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

NO TEXT

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1102
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LAUMAIA B

STATE: HAWAII YEAR: 1877 THIRD -ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °56 ′43.″633 GEODETIC LONGITUDE: 155 22 51.569	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	540,872.52	403,877.49	+ 0 °02 ′26 ″

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

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

QO 395

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 191551 STATION 1103
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Laupahoehoe (Hawaii Island, E. R. Hand, 1913).—Established by Hawaiian Government Survey. On northeast coast of Hawaii, at Laupahoehoe, out on the flat rocky point close to the sea. Station is outside of wall which surrounds lighthouse and is 18 meters from it. The northeast corner of the light building (in 1913) bears S. 85° W. distant 32.5 meters (107 feet). The northeast gable of police station (station *Yellow*) bears S. 5° E., distant 110 meters. Marked by a concrete cylinder about 10 inches in diameter set upright among the stones, centered with a very small triangle.

(11-8-55) RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: LAUPAHOEHOE
ESTABLISHED BY: E.R.H. YEAR: 1913 STATE: Hawaii
RECOVERED BY:* US.G.S. YEAR: 1964 COUNTY: Hawaii

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

Station destroyed. The concrete cylinder marked with triangulation sign believed destroyed by Tsunami.

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: LAUPAHOEHOE
ESTABLISHED BY: E.R.H. YEAR: 1913 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station is gone. It was probably destroyed by a Tsunami, as a considerable amount of the point was washed away.

FORM C&GS-526 (1-69)
USCOMM-DC 18509-P69

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LAUPAHOEHOE
STATE: HAWAII YEAR: 1913 THIRD ORDER
SOURCE: G-92184

GEODETIC LATITUDE:	19 59 48.076	ELEVATION:	≈ METERS
GEODETIC LONGITUDE:	155 14 34.485	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE*
HI 1	5101	588,266.23	422,537.47	+ 0 05 17

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

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

QF 095

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 191551 STATION 1104
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

LELEIWI (USGS)

(Hawaii Island, E. R. Hand, 1912).—On east coast of Hawaii, on Leleiwi Point, 3 miles east of Hilo breakwater. From this point there are three similar points in line, bearing north, the first two close by and equally spaced from the point on which the station stands, and the other distant several hundred meters. On the other side the outermost point bears southwest. The point is about 20 meters long and about 6 meters wide at its widest part where the station is placed; it becomes very narrow where it joins the mainland. Its top is flat, its sides vertical, and its height about 10 feet above high water. Marked by a United States Geological Survey copper plate set in cement flush with flat surface of lava. It is 8.8 meters (29 feet) from extreme end of point; 1.0 meter north of deep crack which runs about east and west, and 1.75 meters (5.7 feet) west of another crack which runs north and south.

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
FORM 526
(Rev. Feb. 1963)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: LELEIWI (USGS)
ESTABLISHED BY: E. R. Hand YEAR: 1912 STATE: Hawaii
RECOVERED BY: C.T.Husemeyer YEAR: 1949 COUNTY: Hawaii

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

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

The station is located about 3 miles east of the Hilo Breakwater; about 0.5 mile east of the old Puumaile Hospital; 753 feet north northeast of triangulation station KEAUKAHA and 29 feet west of the end of Leleiwi Point.

To reach from the bridge which spans the Wailoa River, in the town of Hilo; go easterly, on the main traved road, for 4.3 miles; pass through a gate into the Puumaile Hospital grounds, and go southerly, passing to the left hand side of the main building, for 0.3 mile to a turn around at the end of the paved road. From this point go south and east on a track road for 0.5 mile to the end of truck travel at a small shack. The station lies about 0.1 mile east of this shack.

The station is a U. S. Geological Survey disk, too badly mutilated to read,which is set into a drill hole in bedrock.

This station was located by distance and direction from triangulation station KEAUKAHA.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: LELEIWI (USGS)
ESTABLISHED BY: E.R. Hand YEAR: 1912 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station mark was recovered in good condition. The hospital mentioned in 1949 description is gone. A complete description follows:

Station is located about 5-1/2 miles east of Hilo, on Leleiwi Point, on a prominent rock point that extends about 75 feet north from general shoreline and is about 18 feet wide and 10 feet above water. Station mark is a U.S. Geological Survey disk cemented in a drill hole in bedrock. No stamping can be seen on the disk. It is 30 feet south from tip of point, 753 feet north of station KEAUKAHA and about 550 feet north of an old house.

To reach station from the intersection of Waianuenue St. and Kamehameha Ave. in Hilo, go east on Kamehameha Ave. for 1.7 miles; take left fork and follow Kalanianaole St. for 3.7 miles to end of paved street; continue ahead on gravel road for 0.1 mile; turn right, on narrow macadam road, and go 0.1 mile; take side road left, 50 yards before radio tower, and follow track road east for 0.35 mile; take left fork and go 0.15 mile to end of road at old house. Walk north across rough, grassy area for about 550 feet to station.

FORM C&GS-526 (1-68)
USCOMM-DC 18509-P65

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

(continued on next page)

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LELEIWI USGS
STATE: HAWAII YEAR: 1912 SECOND ORDER

SOURCE G- 9279
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	19 °44′21.840	ELEVATION:	5.9 METERS
GEODETIC LONGITUDE	155 °00′22.968		19 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	x	y	β OR Δ α ANGLE
HI 1	5101	669,750.06	329,278.47	+ 0 °10′00″

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION KEAUKAHA

QE 276

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 191551 STATION 1104

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

LELEIWI (USGS) (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: LELEIWI (USGS)
ESTABLISHED BY: W. R. Hand YEAR: 1912 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R. B. Melby YEAR: 1975 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 5½ miles east of Hilo

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

The station was recovered in good condition as described in 1949 and 1966. The station is on a bare rocky point about 19 feet above sea level. The station is a U.S.G.S. disk stamped HAWAII cemented in a drill hole in the bare bedrock.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Leleiwi (USGS)
ESTABLISHED BY: E.R.H. YEAR: 1912 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: C.K. Townsend YEAR: 1976 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 5½ miles east of Hilo.

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

Recovered in good condition as described in 1949.

FORM C&GS-526 (9-66)
USCOMM-DC 36486-P66

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

NO TEXT

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1105
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION LEPEAMOA

STATE HAWAII YEAR 1891 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE	19 45 25.700	ELEVATION: METERS / FEET
GEODETIC LONGITUDE	155 27 41.717	

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ φ ANGLE *
HI 1	5101	513,207.82	335,475.07	+ 0 00 47

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

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

QO 376

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 191551 STATION 1106
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION LILINOE NEW

STATE HAWAII YEAR 1892 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE: 19 °48 ′44.″99 GEODETIC LONGITUDE: 155 27 39.62		ELEVATION	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE
HI 1	5101	513,403.48	355,579.21	+ 0 00 48

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

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

QD 384

AUG 1979

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 191551 HAWAII
STATION 1107
LATITUDE 19 °30 ′ TO 20 °00 ′
LONGITUDE 155 °00 ′ TO 155 °30 ′
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION

TRIANGULATION STATION

NAME OF STATION: LIO (HGS)
ESTABLISHED BY: L.A. Critchlow YEAR: 1977 STATE: Hawaii
COUNTY: Hawaii BENCH MARK ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3 miles NW of Mountain View
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

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

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION
KULANI HGS 1891				
RM 1	N	46.21	14.086	00 00 00
RM 2	E	17.77	5.419	120 06 20
RM 1 to RM 2		47.01	14.329	201 41 11

The station is located about 11 miles south of Hilo, 9 1/2 miles east of Kulani Honor Camp and 3 miles northwest of Mountain View on the south side of Stainback Highway. (On road right-of-way)

To reach the station from the junction of State Highways 11 and 19 in Hilo, go south on State Highway 11 for 4.3 miles to a crossroad. Turn right and go southwesterly on Stainback Highway 6.9 miles to road intersection left, (Kulani Road). Continue southwesterly on Stainback Highway 1.7 miles to the station site on the left.

The station marks are State of Hawaii survey disks stamped LIO 1977. The surface disk is set in a round concrete post flush with the ground. The underground disk is set in an irregular mass of concrete about 4 feet below the ground. They are 42.3 feet west of telephone pole number 162, 13 feet south of the centerline of the highway, 5.15 feet southeast of a tack in the road and 4 feet south of the south edge of the highway.

Reference mark 1, stamped 1, is a railroad spike with a punch hole marking the center, cemented in a drill hole in lava rock, 26 feet northwest of the centerline of the highway, 2 feet northwest of a small decline and 3 feet above the highway.

Reference mark 2, stamped 2, is a railroad spike with a punch hole marking the center, cemented in a drill hole in a small rock ledge, 21 feet southeast of the centerline of the highway and 2 feet higher than the highway.

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

NOAA FORM 76-96 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED. U.S. DEPARTMENT OF COMMERCE NOAA

* U.S. GPO: 1976-665-661/1220 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: LIO HGS OBS BY NGS
STATE: HAWAII YEAR: 1977 SECOND ORDER
SOURCE: G-16241

GEODETIC LATITUDE:	19 35 24.02924	ELEVATION	653.4 METERS
GEODETIC LONGITUDE:	155 09 39.64230		2144 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE *
HI 1	5101	616,777.08	274,894.57	+ 0°06'50"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
KULANI HGS	63 °34 '10.2	63 °27 '21 "	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 104

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 191551 STATION 1108
HAWAII
LATITUDE 19 °30′ TO 20 °30′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION LOALOA 1

STATE HAWAII YEAR 1891 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE	19 °46′04.776″	ELEVATION	METERS / FEET
GEODETIC LONGITUDE	155 23 05.236		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR △ α ANGLE *
HI 1	5101	539,612.70	339,428.97	+ 0 02 20

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

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

QQ 375

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

NO TEXT

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1109
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LONE HALE

STATE: HAWAII YEAR: 1902 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	19 57 19.032	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 11 30.542		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR $\Delta\alpha$ ANGLE *
HI 1	5101	605,836.60	407,531.22	+ 0 06 19

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

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

QO 359

AUG 1979

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 191551 HAWAII STATION 1110
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION

TRIANGULATION STATION

NAME OF STATION: LURE CALIBRATION PT
ESTABLISHED BY: L.A. Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii BENCH MARK ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 28 miles northwest of Hilo.
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

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

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION
51209 trav. dist.	NE	(284.92)	86.8452	° ' " 00 00 00.0
51209 RM 1 trav. dist.	NE	(76.93)	23.4494	01 14 07.6
51209 to 51209 RM 1 trav. dist.		(208.04)	63.4106	

Station is located near the summit of Mauna Kea Mountain and on the north wall of the University of Hawaii Observatory.

