to Napopoco for 3.05 miles to side road left, just past station KEEI NORTH BASE 1948. Turn left and go 0.65 mile to sand beach at end of Keei village. Follow sandy road right, along beach, for 0.15 mile to end of beach. From here pack southwest across bedrock beach about 125 yards to station.

Station mark is a standard disk stammed PALEMANO RESET 1048, set in

Dedrock Deach about 125 yards to station.

Station mark is a standard disk stamped PALEMANO RESET 1948, set in a concrete post in the center of a 3-foot-diameter, stone and concrete mound 16 inches high, on the north edge of a 2-foot ledge of soft lava rock. Reference mark number one is a standard disk stamped "PALEMANO NO 1 1948", cemented in a drill hole in bedrock, 34.3 feet southwest of a large concrete pad (in which PALEMANO 2 is set), and is about 16 inches lower then estation mark. than station mark.

Reference mark number two is a standard disk stamped "PALEMANO NO 2 1948", cemented in a drill hole in flat lava area, 2-1/2 feet lower than station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PAILEMANO ESTABLISHED BY: E.R. Hand

YEAR: 1928 ' STATE: Hawaii - BENCH MARK(S) ALSO

YEAR: 1972 COUNTY: Hawaii-RECOVERED BY: GEH -

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station mark was recovered as described by R.C. Munson (1968) in fair condition. It appears that the mark has not deteriorated significantly since it was visited in 1968. Reference marks 1 and 2 were recovered as described in good condition.

STATION 1081 QUAD 191553 * TO

LONGITUDE DIAGRAM

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

U. S. COAST AND GEOCHTIC SURVEY
FORTH 585

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PALEMANO 2 STATE: Hawaii County: Hawaii

CHIEF OF PARTY: R.C. Munson YEAR: 1968 Described by: R.F. Hanson NOTE, HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS.1 HEIGHT OF LIGHT ABOVE STATION WARK METERS. DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION Surface-station mark, Underground-station mark OBJECT DISTANCE DIRECTION KEAWEKAHEKA (HGS) 1891 00.0 00 Napoopoo Light, 1928
Honaunau, St. Benedict Catholic SE 14 34 21.3 160 56 51.8 Church, spire, 1948
R.M. No. 1
12a R.M. No. 2 (old PALEMANO RM 1) SW
12a R.M. No. 3 (old PALEMANO RM 2) ENE 22.453 6.844 34.316 10.459 112.920 (34.418) 199 27

Station was established to replace PALEMANO (HTS) 1928 which is being destroyed by wave action.

Located about 3-1/2 miles west-northwest of the post office at Honaunau, 1 mile southwest of Napoopoo, 1400 feet southwest of Keei village and 700 feet west-northwest of Maluhia Boys' Camp, at Palemano Point, at the east, inshore, end of the large, flat, black rock area, near a higher stone bank and brush-line, at an old concrete pad that was once a foundation for a light mast.

To reach station from the post office at Honaunau, go south on State Highway 11 for 1.8 miles to junction with State Highway 16. Turn sharp

right and go downhill on State Highway 16 for 3.5 miles to the City of Refuge; continue north on the road to Napoopoo for 3.05 miles to side road left, just past station KEEI NORTH BASE 1948. Turn left and go 0.65 mile to sand beach at end of Keei village. Gollow sandy road right, along beach, for 0.15 mile to end of beach. Pack southwest along bedrock for about 100 yards to station.

Station mark is a standard disk stamped "PALEMANO 2 1968", cemented in a drill hole in the middle of an ll-foot-diameter, concrete pad flush with surrounding rock, and surrounded by a 2-foot-diameter ring of rusted bolts projecting 4 inches from the concrete. It is about 300 feet east from tip of point and 25 feet west of base of a long boulder bank that is 6 feet higher than station.

Reference mark number one is a standard disk stamped "PALEMANO 2 NO 1 1968", cemented in a drill hole in bedrock, 25 feet west of the boulder bank and about 6 inches higher than station mark.

Reference mark number two is the original PALEMANO (HTS) 1928 RM NO. 1. It is a standard disk stamped "PALEMANO NO 1 1948", cemented in a drill hole in flat lava bedrock at same elevation as station mark.

Reference mark number three is the original PALEMANO (HTS) 1928 RM NO 2. It is a standard disk stamped "PALEMANO NO 2 1948", cemented in a drill hole in flat lawa bedrock at about same elevation as station mark. NOTE: The arrows on RM 2 and 3 point toward the old station.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PALEMANO 2

ESTABLISHED BY: R.C. MUNSON · YEAR: 1968 · STATE: Hawaii · BENCH MARK(S) ALSO ...

RECOVERED BY: GEH · YEAR: 1972 · COUNTY: Hawaii · BENCH MARK(S) ALSO ...

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station mark and Reference mark 1 were recovered as described by R.C.Munson in good condition. Reference marks 2 and 3 (old PALEMANO marks) were recovered as described in good condition.

ADJUSTED HORIZONTAL CONTROL DATA

ME OF STATION	PALEMANO	2	

STATE HAWAII YEAR 1968 SECOND

SOURCE G-12664

GEODETIC LATITUDE	19 27 43.146		2	
GEODETIC LONGITUDE	155 55 48.273	SLALED	~	METERS
		SCALED		FEET

STATE COORDINATES (Feet)							
STATE & ZONE	CODE	×	¥	# OR A A ANGLE			
HI i	5101	351,848.67	228,472.02	- 0 08 36			
		Mar Mills					

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ ICR $\Delta\,$ G) FORMULA REGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH	PLANE AZIMUTH * (From south)	CODE
KEAWEKAHEKA	141°56′32.2	142 05 08	5101
		- 11	

QF 030

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

R

Q 191553 STATION 1083
HAWAII
LATITUDE 19 °00' TO 15 °30'
LONGITUDE 155 °30' TO 156 °00'
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

Palianihi (Hawaii Island, Hawaiian Government Survey, 1884; E. R. Hand, 1913).—On west coast of Hawaii, South Kona District, at Hookena, about 8 feet back from edge of cliff. Station marked by a square drill hole in rock, surrounded by four crosses cut in rock equidistant from center. The following bearings are from the station: Extreme southeast corner of wharf, 140 meters, S. 36° W.; post office, 175 meters, S. 66° W.; steeple of Pukaana church, 410 meters, N. 69° W. Station is 383 feet south of tomb near government road.

NAME OF STATION: Palianihi

ESTABLIBHED BY: H.G.S. YEAR 1884

RECOVERED BY: Chas.L. Furray

YEAR 1938

Detailed statement as to the fitness of the original description:

Location of station: West coast of Eawaii, South Kona on top of and 8-feet away from the perpendicular bluff just back of Hookena village and on the lower side of the road leading down to Hookena.

Old mark found: Drill hole in middle of $\Delta_a^{\text{cut} in rock}$ feet, 2.10 feet and 2.67 feet from the station mark.

New station 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).

DEPARTMENT OF COMMERCE
U. COMPT AND DESCRIPT GENERAL SERVICES AND DESCRIPT GENERAL SERVICES AND DESCRIPTION STATION

NAME OF STATION: PALIANIHI
ESTABLIBERO STHEM.GOVT.SUPVEWEAR: 1584 STATE: HAWATI
RECOVERED ST:* L.C. Wilder Year: 1948 COUNTY: HAWATI

Detailed statement as to the fitness of the original description:

This station was monumented in 1936 by the Hawaii Territory with concrete instrument platform, metal pole and target. At time they recovered a "drill hole in middle of triangle and 4 crosses distant 1.2 feet, 0.52 feet, 2.10 feet and 2.67 feet from the station mark". The present pipe and target were installed over the old center mark.

* Name of chief of party should be inserted here. The officer who actually visited the restion should sign his name at the end of the recovery names resume event.

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

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PALIANIHI

STATE HAWAII

YEAR 1884

THIRD

SOURCE G-SP156

GEODETIC LATITUDE	19 23 00.219			
GEODETIC LONGITUDE:	155 53 59.923	SCALED	43	METERS
		JUALED		FEET

STATE COORDINATES (Feet)						
STATE & ZONE	CODE	×		# OR A ANGLE		
HI 1	510i	302,150.35	199,906.33	- 0 07 58		
	- 30 -	1 - 1 - 1 - 1 - 1				

PLANE AZIMUTH HAS BEEN COMPUTED BY THE \$ 10R \(\text{Q} \) FORMULA NEGLECTING THE BECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
		0 , ~	
		-	

QO 276

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

HORIZONTAL CONTROL DATA

by the NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

STATION 1083 QUAD 191553 , 10 LATITUDE LONGITUDE

DIAGRAM

PALIANIHI (continued)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION. FALIANIHI

ESTABLISHED BY: H.G.S. RECOVERED BY: R.C. Munson

YEAR: 1884 YEAR: 1968 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

Hawaii Bench Mark(s) ALSO STATE: COUNTY: Hawaii

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 4-1/2 miles south-southwest of Honaunau, at the east edge of Hookena village, along west side of macadam road, on the edge of the curving cliff about 100 feet high overlooking the sand beach at Kauhako Bay at south side of

To reach station from the post office in Honaunau, go south on State Highway 11 for 3.9 miles to Hookena School; continue for 0.4 mile to fork and sign "HOOKENA". Take right fork and go downgrade for 2.0 miles to station on left in trees. station on left, in trees.

Station on left, in trees.

Station is marked by a triangular, concrete platform 7 feet on each side, with a 3-1/2-inch hole through the center. A 1-7/8-inch iron shaft, 2 feet long, mounted on 3 iron legs, is centered over the hole, and a punch mark in the top is used for center. Station is 50 yards north-northwest of telephone pole No. 23, 100 yards northwest of telephone pole No. 23, 100 yards northwest of telephone pole No. 22, 57 feet west of center of macadam road, and 200 yards southeast, upgrade, from a hairpin left turn.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PALIANIHI ESTABLISHED BY. H.G.S.

BENCH MARK(S) ALSO YEAR: 1884 STATE: Hawaii COUNTY: Hawaii YEAR: 1972

RECOVERED BY: GEII AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station mark was recovered as described by R.C.Munson (1968) in good condition.

FORM CEGS-526 (9-60)

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

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

HORIZONTAL CONTROL DATA

by the National Ocean Survey Old Hawaiian Datum QUAD 191553 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

STATION 1084

19 0 00 TO 19 0 30 LATITUDE LONGITUDE 155 . 30 TO 156 . 00 DIAGRAM NE 5-1,5 HAWAII

10AA FORM 76-39 12-70) FORMERLY CAST FORM 525

U.S. DEPARTMENT OF COM NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL GEODETIC SURVEY DESCRIPTION OF TRIANGULATION STATION

METERS, ! HEIGHT OF LIGHT ABOVE STATION MARK

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMIMENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

NAME OF STATION PAM NEAREST TOWN KOALIA CHIEF OF PARTY: GEH

HEIGHT OF TELESCOPE ABOVE STATION MARK

SURFACE-STATION MARK, UNDERGROUND-STATION MARK

STATE: Hawa11 . COUNTY: Hawaii QUADRANGLE NO. 191553

YEAR: 1972 .

