HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AK-CAIRN
STATE: HAWAII
YEAR: 1914
THIRD ORDER

G-SP156
NO OBSERVATION CHECK ON THIS POSITION

Geodetic Latitude: 20°46'09.68
Geodetic Longitude: 156°50'05.29

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (ORD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>442,560.48</td>
<td>158,390.91</td>
<td>0'03'35'</td>
</tr>
</tbody>
</table>

Note: Plane Azimuth has been computed by the formula neglecting the second term.

NO ORIGINAL TEXT

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: AK (Cairn)
ESTABLISHED BY: J.B.M.
YEAR: 1914
STATE: Hawaii
RECOVERED BY: H.J. Seaborg
YEAR: 1962
COUNTY: Maui
ISLAND: Lanai

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

A cairn with traces of whitewash was recovered on the point on the south side of Kapoho Gulch and is assumed to be original station. It partially torn down, so was re-built to a height of about 5 feet.

Station is about a 3/4 mile east of the south end of track road (Highway 44) at Hana Gulch.
HORIZONTAL CONTROL DATA

by the National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HI
STATE: HAWAII
YEAR: 1950

SOURCE: G-9311

DESCRIPTIVE LATITUDE: 20° 49' 21.4" N
DESCRIPTIVE LONGITUDE: 156° 33' 31.47" W
ELEVATION: 1025.5 ft

STATE COORDINATES (feet):

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>COGE</th>
<th>X</th>
<th>Y</th>
<th>E WDH</th>
<th>E WDH</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISE</td>
<td>345</td>
<td>46</td>
<td>35.8</td>
<td>345</td>
<td>44</td>
</tr>
</tbody>
</table>

FORM 356
 preserve of the original description, including marks found, stanzas, changes made, and other pertinent facts:

The station and both reference marks were recovered. Although no measurements were taken to the reference marks, it is believed that the

directions are reversed. The distances appear to be correct. Directions for reaching the station are correct. The driving time is about 1 hour.

The description is adequate.

(continued on next page)
**HORIZONTAL CONTROL DATA**

by the

**NATIONAL GEOETIC SURVEY**

OLD HAWAIIAN DATUM

---

**ANU (continued)**

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>BEARING</th>
<th>DISTANCE FEET</th>
<th>DISTANCE METERS</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RICE</td>
<td>NE</td>
<td>16.12</td>
<td>4.92</td>
<td>00 00 00.0</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>NE</td>
<td>18.74</td>
<td>5.71</td>
<td>07 02 12</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>E</td>
<td>39.76</td>
<td>12.08</td>
<td>280 33 00</td>
</tr>
<tr>
<td>Forest Service Boundary Mon.</td>
<td>NE</td>
<td>18.74</td>
<td>5.71</td>
<td>07 02 12</td>
</tr>
<tr>
<td>RICE 1950</td>
<td>SW</td>
<td>18.74</td>
<td>5.71</td>
<td>07 02 12</td>
</tr>
<tr>
<td>Puu None Sugar Mill, S. stack</td>
<td>ENS</td>
<td>14.882</td>
<td>4.537</td>
<td>270 41 59</td>
</tr>
<tr>
<td>Forest Service Boundary Mon.</td>
<td>E</td>
<td>39.760 12.120</td>
<td>280 32 36</td>
<td></td>
</tr>
</tbody>
</table>

Station was recovered and all marks found in good condition. A discrepancy was noted in the distance to the Forest Service Boundary Monument, and upon double-checking, it was found that the 1950 distance in feet is correct, but an error was made in reading or recording the meter distance. It was also found that the RMs are listed wrong as to angle, in the box of the 1950 description. The above 1969 data is correct.

Station is located about 5-1/2 miles southwest of Waikiki and 3 miles northwest of Maalaea Harbor, on the summit of Puu Anu, a barb-topped hill of about 2972 feet elevation, along Kealalohoa Ridge, about 1/2-mile north of a large power line.

To reach station from the post office in Waikiki, go south on State Highway 30 for 7.0 miles to Maalaea Harbor; continue on the highway for 0.9 mile to board gate on right. Pass through gate and going up old track road for 4.4 miles to base of hill. Pack uphill about 100 yards to station. Station mark is a standard disk stamped "ANU NO 1 1949", cemented in a drill hole in a bedrock outcrop that projects 1 foot from ground. Reference mark number one is a standard disk stamped "ANU NO 1 1949", cemented in a drill hole in a flat bedrock outcrop projecting 1 foot from ground, and is 6 inches lower than station mark. Reference mark number two is a standard disk stamped "ANU NO 2 1949", cemented in a drill hole in a 2-foot bedrock outcrop projecting 1 foot from ground, and is 16 inches lower than station mark.

Forest Service Boundary Monument is a badly-rusted, 3-inch-diameter, iron pipe that projects 3-1/2 feet from ground and has a small clair built around the bottom. Top of pipe is at same elevation as station mark.