To reach the station from the post office in Hilo, go westerly on State Highway 20 for 27.3 miles to a paved road right. Turn right and go northerly on the paved road (which turns into gravel at about the 9000 foot level) to the summit, University of Hawaii Observatory and the station as described.

The station is the center of a reflector which is mounted in a wooden box that is 0.25 by 0.27 meters in size and is fastened to the north wall of the observatory and is about 9.546 meters above the ground surface. (Note desc.)

51209, are standard station mark disks stamped 51209 1977. The surface disk is set in a square concrete post flush with the ground surface and the underground disk is set in an irregular mass of concrete post about 36 inches below the ground surface. They are about 280 feet northeast of the entrance to the observatory, 71 feet south-southwest of a small metal dome building, 45 feet west-northwest of center of a graveled road and 5 feet east-southeast of the northwest edge of the hill. (Note 1a,7a)

51209 RM 1, stamped 51209 NO 1 1977, is a standard disk cemented in a drill hole in the southeast corner of a 24 by 30 foot slab of concrete which is flush with the ground surface. It is 103 feet north-northeast of the entrance to the observatory, 64 feet north of the north edge of the observatory and 16 feet west of a concrete foundation which is about 6 by 6 feet in size. (Note desc.)

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

NOAA FORM 76-96 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED. NOAA

☆ U.S. GPO: 1976-665-661/1220 Region

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS OBS BY NGS

NAME OF STATION: LURE CALIBRATION PT
STATE: HAWAII YEAR: 1977 SECOND ORDER

SOURCE: S-16241

GEODETIC LATITUDE:	19 49 33.99540	ELEVATION:	4201.3 METERS
GEODETIC LONGITUDE:	155 28 20.14995		13784 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	509,532.87	360,522.07	+ 0 00 34 "

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 109

AUG 1979

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 191551 HAWAII STATION 1111
LATITUDE 19 °30 ′ TO 20 °00 ′
LONGITUDE 155 °00 ′ TO 155 °30 ′
DIAGRAM NE 5-1,5 HAWAII

NOAA FORM 76-39
(12-70)
(FORMERLY C&GS FORM 528)

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

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LYMAN
NEAREST TOWN: Hilo
STATE: Hawaii
QUADRANGLE NO.:
COUNTY: Hawaii
CHIEF OF PARTY: L. A. Critchlow
YEAR: 1977
DESCRIBED BY: D.H.K.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.

NOTE.*	SURFACE-STATION MARK, UNDERGROUND-STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION					
	OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION‡ °	′	″
	WAIAKEA NEW USGS 1949				00	00	00.0
11a	RM 1	W	23.97	7.306	40	04	33
12a	GENERAL LYMAN FIELD AP STA A 1962	W	2397.95*	730.898	47	27	48.0
	RM 2	N	79.01	24.079	124	22	48
	RM 1 to RM 2		80.28	24.464			

*Geodetic distance

Detailed description:

The station is located at General Lyman Field in the east part of Hilo, anout 1/10 mile north of the intersection of the main runways of the airport, and just outside the airport fence near a curve in Kamehameha Avenue.

To reach the station from the intersection of Kanoelehua and Kamehameha Avenues (State Highways 11 and 19) in Hilo go east 0.05 mile to a road intersection and a traffic circle. Turn right, follow around the traffic circle, and continue east on Kamehameha Avenue 0.45 mile to a left curve in the avenue and the station site on the right, between the guardrail and the airport fence.

The surface and underground station marks are NGS horizontal control disks stamped LYMAN 1977. The underground mark is set in the top of an irregular mass of concrete about 4 feet below the surface of the ground. The surface mark is set in the 1-foot-square top of a concrete post flush with the ground and is 45 feet southeast of the centerline of Kamehameha Avenue, 27 feet southeast of the west end of a guardrail, and 7 feet northwest of a fence corner.

Reference mark 1 is an NGS reference mark disk stamped LYMAN NO 1 1977 set in the top of a 1-foot-square concrete post flush with the ground and is 41 feet southwest of the centerline of the avenue, 24 feet south of the west end of the guardrail, 1 foot north of a fence, and about the same elevation as the station mark.

Reference mark 2 is an NGS reference mark disk stamped LYMAN NO 2 1977 cemented in a drill hole in a large, flat, lava rock outcrop and is 36 feet north of the centerline of the avenue and about the same elevation as the station mark.

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

☆ U. S. GOVERNMENT PRINTING OFFICE 1972: 780-

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: LYMAN
STATE: HAWAII
YEAR: 1977
OBS BY NGS
SECOND ORDER
SOURCE: [illegible]-16241

GEODETIC LATITUDE:	19 43 32.05993	ELEVATION:	8.0 METERS
GEODETIC LONGITUDE:	155 03 25.93664		26 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	652,189.36	324,208.15	+ 0 °08 ′58 ″

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
WAIAKEA NEW USGS	35 °59 ′09.6 ″	35 °50 ′12 ″	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

SM 110

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 191551 STATION 1112
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Manowaeopae 3 (Hawaii Island, E. R. Hand, 1913).—Established by Hawaiian Government Survey. On northeast coast of Hawaii, on the extreme edge of the bluff about 150 meters east of Laupahoehoe railroad station, which is not at the town of that name but on top of the cliffs about ¾ mile to the east. About 30 meters east of the station, between it and Papaaloa, is a deep but narrow gulch. The flagstaff of the railroad station bears S. 85° E. and it and the near or east corner of the roof are exactly on range from the station, which may be found by following this range closely till it cuts the cliff edge, where the station will be found distant 1 meter from edge. Marked by a truncated cone of concrete extending down into the ground about 2½ feet. Bottom of cone is 1.9 feet in diameter, top about 5 inches. Centered with a 1-inch galvanized iron pipe protruding about 5 inches above the concrete.

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: MANOWAEOPAE 3
ESTABLISHED BY: E.R.H. YEAR: 1919 STATE: Hawaii
RECOVERED BY:* U.S.G.S. YEAR: 1964 COUNTY: Hawaii

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

Station destroyed. Bluff caved in, believe station destroyed by tidal wave.

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: MANOWAEOPAE 3
ESTABLISHED BY: E.R.H. YEAR: 1913 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station was not recovered. It is believed that part of the cliff has fallen off and the station lost as it was only 1 meter from the edge originally.

FORM C&GS-526 (1-68)
USCOMM-DC 16508-P65

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MANOWAEOPAE 3
STATE: HAWAII YEAR: 1913 THIRD ORDER
SOURCE: G-92184

GEODETIC LATITUDE:	19 59 14.856	ELEVATION: SCALED	104 METERS / FEET
GEODETIC LONGITUDE:	155 14 04.096		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 1	5101	591,169.75	419,190.69	+ 0 05 27

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

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

QF 093

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 191551 STATION 1113
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Mauna Kea (Hawaii Island, Hawaiian Government Survey, 1892).—On Mauna Kea, on the highest point visible from Waimea, 514.8 meters north of and 49 feet lower than the highest summit. Marked by an iron stake, and a cairn of stones.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MAUNA KEA

STATE: HAWAII YEAR: 1892 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	19 ° 49 ′ 42.812	ELEVATION:	4176 METERS
GEODETIC LONGITUDE:	155 ° 28 ′ 18.014		SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	509,736.64	361,411.51	+ 0 ° 00 ′ 35 ″

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

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

QQ 391

AUG 1979

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 191551 HAWAII
STATION 1114
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: MAUNA KEA UNIV OF HAWAII OBS DOME

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

Description, including sketch of object: The station is located near the summit of Mauna Kea and is the top and center of the University of Hawaii Observatory dome. It is painted white, is about 75 feet high, and is the highest object on the summit.