DESCRIBED BY: RDB

NAME OF STATION HAWAII

OBS BY NGS 1972

SECOND

G-14950 SOURCE

19 20 35:22934 GEODETIC LATITUDE. 333.7 METERS 155 52 33-17083 ELEVATION GEODETIC LONGITUDE 1095 FEET

		STATE COORDINATES (Feet)		
STATE & ZONE	CODE	×	Y	B OR A BI ANGLE
4I 1	5101	370+423-77	185,261.76	- 0 07 28

PLANE AZIMUTH HAS BEEN COMPUTED BY THE & OR A DI FORMULA NEGLEC

HOOKENA	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH *	CODE
HOUNENA	147° 37′ 30; 2	147 44 58	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 180

DISTANCE DIRECTIONS FEET METERS HOOKENA 1972 00 00 00.0 R.M. No. 2 . 14.64 4.460' 32 16 33.4-R.M. No. 1 . 20.44 ESE 6.230 154 05 49.1

Station is located in the Honokua lava flow of 1950, about 10 miles south of Kealakekua Bay on the west side of the island of Hawaii.

To reach station, follow State Highway 11 south from the town of Kealia about 3.9 miles, or about 3.2 miles south of Hookena School. Go to the southern side of the Honokua lava flow of 1950 and turn right on an unpaved road which bends back north, parallel to and approximately 150 feet west of Route 11. Follow this road to about middle of lava flow. Station is located on western edge of unpaved road.

Station is a standard disk stamped "PAM 1972" and set in a large boulder.

Reference mark number 1 is a standard disk stamped "NO. 1" set on eastern edge of unpaved road.

Reference mark number 2 is a standard disk stamped "NO. 2" set in lava rock in the flow north of the station.

*Refers to notes in manuals of triangulation and state publications of triangulation.

**To nearest meter only, when no trigonometric leveling is being done.

**# U.S. GOVERNMENT PRINTING OFFICE: 1971-760-031 # U.S. GOVERNMENT PRINTING OFFICE: 1971-740-031 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 191553 STATION 1085
HAWAII
LATITUDE 19 000' T0 19 030'
LONGITUDE 155 030' T0 156 000'
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE U. S. COAST AND GEODETIC SURVEY FORD 523 DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PEAR 2 (HTS)

STATE

HAWAII COUNTY: HAWAII

KAU DISTRICT

NOTE,	HEIGHT OF TELESCOPE ABOVE Surface-station mark, Underground-station mark		ND DIRECT	IETERS.I	HEIGHT OF UTH MARK, REP N FROM THE GI	LIGHT ABOVE STA	S AND PRO	MINEN	T OBJECT
	OBJECT.		BEARING		ANCE		DIRECT	TON	
					feet	meters	- 0		
12a 12a	RAMEHAME NEW 1 R M 1 R M 2 Steeple, Punal			N NE NE	21.299 31.640	6.492 9.645	251 354 351	00 03 50 55	00 33 07 43.8

The station is located about 2 miles west of Honuape, about 1.5 miles north northeast of Nagleim, about 0.1 mile south of a read forks, about 100 feet south of a good graded road and on side hill pasture land with higher ground to the north.

To reach from the pest office in Naalehu; go north, on the good graded road which leads to the cane fields, for 2.1 miles to the station on the right hand side of the road.

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

Reference mark number 1 is a standard disk, stamped PEAK 2 NO 1 1949, set into a drill hole in bedrock which is flush with the surface of the ground and is about 6 inches higher than the station.

Reference mark number 2 is a standard disk, stamped PEAK 2 NO 2 1949, set into a drill hole in bedrock which is flush with the surface of the ground and is about 4 feet lower than the station.

This station was originally called PEAK 2 to distinguish it from another station called PEAK 1.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PEAK 2 HTS

STATE HAWAII

YEAR 1949

SECOND

ORDER

SOURCE G- 9279

GEODETIC LATITUDE: 19 05 01.720 ELEVATION 399.3 METERS 1310 FEET

B OR A BI ANGLE
- 0 01 29

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, g\, \cos \Delta \, 4 \,$ FORMULA NEGLECTING THE SECOND TERM

GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
356 48 11.2	356 49 40	5101
And the second		
	(From south)	(From south) (From south)

QE 159

(continued on next page)

PEAK 2 (HTS) (continued)

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

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

QUAD 191553

STATION 1085

TO LATITUDE TO LONGITUDE DIAGRAM

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PEAK 2 (HTS)

ESTABLISHED BY: L.C. Wilder YEAR: 1949 D.M. Whipp

YEAR: 1967

Hawaii Hawaii COUNTY: Island: Hawaii

PROM THE G	KOOND XI II	E STATION	ANCE		BE SEE	
OBJECT	BEARING	FEET	METERS		DIRECT	ION
KIPAEPAE (HGS) 18981949 D	ISTANCE	and DIREC	TION	00	00	00.0
STEIN 2 (HTS) RM No. 1 RM No. 2	N NE	21.299	6.492 9.645	131	02 53 39	49.3 13 47
KIPAEPAE (HGS) 18981967 DE STEIN 2 (HTS) 1949	ISTANCE	and DIREC	rion	14	00	57.0
RM No. 1	NW NE	21.330	6.502 9.635	235	50	04

Station was recovered and all marks found in good condition. Station was re-marked with a standard disk and the station pipe was re-enforced with a build-up of stones and concrete. A complete description follows:

Station is located about 1-1/2 miles northeast of Naalehu and 1-1/2 miles west-southwest of Honuapo, at about 1310 feet elevation on a side-hill in pastureland, at curve of graded road.

To reach station from the post office in Naalehu, go east on State Highway 11 for 0.1 mile to crossroad. Turn left and go upgrade on main road for 2.0 miles to left curve of road, and station on right.

Station is marked with a standard disk, stamped "PEAK 2 HTS 1949 1967", set in concrete in the top of a 2-1/2-inch, iron pipe that projects 10 inches from the top of a mass of stone and concrete 30 inches in diameter. It is 127 feet southeast of center line of road, 94 feet southeast of fence line, 5 feet southeast of a white witness post, and in the center of a large rock pile 12 feet in diameter and 3 feet high.

Reference mark number one is a standard disk stamped "PEAK 2 NO 1 1949", cemented in a drill hole in bedrock 1 inch below ground surface. It is 73-1/2 feet southeast of fence line and 0.3 foot lower than station mark.

tion mark.

Reference mark number two is a standard disk stamped "PEAK 2 NO 2 1949", cemented in a drill hole in bedrock 1 inch below ground surface and about 4 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

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

USCOMM-DC 27178-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 191553 STATION 1086
HAWAII
LATITUDE 19 °00' TO 19 °30'
LONGITUDE 155 °30' TO 156 °00'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUAL EHUA

STATE: HAWAII

YEAR: 1890

THIRD

SOURCE: G-SP156

THE OWNER OF	10 "15 '07 "504		
GEODETIC LATITUDE	19 15 27.581		
GEODETIC LONGITUDE	155 47 23.491	ELEVATION	METERS
			FEET

	4.00	STATE COORDINATES (Feet	,	
STATE & ZONE	CODE	×	·	8 OR A BI ANGLE
HI 1	5101	400,026.27	154,170.54	- 0 05 44

 $^{\circ}$ Plane azimuth has been computed by the $\; g\; ({
m or} \, \Delta \; ^{\circ}) \;$ formula neglecting the second term,

GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From touth)	CODE
	0 *	

QD 217

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 OUAD 191553 HAMAII

ADJUSTED HORIZONTAL CONTROL DATA

STATION 1087

19 00 TO 19 30 LATITUDE LONGITUDE 155 0 30 TO 156 0 00

HAWAII DIAGRAM NE 5-1,5

40AA FORM 76-39 12-70) FORMERLY CAGS FORM 826)

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

NAME OF STATION: PUTWA . NEAREST TOWN: HOOKENA CHIEF OF PARTY: GEH .

WAIKAKUU 4, 1951

cliff's edge.

Kauhako Bay and Hookena's beach.

150 feet above the ocean level.

4 feet lower than the station.

RM 1

RM 2

STATE; HAWAII . QUADRANGLE NO. 191553

DISTANCE

7.50

16.04

YEAR: 1972 .

MEIGHT OF TELESCOPE ABOVE STATION MARK 1. 36METERS, 1 HEIGHT OF LIGHT ABOVE STATION MARK METERS
UNDERGROUND-STATION MARK,
UNDERGROUND-STATION MARK
OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

BEARING

SSE

SE

SW

The station is located 4.1 miles southwest of the post office at Honaumau, 3.3 miles south of the City of Refuge and 1.5 miles southeast of Hookena Village on a prominent bluff, on a flat lava mound, at the west end of a cliff and the brush line. To reach the

mound, at the west end of a cilif and the order line. To reach the station from the post office in Honaunau, go south on State Highway 11 for 3.9 miles to Hookena School, continue on the highway for 0.4 mile to a fork in the road and a sign saying Hookena. Take the right fork and go 1.6 miles to a sharp right turn in the road.

From there pack 0.2 mile towards the ocean in a southwesterly direction until reaching the edge of a cliff. The station is midway between Lainamaia Pt. and Kanekaukii Pt. and sees all of

Station mark is a standard disk stamped PUIWA 1972, set in a drill hole in the top of a 5 foot diameter lava mound. It is 8 feet from the cliff's edge near the edge of the brush line and

Reference mark 1 is a standard disk, stamped NO. 1 1972, cemented in a drill hole in a lava mound about 16 feet from the

Reference mark 2 is a standard disk, stamped NO. 2 1972, cemented in lava bed about 8 feet from the cliff's edge and about

DESCRIBED BY: SJH

METERS

4.882

00 00

348 45 53 18

00

24

NAME OF STATIONS HAWAII

1972

OBS BY NGS

SECOND

G-14950

GEODETIC LONGITUDE:

19°22'40:67068 GEODETIC LATITUDE 155 53 52.75145

31.0 METERS ELEVATION 102 EFFT

STATE & ZONE	CODE	×	Y	# IOR A #I ANGLE
	5101	362,832,38	197,932.79	- 0° 07, 55
11 1	3101	552,552.65		

THE MAS BEEN COMPUTED BY THE # (OR A #) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From speth)	PLANE AZIMUTH (From seath)	CODE
MAIKAKUU 4	343*55'40:7	344 03 36	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

Refers to notes in manuals of triangulation and state publications of triangulation.

**Direction-angle measured clockwise, referred to initial station.

**To nearest meter only, when no trigonometric leveling is being done.

**DUS. GOVERNMENT PRINTING OFFICE: 1871-780-081

RL 179

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

GEODETIC LONGITUDE:

0 151553 STATION 1080
HAWAII
LATITUDE 19 °30' TO 19 °30'
LONGITUDE 155 °30' TO 156 °00' STATION 1088 DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTRO

GEODETIC LATITL	100 01		ELEVATION	
NO OBSER	156 RVATION CHECK O	N THIS POSITIO	N.	
STATE: HAWA	II	YEAR: 1884	THIS	- ORDE
NAME OF STATION	PUKAANA CHURC	H SPIRE		
	ADSO	STED HORIZONI	AL CONTROL DATA	

		STATE COORDINATES (Feet)	
STATE & ZONE	CODE	×	Carlo V	BIOR A BI ANGLE
HI 1	5101	361.084.87	200,628.16	- 0 08 02

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE \$ ICR \(4 \) FORMULA NEGLECTING

TO STATION OR OBJECT	GEODETIC AZIMUTH (From sauth)	PLANE AZIMUTH *	COD€
	(9)		
		ĺ	

QG 280

METERS

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 191553 STATION 1089 HAMAII LATITUDE 19 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °30' DIAGRAM NE 5-1,5

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PUNALITU STATE:

HAWATI COUNTY: KAU DISTRICT

NOTE,	F PARTY: L. C. WILDER YEAR: 1949 Described by: C. HEIGHT OF TELESCOPE ABOVE STATION MARK 1.9 METERS.! HEIGHT OF LIGHT ABOVE STATION					EPP	METE		
4	Surface-station mark, Underground-station mark Underground-station mark					ARKS AND PROMINENT ORIECTS			
	OBJECT	BEARING	DIST	NCE					
		BEARING	foot	meters		DIRECT	OMI		
12e	KAHAHA 2 R M 1 Honuape Stack R M 2	SE SW	14.691 5 miles 16.871	4.479 5.143	00 122 205 232	00 47 07 58	00 43 40.1		

The station is located on the crest of a low lava ridge which lies about 5 miles northeast of Honuapo, about 4 miles southwest of Pahala, about 1 mile north of Punaluw and about 200 feet north of the road which runs between Naalehu and Hilo.