**NOTE:** A 4-wheel-drive vehicle is required.

---

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

**NOTE:** One of these forms must be used for every station recovered.
HORIZONTAL CONTROL DATA

NAME OF STATION: AWEMI
STATE: HAWAII
YEAR: 1962
SECOND ORDER

⁴LATITUDE: 20° 30' 70
LONGITUDE: 156° 30' 70
DIAGRAM NS-18 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AWEMI
STATE: HAWAII
YEAR: 1962
SECOND ORDER

SOURCE: G-13124

| DEGREES LATITUDE | 20° 57' 40.508
| DEGREES LONGITUDE | 156° 49' 20.777
| ELEVATION | 154.0 METERS

| STATE & ZONE | CODE | X | Y | D \theta A. ANGLE *
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>2</td>
<td>5102</td>
<td>446,763.43</td>
<td>167,850.35</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TO STATION OR OBJECT</th>
<th>GEOGRAPHIC AZIMUTH (Referred to the Station)</th>
<th>PLANE AZIMUTH (Referred to the Station)</th>
<th>DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUU NENE</td>
<td>153° 25' 22.2</td>
<td>153° 28' 41</td>
<td>5102</td>
</tr>
</tbody>
</table>

*Plane azimuth has been computed by the \( \theta = \theta - \alpha \) formula neglecting the second term.

Below is the description of the triangulation station:

Station is located about 7 miles airline east-southeast of Lanai City, 1-1/4 miles northeast of the end of Highway 44 (which ends at Maka Ohele), and 1/4 mile northwest of the shoreline of the island; at about 155 feet elevation on a flat, kine-covered hill, and about 100 yards north of an old track road.

To reach station from the post office in Lanai City, go northerly on Highway 44 for 1.2 miles to end of paved road. Continue on dirt road, Highway 44, for 0.5 miles to Keawanui Village. Continue ahead for 0.5 miles to a fork. Take left fork and follow road along shoreline for 3.5 miles to point where road winds up over a rocky ridge. Continue northwardly on the road for 1.15 miles to red bench on left. Continue ahead for 0.1 mile to a dim side road sharp right, 100 feet before reaching a very leaning coconut tree. Turn right sharp and go northerly for 0.1 mile to washout and end of truck travel. Park northwest up washed-out road for about 200 yards to calm in road. Bear right, off of road, and go northerly through brush for about 100 feet, keeping about same elevation, to station.

Station mark is a standard disk stamped "AWEMI 1962", cemented in a drill hole in a flat, a 10-foot bedrock cinder that is flush with surrounding ground. It is 7 feet south of the southeast corner of an old, 12-foot-square, rock enclosure that is about 2 feet high, 3 feet northeast of a cairn, and about 8 yards southwest of a cone, a 6-foot boulder. Reference mark number one is a standard disk stamped "AWEMI M1 1962", cemented in a drill hole in a 1 x 6-foot boulder that projects 1 foot above ground. It is about 1.15/8 feet lower than station mark.

Reference mark number two is a standard disk stamped "AWEMI M2 1962", cemented in a drill hole in a 2 x 2.5-foot boulder that projects 6 inches above ground. It is at about the same elevation as the station.

*Note: In notes to cases of triangulation and state publications of triangulation. 1°44' is measured clockwise, referred to a fixed station. 1°44'44" is measured in true north.

QF 365
HORIZONTAL CONTROL DATA
by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BANU
STATE: HAWAII
YEAR: 1904

SOURCE: G-SP156

NO OBSERVATION CHECK ON THIS POSITION

DESCRIPTIVE LATITUDE: 20° 55' 52.08"
DESCRIPTIVE LONGITUDE: 156° 33' 26.42"
ELEVATION: 500 FEET

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>2-SIDE ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>527,391.08</td>
<td>96,064.52</td>
<td>+ 0 02 19</td>
</tr>
</tbody>
</table>

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE 2-NR,$ A FORMULA REFLECTING THE SECOND TERM.

TO STATION OR OBJECT

<table>
<thead>
<tr>
<th>GEODETIC AZIMUTH (From North)</th>
<th>PLANE AZIMUTH (From North)</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 158</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BEACH (Koolau County, Hawaii O.W.S., 1911) - Station is on the E coast of Lanai Island, at Malaekahana, about 12 ft. inland from the high-waterline, 6-1/2 ft. S of the S edge of an old wharf, and 51 ft. SE of the SE corner of a warehouse. It is marked by a 4-ft. piece of rail steel driven 3 ft. into the ground.

OBJECT DISTANCE DIRECTION KERAA
Fienest stack 17 17 06
SE corner post 284 27 15 00

RECOVERY NOTE. TRIANGULATION STATION

NAME OF STATION: BEACH
ESTABLISHED IN: O.W.S. YEAR: 1911 COUNTY: Hawaii
RECOVERED BY: R.J. Seaborg YEAR: 1962 COUNTY: Hawaii

Excerpted statement as to the finding of the original description, including marks found, stationing changes made, and other pertinent data:

Station is destroyed. It was searched for by measurements from old description but could not be found.

Note: The above is based on descriptions of the station as found. The obvious point of the station could not be located and was not found in the field. This station is not in any active service. For more information, refer to Memo of 1962.