Described by _____
U. S. DEPARTMENT OF COMMERCE
NOAA

NOAA FORM 76-81
(10-71)

* U.S. GPO: 1975-665-081/1178 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: MAUNA KEA U OF HAWAII OBS DOME OBS BY NGS

STATE: HAWAII YEAR: 1978 THIRD ORDER

SOURCE: G-16241

GEODETIC LATITUDE: 19 49 33.74462 GEODETIC LONGITUDE: 155 28 19.95101	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	509,551.87	360,496.77	+ 0 00 34 "

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 114

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 191551 STATION 1115
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Mauna Kea (Waiau) Latitude station (Hawaii Island, Hawaiian Government Survey, 1892).—On Mauna Kea, between 35 and 40 feet southeast of Lake Waiau, in one of the summit craters. Marked by a pier 3 by 2½ feet, and 3 feet high, built of stone and cement, with a cross cut in the stone on top.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MAUNA KEA-WAIAU LAT STA

STATE: HAWAII YEAR: 1892 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °48 ′51.″67 GEODETIC LONGITUDE: 155 28 47.08	ELEVATION SCALED 3972	METERS FEET	

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 1	5101	506,962.32	356,251.96	+ 0 00 25

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

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

QQ 389

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 191551 STATION 1116
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION MAWAI

STATE HAWAII YEAR 1891 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE	19 ° 40 ' 27.°423	ELEVATION	METERS
GEODETIC LONGITUDE	155 20 57.742		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	551,819.43	305,406.99	+ 0 03 03

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

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

QD 383

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 191551 STATION 1117
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MILL TALLEST OF 3 STACKS

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 44 28.130 GEODETIC LONGITUDE: 155 05 34.215	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	640,016.40	329,834.06	+ 0 08 15

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

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

QD 336

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 191551 STATION 1118
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Mokuola (Hawaii Island, Hawaiian Government Survey, 1878; E. R. Hand, 1912).—On eastern coast of Hawaii, in Hilo Harbor, on the outermost point of Cocoanut Island, in the sand at the very edge of the grass line. Marked by a granite block about 5 inches square set in a foundation of lava bowlders, forming an equilateral triangle about 1 foot high and 4 feet on side, top finished smooth with cement. The granite block projects slightly above the cement surface. The whole mark now tilts slightly to seaward, and may have suffered some change. Although resting in sand, the mark is protected from seaward by a flat ledge of lava a few feet away, which forms a protecting arm.

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Mokuola STATE: Hawaii COUNTY: Hawaii
ESTABLISHED BY: Haw. County Engr. YEAR: 1878 LOCALITY: Cocoanut Island, Hilo, Hawaii
RECOVERED BY:* C.L. Murray YEAR: 1929

Detailed statement as to the fitness of the original description: A Type B-; Monument was erected over the original mark, a + in concrete, on solid pahoehoe by Chas. L. Murray of the Hawaii Territory Survey on Dec. 24, 1929. Mokuola, 1929 is not the original Mokuola Trig Station but is a new station set on a more prominent point several feet away from the old concrete triangular block which has been moved and which formerly marked the original Mokuola. The old station Mokuola, a large masonry triangular block lies slightly tilted on a depression nearby.

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: MOKUOLA
ESTABLISHED BY: Hawaiian Govt. YEAR: 1878 STATE: Hawaii COUNTY: HAWAII
RECOVERED BY:* J. H. Peters YEAR: 1932 LOCALITY: Hilo Harbor

Detailed statement as to the fitness of the original description: This station was recovered and reoccupied for magnetic observations in May 1932. The old triangular block of concrete with the granite post centre is still there but it is now tilted to the southwestward.

A new station has been established by the Hawaiian Government Survey on the lava ledge to the northeastward of the old station. A concrete base about six feet square and from two to three feet high on the sides has been built on the solid rock. A central raised pillar of concrete with a two and one-half inch short iron pipe imbedded there in mark the centre of the station. A signal banner of two inch pipe with crossed steel banners slips into the short section to provide a signal. On the top of the six foot square base at one side are letters about nine inches in height forming the inscription "MOKUOLA 1929"

Distance of the new station from the present position of the old station 9.18 meters.
Azimuths at MOKUOLA 1878. Recovered in 1932.

South Meridian	0 deg.	0 min.	
△ ALALA	160	00.2	
△ MOKUOLA 1929	227	59	(approx northeast) Dist. 9.18 meters.

*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.
U. S. GOVERNMENT PRINTING OFFICE
NOTE.—One of these forms must be used for every station recovered.
11—7929

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION MOKUOLA
STATE HAWAII YEAR 1878 THIRD ORDER
SOURCE G-SP156

GEODETIC LATITUDE	19 44 00.837	ELEVATION	± METERS
GEODETIC LONGITUDE	155 04 16.992	SCALED	FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	φ OR △ φ ANGLE
HI 1	5101	647,400.05	327,098.91	+ 0 08 41

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

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

40 316

AUG 1979

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 191551 HAWAII STATION 1119
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

RECOVERY NOTE, TRIANGULATION STATION

R

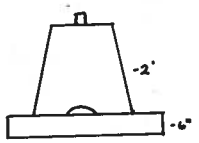
NAME OF STATION: Mokuola 2
ESTABLISHED BY: C.T. Husemeyer YEAR: 1951 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY:* C.K. Townsend YEAR: 1976 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Hilo, Cocoanut Is.
HEIGHT OF TELESCOPE ABOVE STATION MARK FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ' "
HALAI HGS 1877				00 00 00.0
KEOKEA 2 1951			2846.531	168 25 42.3

Recovered in good condition. The published date does not agree with the date inscribed in concrete by the station. Directions and distances observed to the station agree with the published position.

A complete description is as follows: To reach the station from the post office in Hilo proceed northeasterly on Wailuku St. for 0.15 miles, bear right onto Kamehameha Ave. for 1.3 miles, turn left onto acess road to Coconut Island. Station is 130 yds. to the north at end of island.

Station is a triangle inscribed in a concrete slab 6 by 6 ft. and about 6" thick. Over the station is a concrete footing with a 2" diameter pipe designed for use with a metal crossbanner. No reference marks were found.



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

FORM C&GS-526a (12-68)

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

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: MOKUOLA 2 OBS BY CGS
STATE: HAWAII YEAR: 1951 THIRD ORDER
SOURCE: J- 9..23

GEODETIC LATITUDE:	19 44 00.22500	ELEVATION	1.0 METERS
GEODETIC LONGITUDE:	155 04 16.75600		3 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	647,422.75	327,037.23	+ 0°08'41"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
HALAI HGS	62 °38 '59.3	62 °30 '18 "	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1967

3M 116

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 191551 HAWAII STATION 1120
LATITUDE 19° 30′ TO 20° 00′
LONGITUDE 155° 00′ TO 155° 30′
DIAGRAM NE 5-1,5 HAWAII

NO STATION ASSIGNED TO THIS NUMBER

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 191551 STATION 1121
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION NORTH BASE 1

STATE HAWAII YEAR 1891 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE: 19 °45′52.″472 GEODETIC LONGITUDE: 155 22 07.380		ELEVATION:	METERS FEET

STATE COORDINATES (First)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE
HI 1	5101	545,139.30	338,191.78	+ 0 02 40

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

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

QQ 374

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

NO TEXT

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1122
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: NORTH BASE 92

STATE: HAWAII YEAR: 1892 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °42 ′16.381 GEODETIC LONGITUDE: 155 27 50.654	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	512,358.27	316,376.77	+ 0 00 44

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

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

QD 380

JUN 1970
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 191551 STATION 1123
HAWAII
LATITUDE 19°30' TO 20°00'
LONGITUDE 155°00' TO 155°30'
DIAGRAM NE 5-1,5 HAWAII

NO STATION ASSIGNED TO THIS NUMBER

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 191551 STATION 1124
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

OLAA (HGS)

(Hawaii Island, Hawaiian Government Survey, 1896).—In eastern part of Hawaii, on a grassy knoll a short distance west of the road from Hilo to the Volcano, near the 11-mile post. Marked by a copper bolt set with cement into the solid rock.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 536
(Rev. Feb. 1963)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: OLAA (HGS)
ESTABLISHED BY: Hawaiian Govt. YEAR: 1896 STATE: Hawaii
RECOVERED BY: C. T. Husemeyer YEAR: 1949 COUNTY: Hawaii

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

The station was recovered in good condition. In 1930 the Territory Survey built a stone platform 6 feet square and 5 feet high over the station mark, leaving the original mark exposed to view. A new description follows.

The station is located on a rock wall which lies about 2.8 miles southwest of Olaa; about 200 yards northwest of the highway which runs between Hilo and the Volcano; about 100 yards south of a church; about 200 feet northwest of a house and on the highest ground in the immediate vicinity.

To reach from the post office at Hilo; go south and west, on the road which leads toward the Volcano for 8.4; pass the Hongwanji Church, in the village of Olaa, and continue southwesterly, on the road to the Volcano for 2.2 miles; turn right, into a palm tree bordered lane, and go northwest for about 100 yards to the end of truck travel at the garage. From this point, go easterly, through the yard, for about 200 feet to a rock wall intersection; turn left and go northwest for about 150 feet to the station.

The station is the center of a 1/2 inch copper bolt set in concrete.

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.
U. S. GOVERNMENT PRINTING OFFICE
NOTE.—One of these forms must be used for every station recovered.
16—89429-8

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: OLAA HGS
OBS BY CGS
STATE: HAWAII YEAR: 1896
FIRST ORDER
SOURCE: G- 9279

GEODETIC LATITUDE:	19 56 09.48000	ELEVATION:	204.3 METERS
GEODETIC LONGITUDE:	155 03 29.93600		670 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE
HI 1	5101	652,018.45	279,560.14	+ 0 °08 ′54 ″

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
KALULI 2	257 °52 ′23.6 ″	257 °43 ′30 ″	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

3M 121

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 191551 STATION 1124

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

OLAA (HGS) (continued)

R

FORM 526e
(8-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: OLAA (HGS)
ESTABLISHED BY: HGS YEAR: 1896 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1967 COUNTY: Hawaii
Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 2.61 METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

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

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ' "
KEAAU 1949				00 00 00.0
RM No. 1	NE	16.101	4.908	22 13 55
KALOLI 2 1949				51 10 03.4
HONUAULA (HTS) 1901				100 16 57
RM No. 2	NW	13.639	4.158	299 29 15

Station was recovered in good condition. Two reference marks were established. A complete description follows:

Station is located at Kurtistown, about 1-3/4 miles southwest of Keaau along northwest side of State Highway 11, on a low, brush-covered hill, at southwest corner of a coffee grove, 200 feet south of a Japanese Mission, and 500 feet northwest of the highway, on the northwest end of an old stone wall which ends on the hill.