To reach the station from the post office at Naalehu; go east and north, toward Hile, for 3.5 miles; pass the sugar mill at Honuape and follow the highway northeasterly for 5 miles to the Punaluu out-off read; continue straight ahead, toward Hile, for 0.1 mile to the point about midway between telephone poles number 1207 and 1208 which is the end of truck travel. From this point pack northwest for about 200 feet to the high point of the low ridge and the station.

The station is a standard disk, stamped PUNALUU 1949, set into a drill hole in a flat boulder which is about flush with the surface of the ground.

Reference mark number 1 is a standard disk, stamped PUNALUU NO 1 1949, set into a drill hole in a boulder which is about 2 feet in diameter and projects about 2 feet. It is located on the crest of the low ridge and is about 1 foot higher than the station.

Reference mark number 2 is a standard disk, stamped PUNALUU NO 2 1949, set into a drill hole in a boulder which is about 4 feet in diameter and is flush with the ground to the east and projects about 5 feet on the west. It is located about 2 feet lower than the station.

A 22 x 22 black and white pele has been plumbed over this station and a cairn of rocks built around the pole.

is of triangulation and state pub

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

PUNALUU

OBS BY CGS

LIAWAH STATE

1949

FIRST

G- 9279

GEODETIC LATITUDE:	19 09 10.37606 155 30 47.68700	ELEVATION	117.6	METERS
GEODETIC LONGITUDE.	255 00 45640700	2 7 1 1 1 1 1 1	386	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	×	ν	B OR A B ANGLE
41 1	5101	4751236.64	116,038.28	- 0 00 16
				A STATE OF THE STA

Plane azimuth has been computed by the $\, g \,$ or $\Delta \,$ 4 $\,$ formula neglecting the second term,

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUJ ULAULA HTS	234 45 33.8	234 45 50 "	5101
		1745-1	

THESE DATA ARE USTAINED FROM ADJUSTMENT OF 1951

3M 135

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

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

STATION 1089 QUAD 191553 , 10 LATITUDE / TO LONGITUDE DIAGRAM

PUNALUU (continued)

FORM \$260

RECOVERED BY:

NAME OF STATION: PUNALUU

D.M. Whipp

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

YEAR: 1949 ESTABLISHED BY: L.C. Wilder STATE:

YEAR: 1967 Hawaii COUNTY: Hawaii Island:

DISTANCES AND DIRECTIONS TO AZIMUT	1.5 METERS, HI MARK, REFERENCE MARE ROM THE GROUND AT THE	S AND PROMINI	ABOVE STATION	ICH CAN	BE SE	METERS
OBJECT	BEARING	DIST	ANCE		DIRECT	ION
PUU ULAULA (HTS) 1914 RM No. 1 HILL (PUEHU HTS) 1914 RM No. 2	1949 DISTANCE SE SSW 2 W 1967 DISTANCE SE SSW	14.691 804.9 16.871	5.143 ECTION 4.479 5.143 ECTION 4.476 5.146	00 74 143 184 00 74 143 184	00 08 28 19 00 05 28 20	00.0 46 39.5 54 00.0 58 41.6

Station was recovered and all marks found in good condition. A

Station is located about 4 miles southwest of Pahala, 1 mile north of Punaluu, and 5 miles northeast of Honuapo, at about 383 feet elevation, on the high point of a small brushy ridge running up northwest from the highway. It is about 75 yards northwest of the highway and 40 feet higher, complete description follows: opposite a large parking area and a State Historical Marker on southeast

side of the highway. To reach station from the post office in Pahala, go south on Pikake St. 0.2 mile to crossroad. Turn right on State Highway 15 and go 0.85 mile to junction with State Highway 11. Turn right and go southwest on State Highway 11 for 3.7 miles to the wide parking area on left, and end of truck travel, 0.15 mile before reaching the Punaluu Road junction. Walk northwest up shallow gully about 75 yards to station. Station mark is a standard disk stamped "PUNALUU 1949", cemented in a drill hole in a rock flush with ground. There is a large cairn built over

drill hole in a rock flush with ground. There is a large cairn built over station mark, with a long, black and white, 2-1/2-inch-square, target

pole in the center. Reference mark number one is a standard disk stamped "PUNALUU NO 1 1949", cemented in a drill hole in a bedrock ledge on top of ridge line, 10 inches higher than station mark.

Reference mark number two is a standard disk stamped "PUNALUU NO 2 1949", cemented in a drill hole in a bedrock knob outcrop at southwest edge of ridge, where it drops steeply for 8 feet into a gully. It is 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.

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

USCOMM-DC 27178-P88

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUMALUU ESTABLISHED BY: J. C. Wilder YEAR: 1910 STATE: Hawaii RECOVERED BY: L.A. Critchlow YEAR: 1977 COUNTY: Hawaii BENCH MARK ALSO AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 5 miles SW of Pahala HEIGHT OF LIGHT ABOVE STATION MARK 4 HEIGHT OF TELESCOPE ABOVE STATION MARK $\hat{I}_{\!\! L}$ FEET.

		DIS	TANCE		DIRECTI	OH
OBJECT	BEARING	PEET	METERS		DIRECT	-
PUU ULAULA HTS 1914 Mt 1 ' RN 2 ' RN 1 to RN 2'	SE SW	14.69 16.87 25.94	4.480 5.144 7.908	00 74 184	00 07 20	00.0 20 01

The station mark and reference marks 1 & 2 were recovered in good condition. The direction and distances measured on this date compared favorably with the 1949 & 1967 measurements. The 1967 recovery note is adequate with the addition of the following new to reach description:

To reach the station from the intersection of Pikake and Kamani Streets, just north of Pahala Post Office, go east on Kamani Street 0.4 mile to the intersection of State Highway 11. Turn right and go southwest along Highway 11,4.3 miles to a parking area on the left. Pack northwest up a shallow gully about 75 yards to the top of a hill and the station site.

NDAA FORM 76-96 SUPERSEDES CAGS FORM 528A WHICH MAY BE USED

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

JUN 1578
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 191553 STATION 1090

HAWAII
LATITUDE 19 00' TO 19 30'
LONGITUDE 155 30' TO 156 00'
DIAGRAM NE 5-1.5 HAWAII

Puu Ahinui (Hawaii Island, Hawaiian Government Survey, 1890).—In the southern part of Hawaii, in South Kona, on the land of Kaapuna, on Puu Ahinui, about 400 meters south of trail through ohia forest. Marked by a large triangle cut in solid rock, and by a large stone cairn.

DEPARTMENT OF COMMERCE RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU AHINUI

ETTABLISHED BY: HAWAIIAN GOVYL.YEAR: 1890 STAYE:
RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: HAWAII

HAWAII

Detailed statement as to the fitness of the original description:

The original station was recovered in good condition. A new description follows--

The station is located on the summit of a low lava knoll which projects about 15 feet above the scrub trees and lies about 7.5 miles northeast of Milolii, about 5 miles east of the sea, about 4.5 miles south southeast of the Kaohe Ranch, about 2 miles northwest of the old Koa Mill, about 0.4 mile south of the 1919 lava flow and about 200 yards south of an old trail which runs between the sea and the Kaapuna Ranch.

To reach from the post office at Honaunau; go south on the road which leads toward Waiohinu for 15.5 miles to the Alika Lava Flow of 1919; continue south for 0.3 mile; turn left, onto an ciled road, and go easterly, up the steep grade for 1.2 miles to the site of an Ohia Mill; turn left and follow the ciled road easterly for 3.45 miles to the site of an Old Koa Mill; the Aliki Lava Flow, for about 0.4 mile; take the left hand fork and follow the dim track road northerly for about 0.5 mile to an east-west rock wall and to the north side of the rock wall for about 0.5 mile to an old pole corral; here, leave the timber and head southwest for about 0.3 mile to the station.

The station is a 2 inch drill hole surrounded by a triangle carved into the rock.

Reference mark number 1 is a standard disk, unstamped, set into drill hole in a boulder which projects 3 feet and is about 4 feet higher than the station.

Object

Distance

Direction

PUU NAHAHA 2 R. M. 1 E KAPUKAWAA (metal target)

1.570 m 5.150 ft

00 00 00 237 12 * 19 35 48.4

* too close to focus

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

R

NAME OF STATION: PUU AHINUI

ESTABLISHED BY: Haw. Govt. YEAR: 18
RECOVERED BY: U.S.G.S. YEAR: 19

YEAR: 1890 STATE: YEAR: 1958 COUNTY:

Hawaii Hawaii

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

Station recovered.

To reach from the post office at Honaunau; go south on the road which leads toward Waiohinu for 15.8 miles to the Alika lava flow of 1919; continue south for 0.3 mile; turn left onto an oiled road and go easterly for 1.2 miles to the site of an old Ohia mill; turn left and follow oiled road easterly for 3.45 miles to the site of an old Koa mill; pass to the eastward of the mill and follow graded road northerly across Alika lava flow for 2.8 miles to an old corral; take road fork to left on graded road westerly down lava flow for 1.9 miles to a large wooded corral and end of truck travel. From this point pack southerly for about 0.3 mile thru dense brush to the west side of a small densely brushed knoll and station.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PUU AHINUI

STATE HAWAII

... 1893

SECOND

SOURCE G- 9279

 GEODETIC LATITUDE
 19 15 04.421
 ELEVATION
 1209.6
 WETERS

 GEODETIC LONGITUDE
 155 50 02.879
 39 08
 FEET

		STATE COORDINATES (Feet		
STATE & ZONE	CODE		· ·	8 OR A BI ANGLE
HI 1	5101	384,751.10	151,862.13	- 0 06 37
	1 2-1			

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH *	CODE
PUU NAHAHA 2	30 15 26.9	30 22 04	510

QE 071

JUN 1978 U.S. DEPARTMENT OF COMMERCE 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

PUU AHINUI (continued)

RECOVERY NOTE, TRIANGULATION STATION

PUU AHINUI NAME OF STATION

HGS ESTABLISHED BY R.C. Munson RECOVERED BY:

YEAR: YEAR: 1968 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

Hawaii Bench Mark(S) ALSO [STATE: Hawaii COUNTY: Island: Hawaii

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 and the distance to the RM was checked. The old trail mentioned in 1948 is gone. The trees and brush in the area are growing and the station knoll no longer projects above the brush, but is camouflaged by it and is difficult to

Station is located about 6-1/2 miles northeast of Milolii, 5 miles southwest of Kaohe Ranch, 2000 feet south of a track road and 2100 feet south-southwest of a corral where a wire fence leads off to east-southeast south-southwest of a corral where a wire fence leads off to east-southeast and a cleared strip runs due east up through large trees. It is at 3968 feet elevation, in a rough lava area that is covered with small ohia trees, brush, and uluhe fern, and is about 200 yards northwest of a prominent

To reach station from the post office at Honaunau, go southerly on State Highway 11 for 13.2 miles to a board gate on left by corral, just clump of very tall trees. south of a quarry at the south edge of the 1950 Kapuna lava flow. Pass through gate and go upgrade on track road for 2.3 miles to a crossroad at 3200 feet elevation. Continue on road, along a finger of the lava flow, for 0.9 mile to a board gate at 3820 feet elevation. Pass through gate and continue for 0.35 mile to corral and end of truck travel at 3980 feet elevation. Pack south-southwest at about same elevation, through very dense brush and fern, for about 2100 feet to station. NOTE: An altimeter is of great help because the brush obstructs the view most of the way.