---

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BEACH
STATE: Hawaii
YEAR: 1931
THIRD ORDER

SOUTH 49 59.759
EAST 156 48 33.456
ELEVATION: 1 METER

GEOGRAPHIC LATITUDE: 21° 14' 52.2"
GEOGRAPHIC LONGITUDE: 156° 48' 33.456

SCALE: 1" = 1 METER

STATE COORDINATES (ft)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X (ft)</th>
<th>Y (ft)</th>
<th>Z (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI</td>
<td>2</td>
<td>5102</td>
<td>447,398.56</td>
<td>181,959.34</td>
</tr>
</tbody>
</table>

* A PLAN CHECK HAS BEEN COMPLETED BY THE \( M \) FORMULA IS SELECTED FOR THE SECOND TERM.

TO STATION OR OBJECT GEOGRAPHIC DISTANCE (ft)

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>DISTANCE (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KERAA</td>
<td>228 18 55.2</td>
</tr>
</tbody>
</table>

CODE: 5102
**HORIZONTAL CONTROL DATA**

**DESCRIPTION OF TRANSVERSE STATION**

**NAME OF STATION:** BECK  
**STATE:** HAWAI'I  
**COUNTY:** MAUI

**CHIEF OF PARTY:** Rate the Beairg  
**YEAR:** 1963  
**DESIGNER:** R.R. B.

**DISTANCE AND DIRECTIONS TO ADJACENT MARKS, REFERENCE STATIONS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION**

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>BEARING</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREY 2</td>
<td>&quot;T.0.&quot;</td>
<td>2.1 NES</td>
<td>0 00 00.0</td>
</tr>
<tr>
<td>12a</td>
<td>N 57.79</td>
<td>15.823</td>
<td>303 09 43.2</td>
</tr>
<tr>
<td>12a</td>
<td>S 44.66</td>
<td>13.615</td>
<td>25 56 14</td>
</tr>
</tbody>
</table>

Station is on the east end of Kaholawe Island, 1 mile west of the southeasterly shore of Kanapou Bay. It is about 1 mile northeast of the north shore of the Island. It is about 1 mile west of the head of Kanapou Bay and is located on a red earth ridge. The northern end of the ridge is visible over a red dirt ridge. To reach station from the sand beach at Beck Cove, proceed in a southerly direction up the rock slide gully to the top of a 700 foot ridge, keeping to the right side of the gully. From the top of the ridge, proceed right (northwest) 1 mile to the station. It is about 1½ hour walk to the station.

The station is marked with a standard triangulation disk, stamped \( \text{BECK 1963} \) set in cement in a drill hole in a small outcrop of bedrock projecting about 1 foot.

*Reference mark 1 is at approximately the same level as the station mark. It is a standard disk stamped \( \text{BECK NO. 1 1963} \) set in cement in a drill hole in a small outcrop of bedrock.*

*Reference mark 2 is about 1 meter below the station mark. It is a standard disk stamped \( \text{BECK NO. 2 1963} \) set in cement in a drill hole in a small outcrop of bedrock.*

---

**ADJUSTED HORIZONTAL CONTROL DATA**

**NAME OF STATION:** BECK  
**STATE:** HAWAI'I  
**YEAR:** 1963  
**SECOND ORDER**

**SOURCE:** G-13249

**STATE COORDINATES (FIRST)**

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>U.S. I.D. ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>592,007.83</td>
<td>76,228.47</td>
<td>0 54 42.0</td>
</tr>
</tbody>
</table>

*Plane azimuth has been computed by the second order formula neglecting the second term.*

### To Station or Object

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>GEODETIC AZIMUTH (FROM NORTH)</th>
<th>PLANE AZIMUTH (FROM NORTH)</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREY 2</td>
<td>384 33 43.9</td>
<td>384 31 46</td>
<td>3502</td>
</tr>
</tbody>
</table>

---

*Refer to notes in manuals of triangulation and state publications at triangulation.*

(Directions and angles measured on the ground in degrees, minutes, and seconds of arc.)
**HORIZONTAL CONTROL DATA**

**NAME OF STATION:** BENCH  
**STATE:** HAWAII  
**YEAR:** 1904  
**THIRD ORDER**

**SOURCE:** 6-6P15c  
**NORTH OBSERVATION CHECK ON THIS POSITION**

<table>
<thead>
<tr>
<th>STATION</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>E. D. M. ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>538,262.56</td>
<td>77,610.70</td>
<td>+ 0 02 21</td>
</tr>
</tbody>
</table>

* Planes Azimuth has been computed by the 2 U.O. R. Formula neglecting the second term.