To reach station from the post office in Keaau, go northeast 0.1 mile to crossroad. Turn left and go 0.1 mile to State Highway 11. Turn left and go southwest on the highway 1.9 miles to paved side road right, at sign "KURTISTOWN JODO MISSION". Turn right and go 0.1 mile; turn left and go 0.05 mile to end of truck travel in the mission yard. Walk south, along edge of the coffee grove about 200 feet to station in brush.

Station mark is a 3/4-inch copper pin, with a punch-mark in the top, cemented in a drill hole in bedrock that is flush with ground. The pin projects 3 inches from the rock. A Hawaii Territorial Survey, Type A signal is centered over the mark, with the 6-foot-square, concrete platform 4 feet above ground. A red and white metal target extends 8 feet above the platform. Station is 20 feet southwest of the corner of the coffee grove, 45 feet north of a stock shed, and partially hidden by the guava brush.

Reference mark number one is a standard disk stamped "OLAA HGS 1896 NO 1 1967", cemented in a drill hole in a bedrock outcrop projecting 8 inches. It is in the southwest corner of the coffee grove, 8 feet southwest of a pandanus tree and 3 feet lower than station mark.

Reference mark number two is a standard disk stamped "OLAA HGS 1896 NO 2 1967", cemented in a drill hole in a bedrock outcrop, in heavy brush. on line with the stone wall and 1.7 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-P69

NOAA FORM 76-31A
(11-74)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: OLAA HGS
ESTABLISHED BY: HGS YEAR: 1896 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY:* L.A. Critchlow YEAR: 1977 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: In Kurtistown.
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

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

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION ° ' "
KALOLI 2 1949				00 00 00.0
RM 2	NW	13.640	4.156	248 16 48
RM 1	NE	16.080	4.900	331 01 18

The station mark and reference marks 1 and 2 were recovered in good condition. Compared to the 1967 recovery note the distance to reference mark 1 was found shorter by 0.008 meter and the direction was found smaller by 02 minutes and 24 seconds. The distance to reference mark 2 was found shorter by 0.002 meter and the direction was found smaller by 02 minutes and 34 seconds. A complete new description follows.

The station is located in Kurtistown, about 1 3/4 miles southwest of Keaau, 500 feet northwest of State Highway 11, 200 feet south of a Japanese Mission and on property owned by Mr. Tameo Yamashita.

To reach the station from the junction of State Highways 11 and 13 in Keaau, go southwest on highway 11 for 2.05 miles to a driveway right at power pole number 144X. Turn right into the driveway keeping to the right in a circle drive for about 100 feet to a house. From here pack northwest around the right side of the house through a flower garden for about 200 feet to a rock fence and a gap in the fence. Pass through the gap and go uphill for about 50 feet to an abandoned hog shed and the station north of the shed as described.

The station mark is a 3/4-inch copper pin, with a punch hole in the top. It is cemented in a drill hole in bedrock which projects about 3 inches above the ground surface. The station is covered by a 5 foot square concrete platform which is about 4 feet high. It is 40 feet north of the hog shed. (Note desc.)

Reference mark 1, stamped OLAA HGS 1896 NO 1 1967, is a C&GS reference mark disk cemented in a drill hole in bedrock which has an exposed surface about 14 by 20 inches and projects about 6 inches above the ground surface. It is about 3 feet lower than the station mark.

Reference mark 2, stamped OLAA HGS 1896 NO 2 1976, is a C&GS reference mark disk cemented in a drill hole in bedrock which has an exposed surface about 2 by 3 1/2 feet and is flush on the north side and projects about 12 inches on the south side. It is about 1 1/2 feet lower than the station.

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

NOAA FORM 76-96 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED.

NOAA

* U.S. GPO: 1976-665-661/1270 Region 6

USCOMM-NOAA-ASHEVILLE

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 191551 STATION 1125
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 596

DESCRIPTION OF INTERSECTION TRIANGULATION STATION

NAME OF STATION: OLAA SUGAR CO.. STACK STATE: Hawaii COUNTY: Hawaii
ESTABLISHED BY: C. T.Husemeyer YEAR: 1949 LOCALITY: Puna District

Detailed statement as to the fitness of the original description:

This stack is not the same stack which was observed in 1914. However, it rests on the same base and may be considered identical with the old stack. A new description follows.

The station is located at the Olaa Sugar Company Mill in the village of Olaa. It is about 20 feet east of the boiler house.

The station is the top and center of a steel smoke stack 9 feet in diameter and 185 feet high. It rests on a rock base 20 feet square and 20 feet high which was built in 1901.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Olaa Sugar Co., stack
ESTABLISHED BY: C.T.Husemeyer YEAR: 1949 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station was recovered. It is the tall steel stack, painted silver, with black top, located at the Olaa Sugar Co. Mill, 3/4-mile northeast of Keaau Village.

RECOVERY NOTE OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: OLAA SUGAR CO STACK 1949

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

Description, including sketch of object:

The station was recovered in good condition and as described with the exception it is now owned by the Puna Sugar Company.

NOAA FORM 76-81
(10-71)

Described by _____
U. S. DEPARTMENT OF COMMERCE
NOAA
* U.S. GPO: 1975-668-081/1178 Region 6

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: OLAA SUGAR CO STACK

STATE: HAWAII YEAR: 1949 THIRD ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	19 °38 ′02.″656	ELEVATION	METERS
GEODETIC LONGITUDE:	155 02 01.518		FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	β IOR△ α ANGLE *
HI 1	5101	660,440.82	290,999.73	+ 0 °09 ′24 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β IOR△ α FORMULA NEGLECTING THE SECOND TERM.

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

QE 234

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 191551 STATION 1126
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 525 b

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION OLAA SUGAR CO WATER TANK YEAR: 1949 STATE: Hawaii COUNTY: Hawaii
CHIEF OF PARTY: C. T. Husemeyer

Description, including sketch of object: The station is the top and center of an elevated steel water tank on the grounds of the Olaa Sugar Company Mill.

The tank is about 30 feet in diameter and about 25 feet high. The total height above ground is 125 feet.

It is located about 150 yards west of the grinding mill.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Olaa Sugar Co., Water Tank
ESTABLISHED BY: C.T. Husemeyer YEAR: 1949 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station was recovered. It is the silver-colored, elevated, water tank, with peaked top painted alternate red and white, located at the Olaa Sugar Co. Mill, 3/4-mile northeast of Keaau Village.

[redacted] OF TRIANGULATION INTERSECTION STATION

RECOVERY NOTE
NAME OF STATION: OLAA SUGAR CO TANK 1949

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

Description, including sketch of object:

The station was recovered in good condition and as described with the exception it is now owned by the Puna Sugar Company.

Described by _____
U. S. DEPARTMENT OF COMMERCE
NOAA

NOAA FORM 76-81
(10-71)

* U.S. GPO: 1975-665-081/1178 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION OLAA SUGAR CO WATER TANK
STATE HAWAII YEAR 1949 THIRD ORDER

SOURCE G- 9279

GEODETIC LATITUDE	19 38 03.463	ELEVATION	METERS / FEET
GEODETIC LONGITUDE	155 02 05.690		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ = R Δ α ANGLE
HI 1	5101	660,041.81	291,080.05	+ 0 09 23

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

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

QE 235

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 191551 STATION 1127
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Omaokoili (Hawaii Island, Hawaiian Government Survey, 1891).—In the central part of Hawaii, on a hill of the same name, near the southwest foot of Mauna Kea. Marked by a triangle cut in a rock imbedded in the ground, with three ridges of imbedded rocks radiating from the center.

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Omaokoili
ESTABLISHED BY: H.G.S. YEAR: 1891 STATE: Hawaii COUNTY: Hawaii
RECOVERED BY: Chas. L. Murray YEAR: 1938 LOCALITY: N. Hilo, Hamakua Bdy., Hawaii

Detailed statement as to the fitness of the original description:

Location of Station: On the summit of a large hill of the same name near the southwest foot of Mauna Kea slope. The Waiki-Humuula road skims the foot of north slope of this hill at a point 2 1/2 miles from Humuula.

Old mark found: The old mark, a Δ on rock and stonepile was found.

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

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: OMAOKOILI
ESTABLISHED BY: HGS YEAR: 1891 STATE: Hawaii
RECOVERED BY:* Y Yamamoto USGS YEAR: 1955 COUNTY: Hawaii

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

Located about 3.2 mi. SE of Pohakuloa Hunting Lodge, 2.4 mi. W of Humuula Sheep Station, most northerly of a group of six cinder hills, at the highest point of the hill known as Omaokoili.
To reach from Hilo Post Office, drive W for 29.3 mi. along Saddle Rd. to side rd. leading N to Hulapohaku; turn N for 0.9 mi. to Humuula Sheep Station; turn W on old rd. 2.1 mi. to locked gate; 0.7 mi. past the first gate (key may be obtained from the Forestry division of the Territorial Agriculture Dept.); 0.2 mi. beyond this point at a crest in the rd. turn l left (s) leaving the rd. and go 0.5 mi. up S rim of cinder hill to top and station.
Station mark: Drill hole and triangle cut in lava rock over which the Hawaiian Govt Survey has erected a type "D" monument. (Triangular concrete platform 7½ ft. on a side built level with the station mark.)
Reference mark No. 1: Copper nail and washer cemented in lava rock, 70.71 ft from station mark in azimuth 133°51'.
Reference mark No. 2: Copper nail and washer cemented in lava rock, 52.73 ft. from station mark in azimuth 317°03'.

*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.