Station is marked by a 2-inch drill hole in flat bedrock, on west point of the broken-up lava knoll, at west side of a 4-foot-high rock that is the highest point of the knoll. A small cairn with a 3 x 3-inch target is centered over station.

Reference mark number one is a standard disk, unstamped, cemented in drill hole in the top of the 4-foot-high rock. It is 1.570 m (5.150 ft) from station, in azimuth 267° 27' 27". NOTE: The disk was under a 6-inch layer of moss.

NOTE: At the board gate at 3820 feet elevation a timbered hill may be seen a few hundred yards to south-southeast, and about the same distance beyond it, over it's right end, may be seen another timbered hill, which is the station hill.

A 4-wheel-drive vehicle is required after leaving State Highway 11.

QUAD 191553

TO LATITUDE 10 LONGITUDE

DIAGRAM

STATION 1090

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

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

R

Q 191553 STATION 1091
HAWAII 1 19 °00' TO 19 °30'
LONGITUDE 155 °30' TO 156 °00'
DIAGRAM NE 5.1.5 HAWAII

NO ORIGINAL TEXT

Puu Enuhe (Hawaii Island, Hawaiian Government Survey, 1894; E. R. Hand, 1914).—In the southern part of Hawaii, in southern Ka-u, on the summit of Puu Enuhe, a hill northwest of Punaluu Landing. Station is not on highest point of hill, but about 10 feet below it and 114 meters N. 60° E. from a small bushy tree which is almost at the highest part. This hill is roughly a truncated pyramid, its flat top sloping toward the sea, and the position of the station may be approximated, from a distance, as follows: As seen from Punaluu its position is one-fourth the distance along its flat top from its west end. From Honuapo the small lone tree on its summit resembles a cairn, and the station appears about 100 meters east from it along the skyline. Palaha Mill stack is seen over the edge of the hill, across a gully, above the ground, and to the left of the summit, on a bearing N. 57° E. Punaluu warehouse bears S. 50° E. Marked by a standard bronze disk station mark set in center of original mark, a triangle cut in a long stone set in the ground, surrounded by three similar unmarked tree fern logs.

DEPARTMENT OF COMMERCE IN A CONT DATE OF THE SAME THE SAM

NAME OF STATION: Puu Enuhe
ESTABLIABUS BY: H.G.S.
RECOVERED BY: GAS. L. Murray
YEAR: 1894 LOCALITY: Kau, Hawaii
YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of station: On a flat-topped, triangular hill, the top of which slopes toward the sea. This hill is located about 2 1/2 miles above Punaluu. It is best reached by taking the plantation road at the Plantation stables, in Pahala. The station is located near the upper end of the flat top and is difficult to reach due to the heavy growth of fern and brush. Old station mark: U.S.C.S. bronze tablet in buried rock which is buried in a small mound of dirt formed from decomposed fern stumps. New station mark: Two U-snaped steel brackets, bolted together to form a four-legged stand, driven in the ground over the bronze tablet. A 2U-foot 1 1/2" pipe with metal target set over the bolt uniting the two brackets and guyed with heavily galvanized wire to three steel plates and eye-bolt anchors form the signal.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU ENUHE
ESTABLISHED BY: HGS YEAR: 1894 STATE:
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
ARRLINE 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 in good condition, although the pipe target constructed by the Hawaii Territorial Survey is now rusted and fallen over. A complete description follows:

Station is located about 4 miles southwest of Pahala and 8-1/2 miles north-northeast of Naalehu, at 2336 feet elevation, on a prominent, timbered, steep-sided hill, or butte, that sets in the canefields, and has a rather flat top which slopes towards the sea.

To reach station from the post office in Pahala, go southwest on Pikake St. for 0.15 mile to crossroad. Turn right on Huapala St. and go 0.5 mile to crossroad. Keep ahead and go upgrade for 0.35 miles; take left fork and follow wide macadam cane road for 2.6 miles to fork just past old houses. Take left fork and go 0.6 mile to crossroad. Keep ahead on main road for 0.75 mile to crossroad; turn right and go 0.6 mile; take side road right and go 0.05 mile to T-junction. Turn left and go downgrade for 0.2 mile to crossroad. Turn right, along drainage, and go 0.05 mile to end of truck travel at dim crossroad. Walk right, west, on trail between base of hill and canefield for about 350 yards to point about below station, then climb (continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PUU ENUHE

STATE HAWAII

YEAR 1894

THIRD

ORDER

SOURCE. G-92184

GEODETIC LATITUDE	19 °10 '45."510 155 32 21.988	SCALED	711	METERS
		JOHELD	•	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	×	•	FIOR A GI ANGLE
HI 1	5101	486,350.15	125,635.95	- 3 00 47

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ IOR $\Delta\,$ OF FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH	CODE
	10 17 -00	5 5 (5)	
		! 1	
	1		
	· ·	,	

QF 084

HORIZONTAL CONTROL DATA

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

by the NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

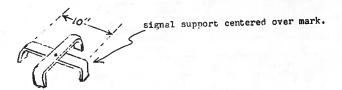
STATION 1091 QUAD 191553 ' TO LATITUDE , TO LONGITUDE DIAGRAM

PUU ENUHE (continued)

up very steep and slippery hillside about 150 yards to station.

Station mark is a standard disk, unstamped, cemented in a drill hole in a flat boulder flush with ground. It is located in an open area, on a slightly rounded point covered with grass and ferms, about 100 yards a slightly rounded point of hill, 45 feet south of a 10-inch ohia tree east from highest point of hill, 45 feet south of a 10-inch ohia tree with a triangular blaze and 40 feet southwest of another similar tree with a triangular blaze. An old target support, made of 2 strap-irons 2 inches wide and 10 inches long, crossed and bolted in the middle, and projecting inches above ground, is contered over the mark.

NOTE: All lines are now obstructed by trees.



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 191553 STATION 1092

HAWAII
LATITUDE 19 °00' TO 15 °30'
LONGITUDE 155 °30' TO 156 °00'
DIAGRAM NE 5-1.5 HAWAII

Puu Hoomaha (Hawaii Island, Hawaiian Government Survey, 1890).—In southern Hawaii, South Kona, land of Kipahoehoe, on the summit of Puu Hoomaha, just above the forest belt, on an old "pahoehoe" flow, and 250 feet north of an "aa" flow. Marked by a large triangle cut in the solid rock.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU HOOMAHA		
STATE HAWAII	AB 1890	THIRD

SOURCE G-SP156

GEODETIC LONGITUDE	19 14 28.755 155 45 53.379	SCALED	2025	METERS FEET
	STATE COORDINATES	(Feet)		

STATE COORDINATES (Feet)					
STATE & ZONE	CODE	×	¥	PIONA BI ANGLE	
HI 1	5101	408,650.63	148,223.18	- 0 05 14	
				Life T	

 ullet Plane azimuth has been computed by the $\, heta\,$ for $\Delta\,$ 4. Formula neglecting the second term,

(From south)	CODE
0 . 4	

QO 218

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 151553 STATION 1093
HAWAII
LATITUDE 19 °00' TO 19 °30'
LONGITUDE 155 °30' TO 156 °00'
DIAGRAM NE 5-1.5 HAWAII

PUU KI (HGS) (Hawaii Island, Hawaiian Government Survey; E. R. Hand, 1914).—On the southwest coast of Hawaii, 8½ miles west-northwest from Ka lae, the south point of the island, in the land of Kahuku, about ½ mile south of Pohue coconut grove, on the highest point (southeast rim) of the extinct volcano called Puu Ki, the highest hill in the vicinity. Marked by a triangle cut in a rock set even with the surface of the ground in gravel. A small cairn is over the station.

PEPARTMENT OF COMMERCE
U. S. COMET AND SECRET CHAPTER
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU KI (HGS)

ESTABLISHED BY: E.R. Hand .YEAR: 1914 STATE: HAWAII

RECOVERED BY: L. C. Wilder YEAR: 1949 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

The station was recovered, as described, and in good condition. A new description follows—

The station is located on the highest point (southeast rim) of an extinct volcanic cone which lies about 10 miles northwest of Kalae (South Point), about 5.5 miles southwest of the road which runs between Naalehu and Captain Cook, about 0.5 mile south of the Pohue Coccanut Grove and on the highest point in the immediate vicinity.

To reach from the school house and church in the village of Waichinu; go west and north, on the road which leads toward Captain Cook, for 11.2 miles to several covered tanks; turn left, pass through a board gate (key for gate may be obtained at the Kahuku Ranch) and follow a cinder road, westerly, for 5.2 miles to the ocean and the end of truck travel. From this point pack southerly for about 0.5 mile to the summit of the low cone and the station.

The station is the center of a linch drill hole, surrounded by a carved triangle, in a flat rock which is flush with the surface of the ground.

A rock cairn has been built over the station.

Object

NA PUU A PELE NW 00 00 00 PUU 0 KAMAQA (metal target) NNE 92 22 51.1 UMI'S AHU (metal target) SE 178 26 19.3

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PUU KI HGS

STATE HAWAII

YEAR 1914

SECOND

- OBDF8

SOURCE G- 9279

	10 000 100 100		
GEODETIC LATITUDE	19 00 28.241		44.1
GEODETIC LONGITUDE	155 47 44.432	ELEVATION	1 4 E
			143 test

STATE COORDINATES (Feet)					
STATE & ZONE	CODE	×	· ·	A OH A AI ANGLE	
HI 1	5101	397,866.52	63,455.82	- 0°05′47	

 $^{\circ}$ PLANE AZIMUTH HAS BEEN COMPUTED BY THE | heta| OFF Δ OFF FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH	CODE
NA PUU A PELE	111 13 05.3	111 18 52	5101
		2.0	

QE 083

(continued on next page)

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

PUU KI (HGS)(continued)

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

STATION 1093 QUAD 191553 LATITUDE TO TO LONGITUDE

FORM 5260

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

PUU KI (HGS) NAME OF STATION: YEAR: 1914 STATE: E.R. Hand ESTABLISHED BY: D.M. Whipp YEAR: 1967 RECOVERED BY:

Hawaii COUNTY: Hawaii Island: Hawaii

HEIGHT OF LIGHT ABOVE STATION MARK HEIGHT OF TELESCOPE ABOVE STATION MARK 1.61 METERS, METERS. DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION DISTANCE FEET METERS 00 00.0 NA PUU A PELE (HGS) 1891 66 44 22 11 20.686 6.305 RM No. 2 NNE 92 51.2 PUU O KAMAOA (HTS) 1948 51 10.593 216 45 RM No. 1 SE 34.751

Station was recovered as described. It was re-marked with a standard station disk and two reference marks were established. A complete des-

cription follows: Station is located about 14 miles west-southwest of Naalehu and 10 miles northwest of the southernmost point of the island; on the summit of Puu Ki, a prominent, bare hill of 145 feet elevation that lies about 1/2 mile southeast of Pohue Bay and 300 feet northeast of Keliuli Bay.