**TO STATION OR OBJECT**

<table>
<thead>
<tr>
<th>TO STATION OR OBJECT</th>
<th>GEODETIC AZIMUTH (FROM OBJECT)</th>
<th>PLANES AZIMUTH (FROM OBJECT)</th>
<th>CODE</th>
</tr>
</thead>
</table>

| | | | W3 204 |
HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Hawaii
LATITUDE 20 ° 31' 4" TO 21 ° 0' 0"
LONGITUDE 156 ° 30' 10" 157 ° 00' 10"

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: OCENH HAWAII 26 M USGS
STATE: HAWAI'I

NAME OF STATION: OCENH HAWAII 26 M USGS
STATE: HAWAI'I

ELEVATION 5494 WATER: 225

STATE COORDINATES (HAW):

<table>
<thead>
<tr>
<th>STATION &amp; ZONE</th>
<th>COORD</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>418°118.87'</td>
<td>212°404.74'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0°03'05&quot;</td>
<td></td>
</tr>
</tbody>
</table>

PLANE AT MOOTH HAS BEEN COMPUTED BY THE 5 ORM. 5 FORMULA IMPROVING THE SECONDS TERM

TO STATION OR OBJECT | DEGREES AT Mothin' | PLANET AT Mothin' | COOR
|---------------------|---------------------|------------------|-----|

POSITION DETERMINED BY TRAVERSE FROM STATION GIL 2

QF 378
HORIZONTAL CONTROL DATA

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BENCH MARK 27 M USGS
STATE: HAWAII
COUNTY: Maui

CHIEF OF PARTY: H.J. Seaberg
YEAR: 1962

NOTE:
DISTANCES AND DIRECTIONS TO ALTIMETER MARKS, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>MEASURED</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONOMAE</td>
<td>00 00 00.0</td>
<td>30.002</td>
<td>16.34 15.89</td>
</tr>
<tr>
<td>12c R.M. No. 1</td>
<td>E 16.34</td>
<td>4.690</td>
<td>211 14 23.</td>
</tr>
<tr>
<td>12c R.M. No. 2</td>
<td>SW 15.70</td>
<td>3.595</td>
<td>219 48 15.</td>
</tr>
</tbody>
</table>

Station is located about 7 miles northwest of Lanai City, about 1.5 miles west of a large wooded ship, and a rocky point known as Lei Whale, about 100 feet south of the north shore of the island. To reach from the post office in Lanai City, go northeast on Lanai Ave. and State Highway 44 northerly for 3.0 miles to two board gates on the left, pass through the right one of these gates, then turn right -- dim track road and follow it for 0.6 mile to a fork. Take left for 0.1 mile to a water trough, continue ahead for 1.0 mile to a board gate. Pass through gate and continue for 0.7 mile to the start of rough, rocky jeep road. Continue on rocky jeep road for about 1.8 miles, just before reaching a large sand trap. From here, head about 100 yards to a fishing hut, then left and go about 140 yards to a small rocky knoll that is about 20 feet above sea level.

Station mark is a standard USGS disk stamped, BM 27 M 20 feet 1925, cemented in a drill hole in bedrock that is flush, about 100 feet south of the coast line and 2 feet south of a rock cairn. Reference mark No. 2 is a standard disk stamped, BM 27 M USGS No 2 1962, cemented in a drill hole in bedrock that is 1 foot higher than the station, 12 feet southwest of the cairn. Reference mark No. 1 is a standard disk stamped, BM 27 M USGS No 1 1962, cemented in a drill hole in bedrock that is 1 foot higher than the station, 18 feet south of the cairn.

ADJUSTED HORIZONTAL CONTROL DATA

STATE: HAWAII
YEAR: 1962
SECOND PARTY NUMBER

SOURCE G-13124

| DEGREES LATITUDE (FEDS) | 20° 55' 35.134" |
| DEGREES LONGITUDE | 156° 56' 26.547" |
| ELEVATION | 19.8 Meters |

STATE COORDINATES (FEDS): W 5102 406,486.44 - 215,490.05 - 0.15 52. |

PLAN ARIAMTH HAS BEEN COMPUTED BY THE X OR DION FORMULA PROGRESSIVELY THE SECOND TERM.

<table>
<thead>
<tr>
<th>TO STATION OR OBJECT</th>
<th>DEGREES ARIAMTH (FROM NORTH)</th>
<th>PLAN ARIAMTH (FROM NORTH)</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONOMAE</td>
<td>97° 03' 46.7&quot;</td>
<td>97° 09' 39&quot;</td>
<td>5102</td>
</tr>
</tbody>
</table>

GF 355
HORIZONTAL CONTROL DATA

DESCRIPTION OF TRIANGULATION STATION

Bench Mark 855 USGS

State: HAWAII

Name of Station: BENCH MARK 855 USGS

Chief of Party: Harold J. Seberg

Year: 1963

County: MAUI

Island: KAHOLALEU

Height of Telescope above Station Mark: 1.06

Height of Lens above Station Mark: 1.06

Note 1: Height of Telescope above Station Mark; Height of Lens above Station Mark

Table of Distances and Directions to Azimuth Mark, Reference Mark and Prominent Objects measured from the ground at the Station

<table>
<thead>
<tr>
<th>Object</th>
<th>Bearing</th>
<th>Distance</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>COB 2</td>
<td>NNE</td>
<td>00 00 00.0</td>
<td></td>
</tr>
<tr>
<td>KAHOLALEU 2</td>
<td>ENE</td>
<td>77 58 10.8</td>
<td></td>
</tr>
</tbody>
</table>

Station is 1.7 miles SE of Makawae Point, 3.8 miles ENE of Kaalaheiku Point, 3 miles N of Puuone Island, located on W rim of Kaalaheiku Crater near edge of brush at about 855 ft elevation, about 300 yards N of red dirt bombing range and 300 yards W of large water hole in crater.