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: OMAOKOILI
STATE: HAWAII YEAR: 1891 THIRD ORDER
SOURCE: G-SP156

GEODETIC LATITUDE:	19 42 54.780	ELEVATION:	2161.0 METERS
GEODETIC LONGITUDE:	155 29 55.337		7090 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE *
HI 1	5101	500,445.49	320,249.07	+ 0 00 02

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

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

QD 379

AUG 1979

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 191551 STATION 1128
HAWAII
LATITUDE 19 °30 ′ TO 20 °00 ′
LONGITUDE 155 °00 ′ TO 155 °30 ′
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION

TRIANGULATION STATION

NAME OF STATION: PANAEWA (HGS)
ESTABLISHED BY: L.A. Critchlow YEAR 1977 STATE Hawaii
COUNTY: Hawaii BENCH MARK ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3 miles south of Hilo
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

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

OBJECT	BEARING	DISTANCE FEET	DISTANCE METERS	DIRECTION
HALAI 2 HGS				00 00 00
RM 1	NW	28.38	8.650	23 02 21
RM 2	NE	31.99	9.750	96 10 18
RM 1 to RM 2		36.10	11.002	

The station is located about 4 miles northwest of Keaau and 3 miles south of Hilo on the east side of State Highway 11 on the highway right-of-way.

To reach the station from the junction of State Highways 11 and 19 in Hilo, go south on State Highway 11 for 3.45 miles to a small power-line crossing, 0.05 miles south of a highway bridge. Pack easterly up steep bank about 40 feet from the edge of the highway to the station site.

The station marks are State of Hawaii survey disks stamped PANAEWA 1977. The surface disk is set in a round concrete post centered in a 4 by 4 foot concrete platform and recessed 0.3 foot. The underground disk is set in an irregular mass of concrete about 4 feet below the ground. They are about 40 feet east of the east edge of the highway, 29 feet south of a powerpole and 8 feet east of the top of a slope.

Reference mark 1, stamped 1, is a railroad spike with a punch hole marking the center, cemented in a drill hole in a boulder, 13 feet east of the top of a slope and 10 feet southeast of upper end of a rock and concrete waterline cover.

Reference mark 2, stamped 2, is a railroad spike with a punch hole marking the center, cemented in a drill hole in a concrete foundation for a manhole cover 18 feet east of a powerpole.

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

NOAA FORM 76-96 (1-72) SUPERSEDES C&GS FORM 926A WHICH MAY BE USED.

U.S. DEPARTMENT OF COMMERCE
NOAA

☆ U.S. GPO: 1976-665-661/1220 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

OBS BY NGS

NAME OF STATION: PANAEWA HGS
STATE: HAWAII YEAR: 1977 FIRST ORDER

SOURCE: G-16241

GEODETIC LATITUDE:	19 40 35.89439	ELEVATION:	66.2 METERS
GEODETIC LONGITUDE:	155 04 01.49303		217 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE
HI 1	5101	648,932.75	306,428.08	+ 0 °08 ′45 ″

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
HALAI 2 HGS	144 °38 ′48.2	144 °30 ′03 ″	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

SM 124

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 191551 STATION 1129
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Papaaloa (Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1913).—On northeast coast of Hawaii, North Hilo District, land of Papaaloa, on the high flat-topped hill immediately behind the Papaaloa and about ¾ mile from the road. To reach the station take the road or trail at plantation stables, near hospital, and go directly up the hill; the trail will turn to right and go under a flume, then continue again to top of hill. Just before top is reached the trail forks and goes either side of station, which will be found at highest point of hill. Station originally marked by a buried copper triangle; later by a cylinder of concrete, with top, 1 foot in diameter, level with ground. A United States Geological Survey tablet set in the concrete marks the center. A large pile of stones surrounds it.

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PAPAALOA
ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 STATE: Hawaii
RECOVERED BY: C.T.Husemeyer YEAR: 1949 COUNTY: Hawaii

Detailed statement as to the fitness of the original description: Original station was described as an Ohia post with a copper triangle under it. In 1899 station was remarked with a concrete cylinder set in rammed stone and cement, marked with a drill hole two inches deep and a cross. In 1912 the station was remarked by the U.S.Geological Survey with a bronze tablet set in a concrete cylinder 12 inches in diameter and projecting about six inches above the ground. In 1929 the Hawaii Territory Survey placed a six foot square concrete platform with four foot high masonry supports over the station. The disk may be plumbed to through a 2.5 inch pipe in the center of the platform.

Located on the northeast coast of Hawaii, in North Hilo District, land of Papaaloa, on a high flat topped cane covered hill immediately behind the Papaaloa and about 3/4 mile from the government road.

To reach from the post office in Hilo: go north on the coast highway for 25.0 miles to Papaaloa post office, turn left and follow paved road up steep hill for 0.7 miles to a fork at small shack and station on right.

Reference mark No.1 is east southeast of the station, on the west side of the road, two feet from the fence line and near the southeast corner of the shack. A standard reference disk stamped PAPAALOA NO 1 1949, set in the top of a square topped concrete post projecting three inches above the ground.

Reference mark No.2 is south southwest of the station, on the south side of the road at a fence corner, near the northwest corner of the shack. A standard reference disk stamped, PAPAALOA NO 2 1949, set in the top of a square topped concrete flush with the ground.

OBJECT		FEET	METERS	DIRECTION
HUMUULA				DO 00 00.0
R.M. No.1	SSE	59.003	17.948	228 36 49.6
R.M. No.2	SSW	69.424	21.160	260 42 41.7

(continued on next page)

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PAPAALOA
STATE: HAWAII YEAR: 1877 SECOND ORDER
SOURCE: G- 9275

GEODETIC LATITUDE:	19 58 15.784	ELEVATION:	280.3 METERS
GEODETIC LONGITUDE:	155 13 52.047		920 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	592,328.49	413,233.24	+ 0 05 31

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
HUMUULA	123 25 17.1	123 19 46	5101

QE 125

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 191551 STATION 1129

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

PAPAALOA (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PAPAALOA
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station mark was recovered in good condition. The reference marks were searched for by distance and angle but not found and are believed destroyed by cultivation. No new reference marks were set as cane is planted up to road edges and there is no suitable location. The shack mentioned in the 1949 description has been removed. A complete description follows:

Station is located about 3/4-mile southwest of Papaaloa Village and State Highway 19, on northwest bank of road at fork of paved cane field roads, at about 915 feet elevation, and 100 feet northwest of a prominent, lone, slender ironwood tree about 100 feet tall.

To reach station from the post office in Papaaloa, go upgrade for 0.05 mile; cross State Highway 19 and continue upgrade for 1.0 mile to station

Station mark is a USGS disk stamped "917 1912", set in the top of a 12--inch-diameter concrete monument that projects 2 inches. A Type A signal is centered over the mark, with the 6-foot-square, concrete platform 4 feet above ground. It is 16 feet northwest of center line of road and 25 feet north-northwest of the road fork junction.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PAPAALOA
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: J.M. Collom YEAR: 1969 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station recovered in good condition. 1966 description adequate.

FORM C&GS-526 (9-66)
USCOMM-DC 36496-P66

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

Q 191551 STATION 1130
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Papalekoki (Hawaii Island, Hawaiian Government Survey, 1877).—In the northern part of Hawaii, on the northern slope of Mauna Kea, on the north brow of the summit called Papalekoki, between the summits of Mauna Kea and Kaluamakani. Station marked by a copper triangle underground, with an immense cairn over it.

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PAPALEKOKI
ESTABLISHED BY: Haw.Govt.Survey YEAR: 1877 STATE: HAWAII
RECOVERED BY:* L. C. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

The mark for this station was not searched for as it is buried in an immense cairn. Some of the rocks of the cairn were removed but as the time for the building party was limited, the task was discontinued.

Station Papalekoki 2 (ecc) is at the surface of this same cairn which is very prominent for miles distant.

Station Papalekoki 2 is NNW of the cairn, 3.342 meters.

* 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.

U. S. GOVERNMENT PRINTING OFFICE

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

H-2518-2

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PAPALEKOKI

STATE: HAWAII YEAR: 1877 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	19 °52 ′38.″541	ELEVATION:	3426 METERS
GEODETIC LONGITUDE:	155 29 06.082		SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	505,146.00	379,138.35	+ 0 00 18

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

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

QQ 221

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 191551 STATION 1131
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 525
Rev. Aug. 1948

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PAPALEKOKI 2 STATE: HAWAII COUNTY: NORTH SLOPE OF MAUNA KEA HAWAII

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

NOTE.*	HEIGHT OF TELESCOPE ABOVE STATION MARK	1.7 METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.
4	Surface-station mark, Underground-station mark	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION		

OBJECT	BEARING	DISTANCE feet	DISTANCE meters	DIRECTION ° ′ ″
NOHONAOHAE (metal target)				00 00 00
PAPALEKOKI 2 ECC.			3.342	226 10 54

Detailed description:

The station is located on the northeasterly and lower end of a prominent red ridge, on the northern slope of Mauna Kea. It is about 15 miles south of Honokaa, about 3.5 miles north northwest of the summit of Mauna Kea, about 0.2 mile northeast of the summit of a prominent red ridge, about 100 feet north of a small crater and 3.342 meters northwest of a large cairn.

The station is best reached, by horse, from the northerly foot of Mauna Kea. This is about a 4 hour horse pack. The station is about 1000 feet above timber line. All water must be packed from the foot of the mountain. Good shelter for a tent is available in the small crater which lies about 100 feet south of the station.

The station is a standard disk, stamped PAPALEKOKI 1948, set into a drill hole in a boulder which projects about 6 inches.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PAPALEKOKI 2
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station was recovered in good condition. It is now possible to reach station without the use of horses by using a 4-wheel-drive vehicle to gain station elevation and then hiking about 4-1/2 miles at same level. A complete description follows:

Station is located about16 miles southeast of Kamuela, 15 miles south of Honokaa and 4 miles north of the summit of Mauna Kea, at about 11,241 feet elevation, on the northeast and lower point of a northeast-southwest red ridge about 1600 feet long (The southwest, higher, point is about 200 feet higher than station). Station is at northwest side of a very large cairn about 12 feet in diameter and 6 feet high, which is reportedly built over old station PAPALEKOKI (HGS) 1877.