To reach station from the post office in Naalehu, go west on State Highway 11 for 7.7 miles to Kahuku Ranch road on left. Continue west on the highway for 5.3 miles to locked board gate on left, between power poles

396 and 397. (Key for gate was obtained at the Kahuku Ranch). Pass through gate and go southerly on track road for 5.6 miles to fork. Take left fork and follow dim road 0.7 mile to top of hill and station. NOTE: A 4-wheel drive vehicle is required.

drive vehicle is required.

Station mark is a standard disk stamped "PUU KI HGS 1914 1967", cemented in the original station drill hole in middle of an 8-inch, chiseled triangle in the top of a flat rock flush with ground. It is 30 feet northwest of a large and prominent hydro-signal. A large cairn, with target pole in center, is built over the station mark.

Reference mark number one is a standard disk stamped "PUU KI HGS 1914 NO 1 1967", cemented in a drill hole in a square bedrock outcrop 12 x 20 inches, and projecting 8 inches above ground. It is 4.1 feet lower than station mark.

Reference mark number two is a standard disk stamped "PUU KI HGS 1914 NO 1 Reference mark number two is a standard disk stamped "PUU KI HGS 1914 NO 1 1967", cemented in a drill hole in a square bedrock outcrop 12 x 20 inches, and projecting 8 inches above ground. It is 4.1 feet lower than station mark.

Reference mark number two is a standard disk stamped "PUU KI HGS 1914 NO 2 1967", cemented in a drill hole in a rough lava bedrock outcrop 4 feet in diameter and projecting 1 foot above ground. It is 4.2 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.

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

USCOMM-DC 27175-PSE

STATE HEWA:	Li (COUNTY Hawali		QUADRANG	46	the ear	i Fh
QUOTE PRIMA	REFERENCE In Souther im of Akihi Hill.	rn part of Ha	Wall In a	distance)	Kau on	CHE BOO	
CIGCOI .	PUU KI (HO	s)					
DESIGNATION	STAMPED	Т	YPE OF MARE	c: BM	. TT	TRIAP	rg, X
	(10.0000 10.0000	CONDITION			ESTABLISH		
Lat. 19	00' 28.241."	Disturbed		USGS		USBR	
	. 47 44.432."	Destroyed		USCAGS	353	State GS	
Elev	145 feet	Not Found		USNPS		USNFS	
Elev	145 feet			USGLO)			0 (
i de		Not Found		USGLO USBLM		(Other)	
REMARKS OR TO reach fro left. New: Co mi on Kohala turn left an Ranch), cont for 1.5 mi t recovered in	REVISED DESCRIPTION: m the F.O. in Nahlel continue W. on the Hr Blvd. to Maile Dri- d go 3.4 mi on Blvd cinue on rd. for 2.2 to top of hill and s	Not Found nu, go W. on by, for 4.9 mive, turn right, to locked go	lwy. 11 f	USGLO USBLM or 7.7 m la Blvd. 0.7 mi o may be on left am	i to Ka , turn n Maile btained	(Other) thuku Ran left and to Mai at the along	nch on d go 0 kai Bl Kahuk the co
REMARKS OR TO reach fro left. New: C mi on Kohala turn left an Ranch), cont for 1.5 mi t	REVISED DESCRIPTION: m the F.O. in Nahlel continue W. on the Hr Blvd. to Maile Dri- d go 3.4 mi on Blvd cinue on rd. for 2.2 to top of hill and s	Not Found nu, go W. on by, for 4.9 mive, turn right, to locked go	lwy. 11 f	USGLO USBLM OT 7.7 m 1a Blvd. 0.7 mi o may be o left an and Rm. N	i to Ka , turn n Maile btained	(Other) thuku Ran left and to Mai at the along	nch on d go 0 kai Bl Kahuk the co

DIAGRAM

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

HORIZONTAL CONTROL DATA

National Ocean Survey OLD HAWAIIAN DATUM

R

0 191553 STATION 1094 HAWAII LATITUDE LATITUDE 19 00' TO 19 30' LONGITUDE 155 00' TO 156 00' DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Puu Nahaha (Hawaii Island, Hawaiian Government Survey, 1884; E. R. Hand, 1914).—Near southwest coast of Hawaii, in South Kona, Land of Okoe, east of Hanamalo Point, almost 1½ miles east by north from Okoe Bay, and just to the right of a line from the shed at the bay to the huge barn (station Barn) showing conspicuously about 3 miles inside on the same bearing, on a prominent bare rocky shoulder which commands a view in every direction. Marked by a square headed iron bolt let into the rock inside a triangle cut in the rock. Four crosses each 0.46 meter (1.5 feet) from the center were cut in the rock. A huge cairn was each 0.46 meter (1.5 feet) from the center were cut in the rock. A huge cairn was erected over the station and painted white.

DEPARTMENT OF COMMERCE OF COMM

NAME OF STATION: PUU NAHAHA ESTABLISHED BYHAW.GOVT.SUTVEYYEAR: 1884 STATE: RECOVERED BY: L. C. Wilder YEAR: 1946 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

The original mark, an iron bolt, was recovered in good condition. A standard disk could not be installed vertically above the bolt so it was stamped Puu Nahaha Reset 1948 and set 0.0525 meters from the bolt.

M-2518-2

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU NAHAHA

STATE HAWAII

YEAR 1884

SECOND

SOURCE G- 9279 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	19 00	25.810			
GEODETIC LONGITUDE		28.255	ELEVATION	254.0	METERS
			1	768	FEET

		STATE COORDINATES (Fee	1)	
STATE & ZONE	CODE	х	¥	O OR A A ANGLE
HI 1	5101	364,997.89	118,149.67	- 0 07 42

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE | heta| CR Δ . FORMULA NEG

GEODETIC AZIMUTH (From: 10H1b)	PLANE AZIMUTH * (From sault)	CODE
0 , "		

POSITION DETERMINED BY TRAVERSE FROM STATION PUU NAHAHA 2

QE 261

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

HORIZONTAL CONTROL DATA

National Ocean Survey OLD HAWAIIAN DATUM 0 191553 STATION 1095 HAWAII 19 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5

DESCRIPTION OF TRIANGULATION STATION

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU NAHAHA 2

ESTABLISHED BY:

STATE: L. C. Wilder YEAR: 1948 COUNTY: HAWAII HAWAII

Detailed statement as to the fitness of the original description: The station and marks were recovered in good condition. A standard disk station mark was set 0.0525 meters from the old iron bolt and two reference marks were established. A new description

The station is located on the summit of a low lava butte about 3 miles southeast of Milolii, about 3 miles northeast of Kanewaa Point, about 2 miles east of Hanamalo Point, about 2 miles west of the road which runs between Kealakekua and Walchinu, about 150 yards north of a rock wall which marks the boundary between the Okoa and Kapua tracts and about 100 yards south of a trail which leads to Okoe Bay.

To reach from the post office at Honaunau; go south, on the road which leads toward Walchinu, for 15.8 miles; cross over the Alika Lava Flow and continue south for 1.55 miles to the junction of the road which leads to Milolit; continue south, toward Waiohinu for 3.45 miles; turn right, onto a dirt road, and go westerly for 0.1 mile; pass through a pole gate and continue westward for 0.2 mile; pass through a pole gate, enter barn yard, turn right and go across country for 0.05 mile; pass through a gate, turn left and follow rook lane, westward, for 0.15 mile; pass through five gates in a stone corral and continue westerly for 0.05 mile; pass through a gate in a fence corner and continue westerly for 0.5 mile to three gates in a fence intersection and the end of truck travel. From this point pack westerly along the trail for about 0.2 mile; cross over two wire fences and follow the trail westerly for about 0.5 mile. From this point leave the trail and head for the low butte which lies about 100 yards south of the trail.

The station is a standard disk, stamped PUU NAHAHA RESET 1948. set into a drill hole in solid rock.

Reference mark number 1 is a standard disk, stamped PUU NAHAHA 1948, set into a drill hole in bedrock which is flush with the surrounding rock. It is located on a rock ledge about 1 foot lower than the station. Reference mark number 2 is a standard disk, stamped PUU NAHAHA 1948, set into a drill hole in a boulder which projects about 1 foot. It is located 6 feet south of a rock ledge and is about the same elevation as the station.

Object			Dist	anoe	Di	reat	ion
2 SE	target)	0.0525 3.805 3.160	meter m m	12.462 ft 10.364 ft		30 31	00 45 36 14.8

NAME OF STATION PUU NAHAHA 2

STATE HAWAII

YEAR 1948

SECOND

SOURCE G- 9279

19 09 29.809 GEODETIC LATITUDE 234.2 METERS ELEVATION 155 53 28.254 GEODETIC LONGITUDE 768

STATE COORDINATES (Feet)					
STATE & ZONE	CODE	ж		ON A OI ANGLE	
HI 1	5101	364,997.98	118,149.57	- 0°07'42	

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta$ IOR Δ all FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH	PLANE AZIMUTH * (From south)	CODE
HANAKEA UMOE	18 25 36.5	18 33 18	5101

QE 073

(continued on next page)

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

HORIZONTAL CONTROL DATA

by the NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

STATION 1095 OUAD 191553 ' TO LATITUDE / TO LONGITUDE

DIAGRAM

PUU NAHAHA 2 (continued)

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATIONS ESTABLISHED BY: RECOVERED BY:	PUU NAHAHA 2 L.C. Wilder R.C. Munson	YEAR:	1948 1968	STATE: COUNTY: Island:	
------------------------------------------------------	--------------------------------------------	-------	--------------	------------------------------	--

DISTANCES AND DIRECTIONS TO AZIMUT	H MARK REFERENCE MAR	KS AND PROMIN	ABOVE STATION	ICH CAN	BE SEE	METERS.
DISTANCES AND DIRECTIONS	FROM THE GROUND AT TH		ANCE		DIRECTI	
OBJECT	BEARING	FEET	METERS		HRECT	-
HANAKEAUMOE R.M. No. 1 R.M. No. 2 HANAKEAUMOE (HGS) 1890 KAPUKAWAA (HGS) 1884 R.M. No. 1 R.M. No. 2	1948 DISTANC NE SE 1968 DISTANC NE SE	12.482 10.364	3.805 3.160 ECTION 3.808 3.165	00 207 289 00 132 207 289	00 31 22 00 20 35 20	00.0 45 36 00.0 18.6 57

Station was recovered and all marks found in good condition, including the original iron bolt, which can be seen just under the edge of the 1948

disk. A complete description follows:
Station is located about 2-1/2 miles southeast of Milolii and 1-1/2
miles west-southwest of the Honomalino Agriculture Co. Office, at about 768 feet elevation, on the summit of a low, broken-up, lava butte, or ridge about 150 yards long, and 150 yards north of a stone wall.