To reach from Smuggler Coves, follow rough caterpillar road starting at SE end of sandy beach for about 2 miles in NE direction to red dirt bombing range. Cross bombing area, then proceed N to top of brushy hill.

Station mark is 8586 bronze disk, stamped Hawaii 855, cemented in drill hole of brown rock outcrop about 8 ft in diameter, projecting 3 ft above ground.

No reference marks. Station COB 2 will serve as azimuth mark.

ADJUSTED HORIZONTAL CONTROL DATA

State: HAWAII

Year: 1963

Table of Horizontal Angles and Distances

<table>
<thead>
<tr>
<th>Station Number</th>
<th>GDA Angles</th>
<th>Plane Angles</th>
</tr>
</thead>
<tbody>
<tr>
<td>COB 2</td>
<td>188 14 44.6</td>
<td>188 14 20</td>
</tr>
</tbody>
</table>

Source: 0-13249

<table>
<thead>
<tr>
<th>State</th>
<th>Zone</th>
<th>Code</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>5086,801.6</td>
<td>75,684.36</td>
</tr>
</tbody>
</table>

Geodetic Lat: 20 32 40.139
Geodetic Long: 156 38 46.4312
Elevation: 255.0
State Coords (UTM): H1 2

Transverse Mercator North: 5102

Refer to notes in manuals of triangulation and state publications of triangulation.
HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BEAT
STATE: HAWAII
YEAR: 1994
THIRD ORDER

NO OBSERVATION CHECK ON THIS POSITION

<table>
<thead>
<tr>
<th>GEODETIC LATITUDE</th>
<th>ELEVATION</th>
<th>METERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°39'17.91&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEODETIC LONGITUDE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>156°32'59.44&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>V (OR Δ ADJUST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>539,596.72</td>
<td>92,618.55</td>
<td>+0 02 28</td>
</tr>
</tbody>
</table>

* Plane ADJUST has been computed by the "1/3 Δ ϕ" formula neglecting the second term

TO STATION OR OBJECT

<table>
<thead>
<tr>
<th>GEODETIC Azimuth (from north)</th>
<th>&quot;PLANE ADJUST&quot; (from north)</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

QO 200
HORIZONTAL CONTROL DATA

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

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: ELACK 2 
STATE: Hawaii 
COUNTY: Kauai 
Island: Kauai 

CHIEF OF PARTY: Harold J. Seaborg 
YEAR OF SURVEY: 1963

HEIGHT OF REFERENCE MARK: 1.62 METERS
HEIGHT OF REFERENCE MARK REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION:

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>BEARING</th>
<th>DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12a KANELOA 
R.M. No. 1 
SE 33.95 10.35 86 24 30
R.M. No. 2 
S 32.25 9.83 128 31 00

Station is located along the crest of a narrow-topped, brushy ridge of about 800 feet elevation, about midway along the south coast of Kauai and 1/4 mile southeast of the north tip of Kauai Bay.

Station is best reached by making skiff landing in Smuggler Cove at west end of the island, hence packing easterly along old road for about 5 miles, and then southerly, cross-country, about 1 mile to head of Kauai Bay and station.

Station mark is a standard disk stamped "ELACK 2 1963", cemented in a drill hole in a 12 x 18-inch exposed section of bedrock flush with the ground. It is in a small clear area, about 30 feet northeast of highest point of ridge and 50 feet west of edge of bluff.

Reference mark number one is a standard disk stamped "ELACK 2 NO 1 1963", cemented in a drill hole in a 1 x 2-foot bedrock outcrop that projects about 8 inches above ground. It is at the north edge of a clump of keawe brush, 35 feet west of edge of bluff, and about 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "ELACK 2 NO 2 1963", cemented in a drill hole in a 2-foot-diameter, bedrock outcrop that projects about 4 inches above ground. It is set along the ridge-top trail at about same elevation as station mark.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ELACK 2 
STATE: Hawaii 
YEAR: 1963

COORDINATE LATITUDE: 20 31 52.485 
COORDINATE LONGITUDE: 156 36 22.380 
ELEVATION: 250.8 Meters

STATE CODES:

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 2</td>
<td>5102</td>
<td>520,688.13</td>
<td>69,864.23</td>
</tr>
</tbody>
</table>

PLAN AZIMUTH HAS BEEN COMPUTED BY THE E. A. D. T. FUNDAMENTAL DATA IN THE SECOND TERM

TO STATION OR MARK:

<table>
<thead>
<tr>
<th>KANELOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A 03 00.2</td>
</tr>
<tr>
<td>2A 01 44</td>
</tr>
</tbody>
</table>

OF 356
Blow (Kahoolawe Island, J. F. Pratt, 1904). — On the eastern end of Kahoolawe Island, on a bare and hill a little south of the highest point of the island. The left tangent to the point on opposite side of Becks Cove bears S. 57° 30' E. (mag.). Marked by bottle buried next to, bottom of bottle being about 1 foot below surface of ground.