To reach station from the post office in Kamuela, go south on State Highway 19 for 6.2 miles to junction with State Highway 20. Go left, on Highway 20, for 9.8 miles to board gate on left, by power pole 91. Pass through gate and follow red cinder road for 1.7 miles; take left fork and go 0.05 mile; take left fork and follow main road for 2.25 miles to gate at Puu Laau Cabin. Pass through gate and continue on track road for 0.9

(continued on next page)

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PAPALEKOKI 2

STATE: HAWAII YEAR: 1948 SECOND ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	19 °52′37.922	ELEVATION:	3426.4 METERS
GEODETIC LONGITUDE:	155 29 06.348		11241 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 1	5101	505,120.62	379,075.90	+ 0 00 18

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ′ ″	PLANE AZIMUTH * (From south) ° ′ ″	CODE
NOHONAOHAE	103 26 37.3	103 26 19	5101

QE 130

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 191551 STATION 1131

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

PAPALEKOKI 2 (continued)

mile to fork. Take right fork and go 1.25 miles; take left fork and go 1.6 miles to fork; take left fork and go 2.35 miles to fork. Take right fork and go 1.1 miles to end of road at base of cinder hills at about 11,400 feet elevation. From here pack left, northeast, along approximately same elevation for about 4-1/2 miles to station.

Station mark is a standard disk stamped "PAPALEKOKI 1948", cemented in a drill hole in bedrock flush with surrounding area.

PAPALEKOKI 2 ECC 1948 is 3.342 meters (10.96 ft.) from station, in azimuth 329° 37′ 34".

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 191551 STATION 1132
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 526
Rev. Aug. 1948

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PAPALEKOKI 2 ECC. STATE: HAWAII COUNTY: NORTH SLOPE OF MAUNA KEA HAWAII

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

NOTE.*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK METERS.
4	Surface-station mark, Underground-station mark	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE feet	DISTANCE meters	DIRECTION‡ ° ′ ″
This station was located by distance and direction from triangulation station PAPALEKOKI 2				

Detailed description:

The station is located on the northeasterly and lower end of a prominent red ridge on the northern slope of Mauna Kea. It is about 15 miles south of Honokaa and about 3.5 miles north northwest of the summit of Mauna Kea. The summit of the red ridge lies about 0.2 mile southwest of the station and a small crater lies about 100 feet south.

The station is best reached, by horse, from the northerly foot of Mauna Kea. This is about a 4 hour horse pack. The station is about 1000 feet above timberline. All water must be packed from the foot of the mountain. Good shelter for a tent is available in the small crater about 100 feet south of the station.

The station is a standard disk, stamped PAPALEKOKI 2 ECC 1948, set into a drill hole in a flat boulder. The station was established in the center of a cairn which is about 12 feet in diameter and is 1.90 meters high. A smaller cairn 5 feet in diameter and 1.52 meters high was erected over the station. A 3 inch by 3 inch wooden post extends from the station disk to a point 1.2 meters above the top of the upper cairn.

Triangulation station PAPALEKOKI 1948 is located 3.342 meters northwest of the station.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PAPALEKOKI 2 ECC
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station was recovered in good condition. It is now possible to reach station without the use of horses, by using a 4-wheel-drive vehicle to gain station elevation, and then hiking about 4-1/2 miles at same level. A complete description follows:

Station is located about 16 miles southeast of Kamuela, 15 miles south of Honokaa and 4 miles north of the summit of Mauna Kea, at about 11,241 feet elevation, on the northeast and lower point of a northeast-southwest red ridge about 1600 feet long (the southwest, higher, point is about 200 feet higher than station). Station is located on top of a very large cairn about 12 feet in diameter and 6 feet high, which is reportedly built over old station PAPALEKOKI (HGS) 1877.

To reach station from the post office in Kamuela, go south on State Highway 19 for 6.2 miles to junction with State Highway 20. Go left, on State Highway 20, for 9.8 miles to board gate on left, by power pole 91. Pass through gate and follow red cinder road for 1.7 miles; take left fork and go 0.05 mile; take left fork and follow main road for 2.25 miles to gate at Puu Laau Cabin. Pass through gate and continue on track road

FORM C&GS-526 (1-68)
USCOMM-DC 18509-P65

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

(continued on next page)

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PAPALEKOKI 2 ECC

STATE: HAWAII YEAR: 1948 SECOND ORDER

SOURCE: G- 9275
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	19 °52 ′37.828	ELEVATION:	3428.3 METERS
GEODETIC LONGITUDE	155 29 06.290		11248 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE*
HI 1	5101	505,126.15	379,066.42	+ 0 °00 ′18 ″

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION PAPALEKOKI 2

QE 275

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 191551 STATION 1132

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

PAPALEKOKI 2 ECC (continued)

for 0.9 mile to fork. Take right fork and go 1.25 miles; take left fork and go 1.6 miles to fork; take left fork and go 2.35 miles to fork. Take right fork and go 1.1 miles to end of road at base of cinder hills at about 11,400 feet elevation. From here pack left, northeast, along approximately same elevation for about 4-1/2 miles to station.

Station mark is a standard disk stamped "PAPALEKOKI 2 ECC 1948", cemented in a drill hole in a rock in the top and center of the large cairn. A smaller cairn, with a 4 x 4-inch signal pole in the center, is built over the mark and extends 4 feet above the top of the large cairn.

PAPALEKOKI 2 1948 is 3.342 meters (10.96 ft.) from station, in azimuth 149° 37' 34".

USCOMM-NOAA-ASHEVILLE

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 191551 STATION 1133
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PAUKAA LIGHTHOUSE

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 45 55.582 GEODETIC LONGITUDE: 155 05 33.141		ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	640,097.79	338,656.49	+ 0 08 16

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

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

QD 335

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 191551 STATION 1134
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Peak A (Pollahu) (Hawaiian Government Survey, 1892).—On the most conspicuous, but not the highest peak of Mauna Kea. Marked by a tall stone cairn, with tin box containing records of six parties since 1885.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PEAK A POLIAHU

STATE HAWAII YEAR 1892 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE	19 49 26.92	ELEVATION	METERS
GEODETIC LONGITUDE	155 29 02.68		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	505,472.51	359,807.78	+ 0 °00 ′19 ″

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

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

QD 386

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

NO TEXT

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1135
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PEAK B

STATE: HAWAII YEAR: 1892 THIRD ORDER

SOURCE: G-SP15e

GEODETIC LATITUDE: 19 ° 49 ′ 30.11 ″ GEODETIC LONGITUDE: 155 28 34.04	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	508,207.24	357,103.54	+ 0 00 ′ 29 ″

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

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

QQ 387

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 191551 STATION 1136
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 525 b

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: PEPEEKEO POINT LIGHT YEAR: 1949 STATE: Hawaii COUNTY: Hawaii

CHIEF OF PARTY: C. T. Husemeyer

Description, including sketch of object: The station is the center of the light of Pepeekeo Point Lighthouse on the east coast of the island of Hawaii. The light flashes white and is mounted of a steel tower which is about 75 feet in height. It is 147 feet above the ocean. The station is located on Pepeekeo Point about 0.4 mile south of Alia Point.

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PEPEEKEO POINT LIGHT.
ESTABLISHED BY: C.T.H. YEAR: 1949 STATE: Hawaii
RECOVERED BY:* H.J.S. YEAR: 1962 COUNTY: Hawaii

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

The station was recovered in good condition as described. The station is located on the water side of the plantation village and north of a playground.

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

R

NAME OF STATION: Pepeekeo Point Light
ESTABLISHED BY: C.T.Husemeyer YEAR: 1949 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 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 identified by angle check and recovered. Located at north end of Pepeekeo Village, on Pepeekeo Point, at north end of large lawn area. Station is center of flashing white light mounted atop a white, steel tower. Light is about 57 feet above ground and 142 above sea level.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Pepeekeo Point Light
ESTABLISHED BY: C. T. Husemeyer YEAR: 1949 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R. B. Melby YEAR: 1975 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 8¼ miles north of Hilo

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

The station was recovered in good condition as described. It is designated as No. 3671 in the publication 'Light List, Volume III, Pacific Coast and Pacific Islands, 1975'.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PEPEEKEO POINT LIGHT
ESTABLISHED BY: C. T. HUSEMEYER YEAR: 1949 STATE: HAWAII BENCH MARK(S) ALSO ☐
RECOVERED BY: R. B. MELBY YEAR: 1978 COUNTY: HAWAII
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 8 MILES NORTH OF HILO

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

THE STATION WAS RECOVERED IN GOOD CONDITION AS DESCRIBED IN 1966.