To reach station from the Honomalino Agriculture Co. Office, which is

about 19.7 miles south on State Highway from the post office at Honaunau, go south on old macadam road for 0.2 mile to start of macadamia orchards on both sides of road; continue on the road for 0.1 mile; turn right on dim track road and go down through orchard and then through pasture, for 1.2 miles to locked metal gate. (Key was obtained at the Honomalino Office). Pass through gate and continue for 0.4 mile to T-junction. Turn right and go 0.05 mile to wire corral; go into corral about 75 feet, then go left, through metal gate, and follow track road down grade for 0.3 mile to end of truck travel where road makes a 90° left turn at 800 feet elevation. Pack northwest across rough lava and pasture area about 600 yards to station. Station mark is a standard disk stamped "PUU NAHAHA RESET 1948", cemented in a drill hole in bedrock flush with ground. It is on a 25-foot diameter, flat-topped, rocky point that rises about 25 feet above the surrounding area.

Reference mark number one is a standard disk stamped "PUU NAHAHA 1948".

Reference mark number one is a standard disk stamped PUU NAHAHA 1948", cemented in a drill hole in flat bedrock about 20 inches southwest from edge of cliff, and at same elevation as station mark.

Reference mark number two is a standard disk stamped "PUU HAHAHA 1948", cemented in a drill hole in a 16-inch bedrock outcrop that projects 8 inches above ground, and is 0.1 foot 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 27178-P88

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 HAWAIIAN DATUM

0 191553 STATION 1096 19 °00' TO 15 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PUU O KANAGA (HTS) ATE:

KAU DISTRICT HAWAII COUNTY: HAWAII

NOTE,	HEIGHT OF TELESCOPE ABOVE		1948 METERS.1	HEIGHT OF	scribed by: LIGHT ABOVE 8	C. J.		MEYEAR
	Surface-station mark, Underground-station mark	DISTANCES AND DIRECT	TIONS TO AZIMUTI CH CAN BE SEEN I	MARK, REF	ERENCE MAR ROUND AT TH	KS AND PRO	MINENT	OBJECTS
	OB	JECT	BEARING -	DIST	TANCE			
				foot	meters		DIRECT	TON:
	EAHUHU SE BASE UMI'S AHU (meta	l target)	ESE			00 38	00 07	00 53.2

The station is located about 13 miles southeast of Milolii, about 10 miles west of Waiohimu, about 1 mile west of the lava flow of 1907, about 200 yards east of a shed, 41.4 feet southwest of the center of a groad, 30 feet south of telephone pole number 230 and 18 feet southwest of a rock wall.

To reach from the school house in Walchinu; go northerly on the road which leads toward Captain Gook, for 11.0 miles to the station on the left hand side of the read.

The station is the center of a 2 1/2 inch iron pipe which projects 0.7 meter from the top of a triangular slab of concrete which is about 7 feet on each side and projects about 6 inches above the surrounding

The Hawaii Territory Survey reports the present station, 22 inch pipe, centered over a rusted iron bolt driven into solid pahoehoe. Station Kahuku SE Base is suitably located for an agimuth.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU O KAMAOA (HTS) ESTABLISHED BY: L.C. Wilder YEAR: 1948 YEAR: 1948
YEAR: 1967
COUNTY: Hawaii BENCH MARK(8) ALSO
COUNTY: Hawaii D.M. Whipp 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. A complete description follows:

Station is located about 11-1/2 miles west of Naalehu, along the southwest side of State Highway 11, 0.1 mile northwest of the intersection of King Kamehameha Blvd., at about 2005 feet elevation, on an open

thold in pasture land, at top of highway grade.

To reach station from the post office in Naalehu, go west on State
Highway ll for 5.7 miles to the South Point Road. Continue ahead on the highway for 6.6 miles to King Kamehameha Blvd. on right. Continue ahead

on highway, upgrade, for 0.1 mile to top of hill and station on left.

Station is the center of a 2-1/2-inch, iron pipe about 2 feet long, mounted vertically on 3 iron legs at the center of a triangular, concrete platform about 7 feet on each side. It is 25 feet southwest of telephone pole 230, 18 feet southwest of stone fence, and 40 feet southwest of the center line of State Highway 11. The words "PUU O KAMAOA" are inscribed in the concrete platform.

FORM C&G5-526 (1-88)

U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PUU O KAMADA HTS

STATE: HAWAII

1948

SECOND

SOURCE G- 9279

OF ODE THE LABOR.	19 04 54.833			
GEODETIC LONGITUDE	155 45 41.938	ELEVATION	611.9 2308	METERS FEET

		STATE COORDINATES (Feet)		
STATE & ZONE	CODE	×	٧	H OR A DI ANGLE
HI 1	5101	409,660.10	90,328.63	- 0 05 08
				İ

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, s\, \cos \Delta \, \, a\, \,$ FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (Fram south)	PLANE AZIMUTH * (From (onl))	CODE
KAHUHU SE BASE	289 58 19.5	290 03 28	5101

QE 387

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

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM 0 151553 STATION 1097
HAWAII
LATITUDE 15 00 TO 15 00'
DIAGRAM NE 5-1,5 HAWAII

Puu o Keokeo (Hawaii Island, Hawaiian Government Survey).—In southern part of Hawaii, in extreme western part of Ka-u District, on Mount Keokeo, on the highest point on the east corner of the mountain, composed of light pumice stone. Marked by a tin can placed underground, and over it a hard stone with a triangle cut in it, and around it three similar stones set as supports for the tripod feet.

ADJUSTED HORIZONTAL CONTROL DATA

GEODETIC LATITUDE: 155 44 40.3	115	SCALED		
15 °13 '01."2	23	SCALED	2096	METE
source G-SP156				
STATE: HAWAII YEAR	n 1890	THIR	D -08	DEM
NAME OF STATION PUU J KEOKEO				

STATE & ZONE	CODE	×	Υ	# OR A BI ANGLE
41 1	5101	415,638.99	135,383.30	- 0 04 50
	- 0	4 4 4 6 5		
		10 May 20		

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From sas(b)	cob

QD 219

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
CID HAWAIIAN DATUM

Q 191553

STATION 1098

HAMAII
LATITUDE 15 °00′ T0 19 °30′
LONGTUDE 155 °30′ T0 156 °00′
DIAGRAM NE 5-1,5 HAWAII STATION 1098

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PUU OHOHIA

STATE HAWAII

YEAR 1914

THIRD

SOURCE G-SP156

GEODETIC LATITUDE	19 1	1 11.139		
GEODETIC LONGITUDE		5 52.306	ELEVATION	METERS
				FEET

		STATE COORDINATES (Feet	"	
STATE & ZONE	CODE	×	2000	BIOR A BI ANGLE
HI 1	5101	408,723.16	128,288.90	- 0 05 13
		Į.		

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\,\, heta\,$ FOR $\Delta\,$ GF FORMULA NEGLECTING THE SECOND TER

TO STATION OR OBJECT	GEODETIC AZIMUTH (From touth)	PLANE AZIMUTH * (Fram wonth)	CODE
		0 , "	
]	
		1	

QC 288

JUN 1578
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 191553 STATION 1099
HA4A11
LATITUDE 19 000' TO 19 30'
LONGITUDE 155 30' TO 156 00'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

SOURCE: G-SP156 GEODETIC LATITUDE: 15 52 17.505 GEODETIC LONGITUDE: 155 52 17.505	
STATE HAWAII YEAR 1713	METE
HAMATT 1713	
THIRD	EA
NAME OF STATION S MOWAE	

STATE & ZONE	CODE	×	Y	0 ION A BI ANGLE
HI i	5101	371,783.87	119,942.31	- 0°07′19

TO STATION OR OBJECT

GEODÉTIC AZIMUTH
(From seath)

(From seath)

GEODÉTIC AZIMUTH
(From seath)

GEODÉTIC AZIMUTH
(From seath)

QO 282

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

HORIZONTAL CONTROL DATA

National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1100 HAWAII 19 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5

DEPARTMENT OF COME

DESCRIPTION OF TRIANGULATION STATION

Name of Station: Stein 2 (HTS)

STATE: Hawaii Countr: Hawaii Locality: Naalehu, Kau, Hawaii

Chas.L.Murray YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of station: On a rise of land about 1000 feet back of Naalehu school.

Old mark found: Δ on set stone and stonepile.

New station 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).

RECOVERY OF TRIANGULATION STATION

Name of Station: STEIN 2 (HTS) STATE: Established By: C.L. Murray Year: 1938 Recovered By: L.C. Wilder YEAR: 1949

HAWAIT COUNTY:

Described by: O. J. HOEPPEL

NOTE,	HEIGHT OF TELESCOPE ABOVE		ETERS.I	De HEIGHT OF	ESCRIBED BY: O.	. J. 1	HOEPI	
	Surface-station mark, Underground-station mark	DISTANCES AND DIRECTI	ONS TO AZIMI	ITH MADE DE	FERENCE MARKS			METERS T OBJECTS
	OI	JECT	BEARING		TANCE	1	_	
				foot	meters		DIRECT	LION:
12a	PEAK 2 R M 1 KAMEHAME 1939	(metal target)	SE	49.550	15.103	00 105 40	00 12 22	00 39 52.6

The station is located about 0.5 mile east of Naalehu, about 300 yards south of the read which runs between Naalehu and Honuape, about 200 yards east of the grounds of the Naalehu School, 10 feet south of a rock wall and on the summit of a large stone pile.

To reach from the post office in Naalchu; go south on the road which leads toward the village dump for 0.2 mile; pass through a board gate and continue straight ahead, easterly for 0.15 mile; pass through a board gate and continue easterly, on the dim track road, for 0.2 mile; pass through a board gate, to the rear of the school grounds, and continue easterly for 0.15 mile to the end of the read. From this point pack north for about 200 feet to the high ground, the rock pile and the

The station is the center of a 1 1/2 inch iron bar which projects about 2 feet from the top of a triangular slab of concrete which is about 6 feet on each side and projects about 8 inches above the ground.

Reference mark number 1 is a standard disk, stamped STEIN R M NO 1 1949, set into a drill hole in bedrock which projects about 3 inches above the ground and is about 4 feet lewer than the station. There is another station about a mile away called STEIN 1 (HTS).

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STEIN 2 HTS

STATE: HAWAII

YEAR: 1938

SECOND

SOURCE: G- 9279

	0 / //			
GEODETIC LATITUDE:	19 33 48.898			
GEODETIC LONGITUDE:	155 34 45.337	ELEVATION	193.3	METERS
			634	FEET

STATE COORDINATES (Feet)						
STATE & ZONE	CODE	×	٧	HIDNA OF ANGLE		
HI 1	5101	472,630.80	83,616.48	- 0 01 53		
				700		

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $|\theta|$ IDR $\Delta|\Phi|$ FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From courts)	CODE
PEAK 2 HTS	190° 50 55.7	190 52 29	510

QE 160

JUN 1978
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY OLD HAWAIIAN DATUM

STEIN 2 (HTS) (continued)

U.S. DEPARTMENT OF COMMERCE

FORM 5260

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: STEIN 2 (HTS) YEAR: 1938 STATE: ESTABLISHED BY: C.L. Murray Hawaii YEAR: 1967 COUNTY: RECOVERED BY: D.M. Whipp

GHT OF TELESCOPE ABOVE STATION MARK 1.50f, MET DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFER FROM THE GRO	UND AT THE	E STATION DIST				
OBJECT	BEARING	FEET	METERS		HECT	
PEAK 21949 DISTANCE and DI R M 1 PEAK 2 (HTS) 19491967 DIST RM No. 2 RM No. 1	RECTION SE ANCE AN NE ESE	49.550 nd DIRECT 11.753 49.418	15.103 ION 3.583 15.062	00 105 00 27 105	00 12 00 06 12	00.0 39 00.0 46 50

Station and reference mark were recovered in good condition. One new reference mark, number two, was established. A complete descrip-

Station is located about 1/2-mile east of the center of Naalehu, 800 feet south of State Highway 11, and 1000 feet east-southeast of the Naalehu School, on a low, brushy rise in pastureland, and along the south side of a stone wall.