[Image -3x-1 to 795x613]
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KAHOLALAWE 2
STATE: HAWAII
COUNTY: HAWAII
CHEF OF PARTY: Harold J. Seaborg
YEAR: 1963

NOTE:

DISTANCES AND DIRECTIONS TO ADJUSTED BASE, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE CREST OF THE STATION

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>Bearing</th>
<th>Distance (feet)</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.H. No. 2</td>
<td>NNE</td>
<td>61.91</td>
<td>18.872</td>
</tr>
<tr>
<td>E.H. No. 1</td>
<td>NEW</td>
<td>89.24</td>
<td>27.202</td>
</tr>
</tbody>
</table>

Stations is located on the northeast side of Kauhale Island, on a bare, red dirt, flat-topped hill, about 1/4 mile north of the highest point on the island and slightly lower. It is about 1-1/2 miles south of the northwest corner of Kaunui Bay, and 3-1/2 miles south-southwest of Kauhale Bay.

Station was reached by small boat landing in Kauhale Bay, or cove, and thence proceeding on foot southwesterly up along the open, red dirt ridge about 1-1/2 miles to station.

Station mark is a standard disk stamped "KMW 2 1963", cemented in a drill hole in a 6-inch-square, exposed surface of a boulder that is flush with the ground. It is about 100 yards northeast of the rim of an old crater, and 12 feet north of a 6-foot ledge.

Reference mark number one is a standard disk stamped "KMW 2 No 1 1963", cemented in a drill hole in a 12 x 16-inch boulder flush with the ground, set in the center of a scattering of small brush and grass clumps, and is about 2 feet lower than the station.

NOTE: The arrow on the disk points southerly, at about a 90-degree angle to the station.

Reference mark number two is a standard disk stamped "KMW 2 No 2 1963", cemented in a drill hole in a 10-inch boulder flush with the ground and about 3 feet lower than the station.

NOTE: The arrow on the disk points on about a 30-degree angle to the right of the station.

Station KAHOLALAWE 2 will serve as the azimuth mark.
NO ORIGINAL TEXT

Bold (Maui Island, F. W. Perkins, 1900; J. C. Gauger, 1912).—A hydrographic signal of 1900 near shore of Malaekahana Bay. A large boulder about 4 feet high lying above the government road about 100 meters northwest of McGregor Light. The boulder is by far the largest isolated rock in this vicinity.

RECOVERY NOTE, TRIANGULATION STATION

BOLD
STATE: Hawaii
YEAR: 1900

Detailed account as to the nature of the original description, including marks found, observations, changes made, and errors pointed out:

A large boulder was found in the vicinity, and appears to have been washed away once. The position was checked by traverse from McGregor Point Light, and it is believed this is the old station. It is now hidden by kiawe trees, and of no value.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BOLD
STATE: Hawaii
YEAR: 1900

DESCRIPTIVE LATITUDE: 20° 46' 53.566"
DESCRIPTIVE LONGITUDE: 156° 31' 34.057"

ELEVATION:
METRES

STATE COORDINATES (X,Y)

STATE & ZONE CODE X Y

HI 2 5102 548,008.04 162,799.49 + 0° 03' 00"

SOURCE: G-1432

FORM CGS-142 (rev 1)
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY
<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>E322</th>
<th>X \n</th>
<th>Y \n</th>
<th>AZIMUTH &amp; ANGLE \n</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>3102</td>
<td>408.900.18</td>
<td>212.809.50</td>
<td>0 00 42</td>
</tr>
</tbody>
</table>

*Planes azimuths have been computed by the 2001 U.S. H.C. formular neglecting the second term.*
NO ORIGINAL TEXT

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

NAME OF STATION: Cairn on Hill
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * H.H. Seaborg Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

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

NAME OF STATION: CAIRN ON HILL
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * E.P.C. Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

* 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 notes. This officer should submit to the supervising officer a brief report summarizing the recovery notes.

NO ORIGINAL TEXT

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

NAME OF STATION: Cairn on Hill
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * H.H. Seaborg Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

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

NAME OF STATION: CAIRN ON HILL
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * E.P.C. Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

* 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 notes. This officer should submit to the supervising officer a brief report summarizing the recovery notes.

NO ORIGINAL TEXT

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

NAME OF STATION: Cairn on Hill
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * H.H. Seaborg Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

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

NAME OF STATION: CAIRN ON HILL
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * E.P.C. Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

* 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 notes. This officer should submit to the supervising officer a brief report summarizing the recovery notes.

NO ORIGINAL TEXT

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

NAME OF STATION: Cairn on Hill
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * H.H. Seaborg Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

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

NAME OF STATION: CAIRN ON HILL
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * E.P.C. Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

* 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 notes. This officer should submit to the supervising officer a brief report summarizing the recovery notes.