FORM C&GS-526 (9-68)
USCOMM-DC 56496-P68

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

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PEPEEKEO POINT LIGHT
STATE: HAWAII YEAR: 1949 THIRD ORDER

SOURCE: G- 9279

GEODETIC LATITUDE:	19 °51 '01.041	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 05 07.509		FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE
HI 1	5101	642,470.34	369,477.40	+ 0 °08 '27 "

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

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

QE 237

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

NO TEXT

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1137
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PIPE

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °46 ′55.″342 GEODETIC LONGITUDE: 155 05 32.232		ELEVATION.	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE ° ′ ″
HI 1	5101	640,170.10	344,685.31	+ 0 08 17

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

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

QD 34

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 191551 STATION 1138
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Puu Ohai (Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1913).—On northeast coast of Hawaii, in North Hilo District, land of Pohakupuka, on a not very pronounced cane-covered hill between Maulua Gulch and the railroad station of Ninole. Station bears S. 27° W. from a church which is 1,200 meters east of Maulua Gulch, on the road, and 200 meters from the sea. It is reached by leaving the government road at the plantation's road which goes "mauka" (inland) just a short distance east of the east end of the railroad tunnel. Follow this road past Kaiakea Camp (Papaaloa plantation) and when the church and a mango grove bear N. 27° E. turn up to top of hill about 200 meters above road. Marked by a buried copper triangle, above which is a concrete cylinder flush with the ground in the center of which is a United States Geological Survey disk.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
(Rev. Feb. 1963)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU OHAI
ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 STATE: Hawaii
RECOVERED BY: C.T.Husemeyer YEAR: 1949 COUNTY: Hawaii

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

In 1877 when this station was established by the Hawaiian Government Survey, the following description was written. " Station mark a copper triangle 2 feet underground 2 pits and a flat stone, by auwai in Kauai's Land in the ahupuna of Pohakupuka 1/4 mile above the main road." In 1900 this station was recovered by J. S. Emerson who made the following note. " Station restored. Present station mark a 12 inch concrete cylinder, divested of its iron covering, marked with a drill hole in its center and projecting 2 inches above the ground secured by rammed stone 4 feet in diameter." In 1912 this station was recovered by the U. S. Geological Survey who made the following note. " Original station recovered. Remarked by a bronze tablet set in the top of the original concrete cylinder." This bronze disk was recovered by E. R. Hand in the year of 1912. At the time of this survey, the U. S. Geological survey disk was recovered in good condition, however, it is now surrounded by a triangular slab of concrete, 6 feet on each side, which is flush with the surface of the soil. This concrete slab was installed by the Territory Survey about 1930. A new description follows--

The station is located, in cane land, about 5 miles southeast of Laupahoehoe Point, about 2.5 miles northwest of Honohina, about 0.7 mile southwest of the highway which runs between Hilo and Honokaa and about 150 feet north of a graded road.

The station is a U. S. Geological Survey bronze disk, stamped 735, set in the top of a concrete cylinder which is 12 inches in diameter and flush with the surface of the soil. It is surrounded by a triangular slab of concrete 6 feet on each side and flush with the surface of the surrounding ground.

No reference marks were established at this station.

To reach from the post office in Hilo; go northerly, on the road which leads toward Honokaa, for 21.4 miles; cross over the Ahole Bridge and turn left, onto a graded field road; go westerly, up a steep grade, for 0.7 mile to the end of truck travel. From this point pack north for about 150 feet to the station.

NOTE	OBJECT	BEARING	FEET	METERS	DIRECTION
	HAIKU (HGS)				00 00 00
	TOLEDO	S	2 miles		48 26 39.79
	PAPAILOA (HGS)	NW	3 miles		177 23 23.58

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU OHAI
STATE: HAWAII YEAR: 1877 SECOND ORDER
SOURCE: G- 9279

GEODETIC LATITUDE:	19 °56 ′43.694	ELEVATION	224.2 METERS
GEODETIC LONGITUDE:	155 11 31.694		736 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE
HI 1	5101	605,733.24	403,966.06	+ 0 06 18

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
	° ′ ″	° ′ ″	
HAIKU	307 22 20.3	307 16 02	5101

QE 177

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 191551 STATION 1138

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

PUU OHAI (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU OHAI
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station was recovered and found to be shifted several inches from it's original position due to undermining of the concrete platform during cultivation of the canefield. Station should be considered destroyed.

FORM C&GS-526 (1-68)
USCOMM-DC 18509-P65

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

USCOMM-NOAA-ASHEVILLE

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 191551 STATION 1139
HAWAII
LATITUDE 19 °30′ TO 20 °30′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Puu Oo (Hawaii Island, Hawaiian Government Survey, 1891).—In the central part of Hawaii, on south side of the summit of the hill, Puu Oo, near the southeastern foot of Mauna Kea. Marked by a triangle cut in the rock, and a cairn of stones.

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Puu Oo
STATE: Hawaii COUNTY: Hawaii
ESTABLISHED BY: H.G.S. YEAR: 1891 LOCALITY: North Hilo, Hawaii
RECOVERED BY: Chas.L.Murray YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of Station: In the central part of Hawaii on the south side of the summit of Puu Oo Hill which is about 0.6 mile northwest of Puu Oo Ranch House and lies on the southeast slope of Mauna Kea.

Old station mark found: Original Δ on rock and stonepile.

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

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU OO
ESTABLISHED BY: HGS YEAR: 1891 STATE: Hawaii
RECOVERED BY:* V Yamamoto YEAR: 1955 COUNTY: Hawaii
USGS

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

Station located about 20.2 mi. W of Hilo, 4.9 mi. NE of Humuula Sheep Station and 500 ft. S of a gravel rd., on top of a hill known as Puu Oo. To reach from Hilo Post Office, drive W for 26.3 mi. along Saddle Rd. to side rd. leading N to Halepohaku; turn N for 2.3 mi. to rd. forks; take right fork and continue 4.1 mi. to foot of low hill on S side of rd; 0.9 mi. beyond the side rd. leading down to the Puu Oo ranch house. Leave truck and climb to top of hill and station. A 5-min. walk.
Station mark: Drill hole and triangle cut in lava rock around which HGS has erected a type "D" monument. (The concrete platform 7½ ft. on a side and 0.3 ft. above the station mark has been built.)
Reference mark No. 1: Copper nail and washer cemented in rock, 53.35 ft. from station mark in azimuth 215°42'.
Reference mark No. 2: Copper nail and washer cemented on top of 1-1.. pipe 51.02 ft. from station mark in azimuth 127°13'.

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

34314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU OO
STATE: HAWAII YEAR: 1891 THIRD ORDER
SOURCE: G-SP156

GEODETIC LATITUDE	19 43 55.657	ELEVATION	2108.0 METERS
GEODETIC LONGITUDE	155 23 46.666		6916 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE*
HI 1	5101	535,663.82	326,405.14	+ 0 32 06

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

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

QJ 371

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 191551 STATION 1140
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU ULAULA

STATE: HAWAII YEAR: 1891 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °32′00.128 GEODETIC LONGITUDE: 155 27 59.702		ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	511,505.96	254,211.02	+ 0 00 40

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

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

00 370

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 191551 STATION 1141
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 525
Rev. Aug. 1945

DESCRIPTION OF TRIANGULATION STATION

U.S.A

NAME OF STATION: PUU ULAULA 2 (HTS) STATE: Hawaii COUNTY: Hawaii

CHIEF OF PARTY: C. T. Husemeyer YEAR: 1949 Described by: C. J. HOEPPEL

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1.03 METERS.† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

Surface-station mark, Underground-station mark — DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE feet	DISTANCE meters	DIRECTION‡ ° ′ ″
AAHUWELA R. M. # 1	SE	28.070	8.556	00 00 00
				106 35 29

Detailed description

The station is located on the summit of a low volcanic knoll which lies on the crest of the easterly shoulder of Mauna Loa about 29 miles southwest of Hilo, about 16 miles northwest of the Hawaiian National Park Headquarters, about 9 miles east northeast of the summit of Mauna Loa, about 250 feet east of the Puu Ulaula Rest House and at an elevation of 10036 feet.

To reach from the Headquarters of the Hawaiian National Park; go westerly, on the road which leads toward Naalehu, for 2.1 miles; turn right, as per the sign reading "Bird Park", and go northwest for 1.2 miles to a turn-around at the end of the paved road; continue straight ahead, on the graded road, for 0.4 mile; pass through a looked gate (key for this gate may be obtained from the Hawaiian National Park Headquarters) and continue northwesterly, on the main traveled road, for 10.1 miles to the end of the road at a corral and stable. From this point pack northwesterly, along a good trail for about 7. 5 miles to the Puu Ulaula Rest House and the station hill.

Water can be obtained from the tank at the Puu Ulaula Rest House. This is about a 4 hour pack.

The station is the center and top of a 1 5/8 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 is flush with the surface of the ground.

Reference mark number 1 is the center of a bronze disk 18 inches in diameter which is used to point out the points of interest from the station hill. It is set in the center of a stone and concrete cairn which is about 4 feet in height.

In 1938 when the Territory Survey Department established this station they made the following note on their recovery card. " Nothing was found to indicate the station which records show was never marked originally exception with an Ohia tripod no remnants of which remain. However a monument was placed at the highest point of the hill, 28 feet away from a 1 foot disk with 8 large arrows cemented to the top of a cemented stonepile about 4 feet high. This disk according to E. G.Windgate, former U.S.G.S. Engr. on Hawaii is not the station mark. In any event the new station Monumented should be retriangulated on."

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

16—54052-1 U. S. GOVERNMENT PRINTING OFFICE

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: PUU ULAULA 2 HTS OBS BY CGS

STATE: HAWAII YEAR: 1949 FIRST ORDER

SOURCE: C- 9.79

GEODETIC LATITUDE:	19 31 59.2800	ELEVATION:	3076.7 METERS
GEODETIC LONGITUDE:	155 27 59.9600		10094 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	511,480.53	254,126.08	+ 0 00 40 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
JWERAHUNA HGS	302 57 13.8	302 56 34 "	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

SM 142

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 191551 STATION 1141

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

PUU ULAULA 2 (HTS) (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU ULAULA 2 (HTS)
ESTABLISHED BY: C.T. Husemeyer YEAR: 1949 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

Station mark was recovered and found to be in poor condition. It was marked by a nail in the center of a cement-filled tomato can, which was set at the middle of a triangular, concrete platform about 7 feet on each side. The iron bar mentioned in original description was centered over this nail. The platform is somewhat cracked and broken so both the iron bar and center nail were in danger of being lost, so the station was remarked with a standard station disk. The distance to the reference mark was checked. A complete description follows:

Station is located about 29 miles southwest of Hilo and 15 miles northwest of the Hawaii Volcanoes National Park Headquarters, on the top of a red cinder hill, known as Red Hill, on the east shoulder of Mauna Loa, 250 feet east from a cabin, and at about 10035 feet elevation.