To reach station from the post office in Naalehu, go east on State Highway 11 for 0.65 mile to side road right, just after passing the

school grounds. Turn right and go south 40 yards to board gate. Pass through gate and continue for 0.15 mile bo board gate on rise, and end of truck travel. Walk left, east, along fence and stone wall about 100 yards to station. NOTE: It is possible to drive slightly closer to station by going to left around the corral just ahead of end of truck travel and then driving the short distance along the about 100 yards

by going to left around the corral just ahead of end of truck travel and then driving the short distance along the power line road.

Station is marked by a 3-1/2-inch hole in the center of a triangular, concrete platform about 7 feet on each side and projecting 7 inches. A 2-inch iron shaft is centered vertically over the hole, mounted on 3 iron legs embedded in the platform, and supports a removeable, red and white metal target 8 feet tall. Station is 7 feet south of the stone wall, 125 feet north of a power line, 115 feet north of the power line road, about 125 yards northeast of corral, and set on the top of a raised, flat, bare, rock area mout 30 feet in diameter. bare, rock area about 30 feet in diameter.

Reference mark number one is a standard disk stamped "STEIN RM NO 1 1949", cemented in a drill hole in bedrock about 2 feet in diameter and projecting 3 inches. It is 5.4 feet lower than station platform.

Reference mark number two is a standard disk stamped "STEIN 2 HTS 1949 NO 2 1967", cemented in a drill hole in bedrock flush with ground, at east edge of the flat, rock area, 1 foot south of base of stone wall and about 1 foot lower than station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION STEIN 2 (HTS) BENCH MARK(S) ALSO STATE: HAWALL

YEAR: 1938 ESTABLISHED BY. C.L. Murray YEAR: 1978 COUNTY HAWAII RECOVERED BY: R.B. MELBY AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN

MILE EAST OF NAAHELU

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 AS DESCRIBED. THE METAL SIGNAL POLE IS STILL STANDING OVER THE STATION.

STATION 1100 QUAD 191553 TO LATITUDE TO. LONGITUDE DIAGRAM

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 191553 STATION 1101
HAMAII
LATITUDE 19 °00' TO 19 °30'
LONGITUDE 155 °30' TO 156 °00'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WAHE PELE

STATE HAWAII

YEAR 1913

THIRD

onnt e

SOURCE G-SP156

GEODETIC LATITUDE	19 13 51.581		
GEODETIC LONGITUDE	155 53 26.461	ELEVATION	METERS
- 2			FEET

STATE COORDINATES (Feet)							
STATE & ZONE	CODE	×	*	POHA G ANGLE			
HI 1	5101	365,229.07	144,555.12	- 0 07 43			

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ OR $\Delta\,$ GI FORMULA NEOLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From healt)	PLANE AZIMUTH * (From smath)	CODE
	3.65 (25)	* (00)	
		1	
		1	

Q3 266

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 191553 STATION 1102
HAWAII 1 19 °00' TO 19 °50' LONGITUDE 15 °30' TO 156 °00' DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE U. S. COAST AND GEDOFIC SURVEY FORTO 835

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WATKAKUU 2

ATE: HAWAT

HAWAII COUNTY: SOUTH KONA DISTRICT

NOTE.	PARTY: L. C. WI	TEAR.	1948 Ers.1		cribed by: 0			PEL.
4	Surface-station mark, Underground-station mark	DISTANCES AND DIRECTION WHICH	S TO AZIMI	OTH MARK, REFI	BENCE MARKS	AND BRA	MINEN	OBJECTS
	QE	UECT	BEARING	DIST	NCE			
				foot	meters		DIRECT	LION!
12e 12e	Hookena Spire R M 1 R M 2	4	NHW N Waw	5 miles 9.826 17.884	2.995 5.451	00 02 07 282	00 15 42 23	00 47.4 34 45

The station is located on an open hill side about 5 miles south southeast of Hockens, about 1 mile east of the osean, about 250 feet north of a house, about 200 feet east of the highway which runs between Captain Gook and Waichinu and about 150 feet southeast of an abandoned shaek.

To reach from the post office at Honaunau; go south on the road which leads toward Waichinu for 1.9 miles to the road forks; continue straight shead, south, toward Waichinu, for 1.9 miles to the Hockena School on the right hand side of the road; continue south 1.6 miles to the Hockena Post Office on the left hand side of the road; continue straight shead, south, for 2.0 miles to a small church on the left hand side of the road; continue south for 0.35 mile; turn left, pass through the most northerly of two gates and go easterly, acress country, for 0.05 mile to the station.

The station is a standard disk, stamped WAIKAKUU 2 1948, set into a drill hole in a boulder which projects about 2 inches.

Reference mark number 1 is a standard disk, stamped WAIKAKUU 2 NO 1 1946, set into a drill hole in a boulder which projects about 2 inches and is about the same elevation as the station.

Reference mark number 2 is a standard disk, stamped WAIKAKUU 2 NO 2 1945, set into a drill hole in a boulder which is flush with the ground and is about 2 feet lower than the station.

DEFATMENT OF COMMERCE
W. & COMPTION SERVICE SHOWLY
POPER 550
((Bits, Fig. 184))

RECOVERY NOTE, TRIANGULATION STATION

R

Name of Station: WAIKAKUU 2 Established by L.C.W. RECOVERED by: *C.L.Murray

YEAR: 1948 STATE: Hawaii YEAR: 1951 COUNTY: Hawaii

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

WAIKAKUU 2 marker set in concrete was found in a slight depression, the marker being a few inches lower than the surrounding ground. There is no liklihood of same having been disturbed.

R.M. NO. 1 - The rock on which the mark is set appears to be solid. Being about 6 inches higher than the ground, it is possible that same may have been run into by truck wheels and moved westward.

R.M. NO. 2 - Marker was found to be set in solid rock flush with the surrounding ground. No liklihood of same having been disturbed.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WAIKAKUU 2

STATE: HAWAII

1948

SECOND

- -

SOURCE: G- 9279

	0 / 4			
GEODETIC LATITUDE: GEODETIC LONGITUDE:	19 18 42.050 155 52 36.989	ELEVATION	362.2 1188	METERS

STATE COORDINATES (Feet)				
STATE & ZONE	· CODE	×	·	P OR A BI ANGLE
HI 1	5101	370,033.29	173,845.58	- 0 07 29

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ OF $\,\Delta\,$ OF FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From sauth)	CODE
LAE LOA	158 58 30.0	159 05 59	5101

QE 070

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

WAIKAKUU 2 (continued)

RECOVERED BY: R.E.A.

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

R

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY

OLD HAWAIIAN DATUM

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: WAIKAKUU 2 ESTABLISHED BY: L.C.W.

YEAR: 1948 STATE: Hawaii 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 and found in good condition. The station can not be occupied because the home of Mr. Lotgrace is built over the station site leaving about only 18 inches clearence.

A new "To reach" follows:

To reach from the south edge of the middle of three 1950 lava flows on State Highway 11, go south on the State Highway for 0.6 mile to an old church on the left, continue straight shead for 0.3 mile to a curve to the left and station WAIKAKUU 4 on the right, continue on the highway for about 50 feet to a driveway on the left. Turn left, go up the driveway for about 200 feet to the home of Mr. Lotgrace and the station under the southeast part of the house.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: WAIKAKUU 2 L.C. Wilder YEAR: 1948 R.C. Munson YEAR: 1968 STATE: Hawaii BENCH MARK(S) ALSO ESTABLISHED BY: L.C. Wilder COUNTY: Hawaii Island: 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 and all marks found in good condition, however a house, at present abandoned, has been built over the station, covering all 3 marks. The floor is about 3 feet above them and it was possible to check the distance to the RMs, which were found to be correct.

Station is located about 9 miles south of the post office at Honaunau

and 1 mile south of the middle 1 of the 3 lava flows of 1950, up on the brushy hillside, 300 feet east of State Highway 11, opposite power pole 99,

and under a house. To reach station from the post office at Honaunau, go south on State Highway 11 for 8.6 miles to the middle lava flow, 1/2-mile past Alae School; continue on the highway for 1.0 mile to side road left, across from power pole 99, go left up driveway for 75 yards to house and station. Station mark is a standard disk stamped "WAIKAKUU 2 1948", cemented

in a drill hole in bedrock, under southeast corner of house.

Reference mark number one is a standard disk stamped "WAIKAKUU 2 NO 2 1948" (mis-stamped 2 instead of 1), cemented in a drill hole in bedrock under northeast angle of house. It projects 3 inches above ground and is at about same elevation as station mark.

Reference mark number two is a standard disk stamped "WAIKAKUU 2 NO 2 1948", cemented in a drill hole in bedrock flush with ground and about 2 feet lower than station mark. It is 2 feet northeast of the second foundation post east from southwest corner of house.

RECOVERY NOTE, TRIANGULATION STATION

QUAD 191553

LATITUDE

DIAGRAM

LONGITUDE

NAME OF STATION: WAIKAKUU 2 .

YEAR: 1948 . STATE: HAWAII BENCH MARK(S) ALSO

' TO

/ TO

STATION 1102

ESTABLISHED BY: LCW COUNTY, Hawaii YEAR: 1972 . RECOVERED BY: GEH .

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN

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

Station mark recovered as described by REA in 1961. No search was made for Reference Marks.

*ORM C&GS-526 (8-84)



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

HORIZONTAL CONTROL DATA

National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1103 LATITUDE 19 °00' TO 19 °30' LONGITUDE 155 °30' TO 156 °00' DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WAIKAKUU 3

STATE: Hawa 11

COUNTY: Hawa11

NOTE,*	HEIGHT OF TELESCOPE-ABOVE	STATION MARK	METERS.1	HEIGHT OF L	IGHT ABOVE STA	TION MARK		METER
	Surface-station mark, Underground-station mark	DISTANCES AND DIRE	CTIONS TO AZIMU	JTH MARK, REFE	RENCE MARKS	AND PROP	MINENT	OBJECT
	OF	JECT	BEARING	DIST	ANCE	T .	DIRECTI	
			BEARING	foot	meters		JIRECTI	DNI
	WAIKAKUU 4 R.H. 3 R.M. 4			286.25 9.02 13.98		00 73 337	00 32 34	00 00 40

Sub-surface mark 3/4 inch galvanized pipe set in concrete to top of

pipe. 6 inch triangle cut in concrete with pipe in center.

Surface mark is a USCaGS triangulation disk set in concrete in center of triangular concrete monument 7 feet on each side and flush with ground. The concrete monument is situated on the west end of a fairly prominent rise of land. To eliminate any unsightliness, the owner of the land, in whose front yard the station is located, asked that the station be covered with a thin layer of dirt. This was done but the triangular form of the monument is clearly discernible.

R.M. 3 - Disk set in cement in drill hole in solid rock flush with ground near west top end of rise on which the station is situated. R.M. 4 - Disk set in cement in drill hole on jutting rock on the

west slope of the rise on which the station is located. Reference marks are standard disks stamped WAIKAKUU 3 RM 3 1951 and WAIKAKUU 3 RM 4 1951.

(11-8-55)

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

 \mathbb{R}

NAME OF STATION: WAIKAKUU 3

ESTABLISHED BY: C.L.M. RECOVERED BY: U.S.G.S.