NO ORIGINAL TEXT

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

NAME OF STATION: Cairn on Hill
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * H.H. Seaborg Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

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

NAME OF STATION: CAIRN ON HILL
Established by: F.G.S. Year: 1927 State: Hawaii
Recovered by: * E.P.C. Year: 1964 County: Maui

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

The station was recovered as described in 1962 recovery.

* 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 notes. This officer should submit to the supervising officer a brief report summarizing the recovery notes.
**HORIZONTAL CONTROL DATA**

**ADJUSTED HORIZONTAL CONTROL DATA**

<table>
<thead>
<tr>
<th>NAME OF STATION</th>
<th>CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATE</td>
<td>HAWAII</td>
</tr>
<tr>
<td>YEAR</td>
<td>1904</td>
</tr>
</tbody>
</table>

**SOURCE 5-SP15a**

**NO OBSERVATION CHECK ON THIS POSITION**

<table>
<thead>
<tr>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>20° 33' 06&quot;.99</td>
<td>156° 32' 57&quot;.59</td>
<td>83.355.5a</td>
<td>+ 0 02 28</td>
</tr>
</tbody>
</table>

**STATE COORDINATES (FEDS)**

<table>
<thead>
<tr>
<th>STATE</th>
<th>CODE</th>
<th>x</th>
<th>y</th>
<th>R-ORD. XI ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI</td>
<td>2</td>
<td>5102</td>
<td>340,147.71</td>
<td>83.355.5a</td>
</tr>
</tbody>
</table>

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE "R-ORD. XI" FORMULA NEGLECTING THE SECOND TERM.

**TO STATION OR OBJECT**

<table>
<thead>
<tr>
<th>GEODETIC AZIMUTH</th>
<th>FROM OBJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PLANE AZIMUTH**

<table>
<thead>
<tr>
<th>GEODETIC AZIMUTH</th>
<th>FROM OBJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CODE**

|                  |             |
HORIZONTAL CONTROL DATA

by the National Ocean Survey
OLD HAWAIIAN DATUM

NAME OF STATION: COB 2
STATE: Hawaii
COUNTY: Maui
Island: Kahoolawe

CHIEF OF PARTY: Harold J. Seaborg
Year: 1963

SHORE STATION NAME

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

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>MEASUREMENT</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEE 2</td>
<td>ESE</td>
<td>61.17</td>
<td>19.255</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>SSW</td>
<td>21.32</td>
<td>15.643</td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>SSW</td>
<td>21.32</td>
<td>15.643</td>
</tr>
</tbody>
</table>

Station is located on the north slope of Kahoolawe Island, about 4 miles airline east-northeast of the western tip of the island and 1-1/4 miles southeast of Makena Point, on a boulder-covered knoll of about 700 feet elevation. It lies about 1/2 mile southwest of a lower, boulder-covered knoll and 1/2 mile north-northwest of the highest point of the west rim of Kaulalalo Crater, and about 150 feet lower than that point.

Station is best reached by making a skiff landing in the cove about 3/4 mile east of Makena Point and packing southerly up slope about 1 mile to station.

NOTE: Station may also be reached from Smuggler Cove by packing northeasterly along old road for about 3-1/2 miles to west end of crater rim, then bearing northerly around rim of crater and going downslope about 1/2 mile to station.

Station mark is a standard disk stamped "COB 2 1963", cemented in a drill hole in a 2 x 5-foot boulder flush with the ground. It is at the south side of a prominent, 6 x 8-foot rock that projects about 6 feet above the ground.

Reference mark number one is a standard disk stamped "COB 2 NO 1 1963", cemented in a drill hole in a boulder that projects about 3 feet above ground.

Reference mark number two is a standard disk stamped "COB 2 NO 2 1963", cemented in a drill hole in the top of a 6-foot-square, brown boulder that projects 3 feet above ground.

STATE COORDINATES (NAD 27)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (ft. below MSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>506.242.93</td>
<td>75.367.47</td>
<td>+ 40.00</td>
</tr>
</tbody>
</table>

PLAN ACHIEVED HAS BEEN COMPUTED BY THE 2D+G FORMULA, NEGLECTING THE SECOND TERM

TO STATION OR OBJECT | GEODETIC LENGTH (FROM STATION) | PLAN ACHIEVED (FROM STATION) | CODE |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SEE 2</td>
<td>72 11 85.0 22</td>
<td>72 11 22</td>
<td>5102</td>
</tr>
</tbody>
</table>
HORIZONTAL CONTROL DATA

BY THE
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION CONE
STATE HAWAII YEAR 1904 THIRD

SOURCE C-SP15e

GEODETIC LATITUDE 20° 54' 21.33" ELEVATION METERS
GEODETIC LONGITUDE 156° 32' 24.945' FEET

STATE COORDINATES (FOOT)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z H.O. M ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>563,238,47</td>
<td>86,913,36</td>
<td>+ 0 02 40</td>
</tr>
</tbody>
</table>

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE H.O. FORMULAE DELECTING THE SECOND TERM.