To reach station from the Hawaii Volcanoes National Park Headquarters, go westerly on Crater Rim Road for 1.8 miles; go right for 0.1 mile to crossroad at State Highway 11. Continue straight ahead, as per sign "MAUNA LOA STRIP SCENIC ROAD", for 1.6 miles to road loop at Bird Park. Pass through stone gateposts and follow winding, macadam road for 10.2 miles to end of road. Pack northwesterly on the Mauna Loa Trail for about 7 miles to Red Hill and station.

Station mark is a standard disk stamped "PUU ULAULA 2 1949 1967", riveted to the top of a 1-inch, iron pipe that is set in concrete, about 2 inches below the top of the triangular, concrete platform. A metal target, supported by 3 iron legs, is centered over the mark, and extends 8 feet above the platform.

Reference mark number one is the center of an 18-inch-diameter, bronze disk, with arrows indicating various points of interest, mounted on top of a stone and concrete cairn about 4 feet high.

NOTE: Packing time is about 4 hours. Water is available at the Puu Ulaula Cabin near station.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU ULAULA 2 HTS
ESTABLISHED BY: C.T.H. YEAR: 1949 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY: *L. A. Critchlow YEAR: 1977 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 29 miles southwest of Hilo
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

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

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	° ′ ″
UWEKAHUNA HGS 1896				00 00 00
RM 1	SE	27.985	8.529	03 27 35
RM 2	NW	25.96	7.913	184 59 56
77-506 USGS	E	2.59	0.790	323 08

The triangular concrete platform and the metal target over the station mark were found destroyed. The station mark was found slightly loose in the ground and was reinforced with concrete on this date. Reference mark 1 was recovered in fair condition as the cairn it is cemented in was found slightly loose and, as a probable result, the distance to reference mark 1 differed from the 1949 measurement by 27 mm. and the direction differed by about 26 minutes. Reference mark 2 was set on this date. The previous descriptions are adequate with the following additions:

The station was reached by helicopter on this date but can also be reached by following the 1967 description.

Reference mark 2 is the center of a 3/4-inch galvanized pipe 4 feet long set in an irregular mass of concrete and projecting 0.2 foot above the ground.

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

NOAA FORM 76-96 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED.

U.S. DEPARTMENT OF COMMERCE NOAA

* U.S. GPO: 1976-665-661/1270 Region 6

USCOMM-NOAA-ASHEVILLE

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 191551 STATION 1142
HAWAII
LATITUDE 19°30' TO 20°00'
LONGITUDE 155°00' TO 155°30'
DIAGRAM NE 5-1,5 HAWAII

NO STATION ASSIGNED TO THIS NUMBER

USCOMM-NOAA-ASHEVILLE

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 191551 STATION 1143
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

RED HILL (HGS)

(Hawaii Island, Hawaiian Government Survey, 1877).—In the northern part of Hawaii, on a prominent peak on the northeast slope of Mauna Kea. Marked by a copper triangle underground, with a large stone cairn over it. Visible from the Volcano House.

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Red Hill (HGS) STATE: Hawaii COUNTY: Hawaii
ESTABLISHED BY: H.G.S. YEAR: 1877 LOCALITY: Hamakua, Hawaii
RECOVERED BY: Chas.L.Murray YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of Station: In the northern part of Hawaii on a Prominent Peak on The northeast slope of Mauna Kea. The hill is about 4 miles southwesterly from Puu Kihe ranch house.

Old station mark found: The old copper triangle which was the only definite mark to identify the station was found lying loose in a pile of stones on about the highest point of the hill. An old grave was found in this pile of stones.

New Station Mark: An H.T.S. Type D.monument was erected over the point where the copper Δ was found but there is a question as to whether this station is built over the original point. It should be re-triangulated on.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 526
(Rev. Feb. 1965)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: RED HILL (HGS)
ESTABLISHED BY Hawaiian Govt. YEAR: 1877 STATE: Hawaii
RECOVERED BY: C.T.Husemeyer YEAR: 1949 COUNTY: Hawaii

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

The original station, consisting of a copper triangle, was found lying loose in a pile of stones by the Territory Survey in 1938 when they built a triangular concrete platform at the station site. They made note of the fact that some doubt exists if the original point was recovered. A new description follows.

The station is located on the northeast summit of Red Hill, which lies on the easterly slope of Mauna Kea, about 16.5 miles south southeast of Honokaa, about 20 miles west of Honomu, about 3.7 miles east northeast of the summit of Mauna Kea and at an elevation of 11,854 feet.

The station can be reached, by trail, from the Puu Kihe Ranch House which is 7.8 miles, by road, west of the Kukaiau Ranch Headquarters.

The station is the center of a 2 1/2 inch iron pipe which projects about 2 feet from the top of triangular slab of concrete which is 6 feet on each side and about flush with the surrounding rock.

This station was located by 16 position intersections from various triangulation stations.

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

(continued on next page)

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: RED HILL HGS OBS BY CGS
STATE: HAWAII YEAR: 1977 SECOND ORDER
SOURCE: C- 9279

GEODETIC LATITUDE:	19 51 05.41800	ELEVATION:	3616.0 METERS
GEODETIC LONGITUDE:	155 25 24.93600		11863 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 1	5101	526,256.67	369,849.94	+ 0 01 '33 "

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

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

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

3M 143

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 191551 STATION 1143

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

RED HILL (HGS) (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: RED HILL (HGS)
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island; Hawaii

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

Station was not visited, but the target may be seen from surrounding stations.

Located about 23 miles west-northwest of Hilo, on the northeast slopes of Mauna Kea, on the summit of Red Hill, at about 11,863 feet elevation, about 3/4-mile northeast of Puu Makanaka.

Station is marked by a 2-1/2-inch iron pipe, projecting 2 feet from the center of a triangular concrete platform. A red and white metal target is mounted in the iron pipe and extends about 8 feet above the platform.

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

REPORT ON PERMANENT SURVEY MARK

AREA OFFICE

STATE Hawaii COUNTY Hawaii QUADRANGLE 54
QUOTE PRIMARY REFERENCE on the NE. slope of Mauna Kea (Direction and distance)

DESIGNATION { LISTED RED HILL (HGS) / STAMPED } TYPE OF MARK: BM ..... TT ..... TRIANG. X

Lat. 19 ° 51 ' 06.410"
Long. 155 ° 25 ' 24.936"
Elev. 11,863 feet

CONDITION
Disturbed ☐
Destroyed ☐
Not Found ☐

ESTABLISHED BY
USGS ☐ USBR ☐
USC&GS ☒ State GS ☐
USNPS ☐ USNFS ☐
USGLO / USBLM ☐ ..... (Other) ☐

REMARKS OR REVISED DESCRIPTION:

The station mark was recovered in good condition as described in the NGS recovery note by C. T. Husemeyer, 1949.
Reached via helicopter

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

Please prepare in triplicate.
Marks found in good condition need not be reported.
FILL IN ALL AVAILABLE INFORMATION

GPO 16—84253-6

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1144
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: REEF

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °44′07.020		ELEVATION:	METERS
GEODETIC LONGITUDE: 155 04 18.420			FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE *
HI 1	5101	647,262.06	327,722.31	+ 0 °08′41″

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

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

QD 325

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 191551 STATION 1145
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: RIDGE
STATE: HAWAII YEAR: 1902 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °59′36.″658 GEODETIC LONGITUDE: 155 15 59.258		ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE *
HI 1	5101	580,183.01	421,373.76	+ 0 04 48

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

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

QJ 354

AUG 1979

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 191551
HAWAII
STATION 1146
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

SEE STATION KEA

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: KEA I
STATE: HAWAII
YEAR: 1971
OBS BY NGS
SECOND ORDER
SOURCE: G-16241

GEODETIC LATITUDE:	19 49 32.97271	ELEVATION:	4201.9 METERS
GEODETIC LONGITUDE:	155 28 19.54111		13786 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 1	5101	509,591.02	360,418.91	+ 0 °00 ′34 ″

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

SM 144

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 191551 STATION 1147
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION SOUTH AZIMUTH STATION

STATE HAWAII YEAR 1892 THIRD -ORDER

SOURCE G-SP156

GEODETIC LATITUDE: 19 48 48.61 GEODETIC LONGITUDE: 155 28 47.08		ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	506,962.36	355,943.27	+ 0 00 25

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

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

QQ 388

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 191551 STATION 1148
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: SOUTH BASE 1

STATE: HAWAII YEAR: 1891 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °45′42.884		ELEVATION:	METERS
GEODETIC LONGITUDE: 155 22 15.096			FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	544,403.09	337,223.99	+ 0 02 37

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

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

QJ 373

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 191551 STATION 1149
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION SOUTH BASE 92

STATE HAWAII YEAR 1892 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE: 19 41 48.567 GEODETIC LONGITUDE: 155 28 03.687		ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR △ α ANGLE
HI 1	5101	511,113.57	313,570.71	+ 0 00 39

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

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

QO 381

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

SEE STATION HILO SOUTH BASE

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1150
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STAKE 88

STATE: HAWAII YEAR: 1949 THIRD ORDER

SOURCE: G- 9279
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 19 °40′59.47″ GEODETIC LONGITUDE: 155 03 14.73		ELEVATION:	44.7 METERS 147 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	653,395.91	308,817.92	+ 0 °09′01″

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION HILO SOUTH BASE

QE 275

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 191551 STATION 1151
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION STAND

STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE G-SP156
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 19 °43 '31."48 GEODETIC LONGITUDE: 155 °04 '49."56		ELEVATION	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	644,296.18	324,129.60	+ 0 °08 '.30 "

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

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

QD 330