YEAR: 1951 STATE:

YEAR: 1958 COUNTY: Hawaii

Hawa11

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

Station recovered in good condition. A house has been constructed on the point of ground and the station mark is located near the southwest corner of the house but it probably could be reoccupied.

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

R

NAME OF STATION: WAIKAKUU 3

ESTABLISHED BY: C.L.M.

YEAR: 1951 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 and found in good condition.

A new "To reach" follows:

To reach from the south edge of the middle of three 1950 lava flows on State Highway 11, go south on the State Highway for 0.6 mile to an old church on the left, continue straight for 0.3 mile to a curve to the left and station WAIKUKUU 4 on the right, continue on the Highway for about 50 feet and a driveway on the left, go up the driveway for about 200 feet to Mr. Lotgrace's home and the station by the southwest corner of the house.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION WAIKAKUU 3

STATE: HAWAII

YEAR. 1951

SECOND

SOURCE: G- 9279 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	19 18 42.020	ELEVATION.	345	METERS
GEODETIC LONGITUDE:	155 52 37.270	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	×	•	8 IOR A GI ANGLE
HI 1	5101	370,006.37	173,842.61	- 0°07′25

PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\, heta\,$ OR $\Delta\,$ OF FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (Fram south)	PLANE AZIMUTH *	CODE
	1.0		-

POSITION DETERMINED BY TRAVERSE FROM STATION WAIKAKUU 2

QE _51

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 191553 STATION 1103

LONGITUDE

DIAGRAM

WAIKAKUU 3 (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: WAIKAKUU 3

ESTABLISHED BY: C.L. MUTTAY YEAR: 1951
RECOVERED BY: R.C. MUNSON YEAR: 1968
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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 RMs was checked and found correct. All lines are blocked by trees. A complete description follows:

Station is located about 9 miles south of the post office at Honsunau and 1 mile south of the middle one of the 3 lava flows of 1950, up on the brushy hillside, 300 feet east of State Highway 11, opposite power pole 99, and at the southwest corner of a house built by Mr. Lot Grace, but now obendened.

To reach station from the post office at Honaunau, go south on State Highway 11 for 8.6 miles to the middle laws flow, 1/2-mile past the Alae School; continue on the highway for 1.0 mile to driveway on left, across road from power pole 99; go left up driveway for 75 yards to station. Station mark is a standard disk stamped "WAIKAKUU 3 1951", set in the

Station mark is a standard disk stamped "WAIKAKUU 3 1951", set in the center of a triangular, concrete platform 7 feet on each side and flush with ground. It is 2 feet southwest of southwest corner of the house. Station WAIKAKUU 2 1948 is 27.08 feet east-northeast, and under the house. Reference mark number three is a USC and GS Bench Mark disk, stamped

"WAIKAKUU 3 1951 NO 3 TRI REF MARK", cemented in a drill hole in the top of a 10-inch-square, smooth-topped rock flush with ground, 4 feet south of edge of porch, 6 feet southeast of the southwest corner foundation post of the porch and about 1 foot lower than station mark. A cap of cement on top of the rock makes it appear to be a concrete monument. Reference mark number four is a USC and GS Bench Mark disk, stamped

Reference mark number four is a USC and GS Bench Mark disk, stamped "WAIKAKUU 3 1951 NO 4 TRI REF MARK", cemented in a drill hole in a small bedrock step down on the steep slope, 6 feet lower than station mark and hidden behind dense shrubbery.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: WAIKAKUU 3 · ESTABLISHED BY: CLM · RECOVERED BY: GEH ·

YEAR: 1951 STATE: Hawaii BENCH MARK(S) ALSO YEAR: 1972 COUNTY, Hawaii

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station mark recovered in good condition as described by CIM in 1951. The to-reach as written by REA in 1961 is adequate. No search was made for Reference Marks.

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

FORM C&GS-526 19-66

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 191553 STATION 1104
HAWALI LATITUDE 19 000' TO 19 030' LONGITUDE 155 030' TO 156 000' DIACRAM NE 5-1.5 HAWAII

U. S. COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WAIKAKUU 14

STATE: Hawaii

County: Hawaii

CHIEF OF PARTY: C.L. Murray

YEAR: 1951

Described by: C.L.M.

METERS.

OTE,	HEIGHT OF TELESCOPE ABOVE		ERS.1		GHT ABOVE STA			RETENS
	Surface-station mark, Underground-station mark	DISTANCES AND DIRECTION WHICH	S TO AZIMU CAN BE SEEN	TH MARK, REFE FROM THE GRO	RENCE MARK OUND AT THE	S AND PR	OMINEN	T OBJECTS
			BEARING	DISTA	NCE	-1	DIREC	TION:
	OE	JECT	BEARING	feet	meters			
	WAIKAKUU 3 R.M. 3 R.M. 4 R.M. 1			286.25 79.59 159.55 56.58		00 58 67 302	00 18 13 41	00 30 45 35

The station mark is a 1 inch galvanized pipe set solidly in concrete flush with the ground. Located on the west side of the Government Road right-of-way. I foot east of a low stone wall.

right-of-way, 1 foot east of a low stone wall.

R.M. 1 is set in concrete and marks the line-of-center of the Government main road.

ment main road.

R.M. 3 is an iron pin set in concrete and marking the center line of the Jovernment main road.

R.W. 4 is a ship spike in the pavement. It is near the west edge of the pavement and surrounded by 3 galvanized roofing nails in a triangle.

(11-8-55)

RECOVERY NOTE, TRIANGULATION STATION

I

NAME OF STATION: WA IKAKUU 4

ESTABLISHED BY: C.L.M.
RECOVERED BY: R.E.A.

YEAR: 1951 STATE: Hawaii 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 and found in good condition.

A new "To reach" follows:

To reach from the south edge of the middle of three 1950 lava flows on State Highway 11, go south on the State Highway for 0.6 mile to an old church on the left, continue straight for 0.3 mile to a curve to the left and the station on the right.

Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end or one country.

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

Comp.-DC 34314

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION WAIKAKUU 4

STATE HAWAII

Y AB 1951

SELOND

SECONT.

SOURCE G- 9279 NO DBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	19 18 41.704 155 52 40.240	SCALED 323	METERS FEET

IOH A RI ANGLE
11.35 - 0 07 30

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE # OR A 41 FORMULA NEGLECTING THE SECUND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH	PLA LE AZIMUTH (Erom smith)	CODE
KAPUKAWAA	14 10 37.2	14 18 07	510:

POSITION DETERMINED BY TRAVERSE FROM STATION WAIKAKUU 2

QE 152

WAIKAKUU 4 (continued)

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

HORIZONTAL CONTROL DATA

NATIONAL GEODETIC SURVEY

OLD HAWAIIAN DATUM

RECOVERED BY: R.C. Munson

U.S. DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: WAIKAKUU 4 ESTABLISHED BY: C.L. MUTTAY YEAR: 1951 STATE:

YEAR: 1968 Hawaii COUNTY Island: Hawaii HEIGHT OF LIGHT ABOVE STATION MARK METERS.

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.69 METERS. DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION DISTANCE OBJECT DIRECTION PEET METERS KAPUKAWAA (HGS) 1884 ----1951 DISTANCE and DIRECTION --оо ОÔ 00.0 58.58 79.59 07 R.M. No. 1 192 33 28 R.M. No. 3 307 44 KAPUKAWAA (HGS) 1884 ----1968 DISTANCE Milolii Point, light KALAPA (HGS) 1884 00 15 and DIRECTION-00 00.0 26.9 54 08 25 164 28.3 R.M. No. 1 WAIKAKUU 3 1951 NE 192 06 56.581 17.247 249 307 79.579 24.256 SE R.M. No. 3 11

Station was recovered and all marks found in good condition, except RM 4, which was not recovered. The station was re-marked with a standard disk set in the original pipe. A tie was made to stations KAPUKAWAA, LAE LOA and KALAPA. A complete description follows:

Station is located about 9 miles south of the post office at Honaunau and I mile south of the middle I of the 3 lava flows of 1950, along the

west side of State Highway ll, at the west edge of a wide, grassy shoulder, at a left curve of the highway.

To reach station from the post office at Honaunau, go southerly on State Highway 11 for 8.6 miles to the middle lava flow, 1/2-mile past the Alae School; continue on the highway for 1.0 mile to station on right, by power pole No. 99, 0.3 mile past old church on left.

Station mark is a standard disk stamped "WAIKAKUU 4 1951 1968", ce-

mented in the center of a 1-inch iron pipe set flush in the center of an irregular, concrete pad flush with ground and with "WAIKAKUU 4 1951" inscribed in the concrete. It is at extreme west edge of shoulder, by low rock wall, 30.5 feet west of center line of highway and 39.5 feet north-northwest of power pole No. 99.

Reference mark number one is a highway traverse marker, a 1/2-inch brass plug, stamped "NO 1", set in the top of a 4-inch-square concrete post, flush with highway surface, in the center line stripe, and is 1.8 feet lower than station mark.

Reference mark number two is a highway traverse marker, a 1/2-inch brass plug, stamped "NO 2", set in the top of a 4-inch-square concrete post, flush with highway surface, in the center line stripe, and is 3 feet higher than station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: WATKAKUU L

YEAR: 1951 ESTABLISHED BY: C.L.Murray . RECOVERED BY: YEAR: 1972 GEH '

STATE: Hawaii " BENCH MARK(8) ALSO COUNTY: Hawaii -

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station mark was recovered as described by R.C.Munson (1968) in good condition. No search was made for the reference marks.

QUAD 191553

STATION 1104

LATITUDE LONGITUDE / TO / TO

DIAGRAM

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

HORIZONTAL CONTROL DATA

by the National Ocean Survey OLD HAWAIIAN DATUM

0 191553 STATION 1105 HAWAII LATITUDE LATITUDE 15 00' TO 19 30' LONGITUDE 155 030' TO 156 00' DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

RECOVERY NOTE, TRIANGULATION STATION NAME OF STATION: WAIKUKUU

RECOVERED BY: L.C.Wilder YEAR: 1946 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

This station was established by the Hawaii Government Survey and was originally marked by a brass shotgun sheil driven into a drill hole in lava rock with four reference marks, crosses cut in rock, east 2.75 feet, south 3.50 feet, west 4.00 feet and north 8.75 feet from the station.

A tie was calculated from Waikakuu 2 (1948) about 296 feet distant and a thorough search for the station mark as well as the tie marks was made, but none could be found. The vicinity is overgrown with guava, the entangled roots of which make it difficult to find any of the marks. The station should be considered lost unless some survey data from nearby known marks can be found to locate 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 twoovery note near reserve oracle. Note.—One of these forms must be used for every station unconvent.

ADJUSTED HORIZONTAL CONTROL DATA

R

NAME OF STATION WAIKUKUU

STATE HAWAII

YEAR - 584

THIRD

SOURCE G-SP15¢

GEODETIC LATITUDE	19 18 41.513		
GEODETIC LONGITUDE	155 52 33.775	ELEVATION	METERS
			FEET

STATE COORDINATES (Frr)				
STATE & ZONE	CODE	ж	ν.	6 ORA 4 ANGLE
HI 1	5131	41.00 ناد، 70د	173,790.74	- 0 07 26
				•

PLANE AZIMUTH HAS BEEN COMPUTED BY THE heta OR Δ OF FORMULA NEGLECTING THE SEC

TO STATION OR BESECT	GEODETIC AZIMUTH	PLANE AZIMUTH *	CODE
			-
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Q3 263