STATION OR OBJECT GEOGRAPHIC AZIMUTH (DEGREES) PLANE AZIMUTH (DEGREES) CODE

GO 202
**HORIZONTAL CONTROL DATA**

**Station:** 1022
**State:** Hawaii
**Year:** 1904

**Name of Station:** Crack
**State:** Hawaii
**Year:** 1904

**Geodetic Lat.:** 20° 36' 25.35"
**Geodetic Long.:** 156° 34' 35.72"

**Plane Azimuth**

<table>
<thead>
<tr>
<th>State &amp; Zone</th>
<th>Code</th>
<th>E</th>
<th>N</th>
<th>S or ( ^\circ ) = Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>9102</td>
<td>330,805.55</td>
<td>991,417.04</td>
<td>+ 0° 21' 54&quot;</td>
</tr>
</tbody>
</table>

*Plane Azimuth has been computed by the \( \cos \phi \), \( \sin \phi \) formula neglecting the second term.*

**TO STATION OR OBJECT**

<table>
<thead>
<tr>
<th>Code</th>
<th>Geodetic Azimuth (from north)</th>
<th>Plane Azimuth (from north)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2 15d</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Adjusted Horizontal Control Data

**Name of Station:** DRY  
**State:** HAWAII  
**Year:** 1934  
**Third Order**

**Source:** G-5PI50

<table>
<thead>
<tr>
<th>Geodetic Latitude</th>
<th>Geodetic Longitude</th>
<th>Elevation (m)</th>
<th>Elev. (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20° 34' 26.422 ''</td>
<td>156° 38' 18.465 ''</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### State Coordinates (Foot)

<table>
<thead>
<tr>
<th>State &amp; Zone</th>
<th>Code</th>
<th>X (ft)</th>
<th>Y (ft)</th>
<th>Z (ft)</th>
<th>Azimuth (deg)</th>
<th>Height (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>502</td>
<td>5094032.33</td>
<td>47616.72</td>
<td>+ 0'00'36'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Plane azimuth has been computed by the z on y, z formula neglecting the second term.

### To Station or Object

<table>
<thead>
<tr>
<th>Geodetic Azimuth (from north)</th>
<th>Plane Azimuth (from north)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GO 213**
### Horizontal Control Data

#### Traverse Name:

**EAT 2**

**State:** Hawaii

**County:** Maui

**Island:** Kahoolawe

**Survey:** L.H. Van Scoy

**Year:** 1963

**Height of Station Above MSL:** 18.00 feet

**Height of Station Above MSL:** 1.55 feet

**Distance and Direction to Adjacent Mark:**

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>Bearing</th>
<th>Distance (feet)</th>
<th>Distance (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KANELOM 1</td>
<td>SE</td>
<td>44.80</td>
<td>13.653</td>
</tr>
<tr>
<td>KANELOM 2</td>
<td>SW</td>
<td>35.60</td>
<td>10.850</td>
</tr>
</tbody>
</table>

**Remarks:**

The station is located in the southeastern part of Kahoolawe Island, about 2.5 miles southwest of Buck Cove, 2 miles east of Kamohio Bay and 1/2 mile north of the southern shore of the island, on the summit of a low, rocky knob of about 680 feet elevation.

Station is best reached by skiff landing in Buck Cove; from here pack southwesterly up steep, rocky canyon for about 3/4 mile to top.

Go left, southerly, across rough, red dirt area for about 3/4 mile to knob and station.

Station mark is a standard disk stamped "EAT 2 1963", cemented in a drill hole in a 2 x 2-foot boulder that projects about 3 inches.

It is at the northeast side of a large pile of rocks that is the remains of an old cairn.

Reference mark number one is a standard disk stamped "EAT 2 No 1 1963", cemented in a drill hole in a 2 1/2 x 2 1/2-foot diametrically shaped boulder that projects about 18 inches.

Reference mark number two is a standard disk stamped "EAT 2 No 2 1963", cemented in a drill hole in a 2-foot-diameter boulder that projects about 8 inches.

---

**Adjunct Horizontal Control Data**

**Name of Station:** EAT 2

**State:** Hawaii

**Year:** 1963

**Second Order**

**Source:** G-1326

**Observation Check on this Position**

**Geodetic Latitude:** 20° 31' 20.40"

**Geodetic Longitude:** 156° 33' 56.77"

**Elevation:** 201.8 feet

**State Coordinates (State):**

<table>
<thead>
<tr>
<th>State &amp; Zone</th>
<th>Code</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HI 2</strong></td>
<td>5102</td>
<td>534,333.66</td>
<td>68,707.90</td>
</tr>
</tbody>
</table>

**Plane Azimuths:**

<table>
<thead>
<tr>
<th>To Station or Object</th>
<th>Geodetic Azimuth (From Origin)</th>
<th>Plane Azimuth (From Origin)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>KANELOM</td>
<td>133 13 41.0</td>
<td>133 11 34</td>
<td>5102</td>
</tr>
</tbody>
</table>

---

*Refer to notes in manual of triangulation and state publications on triangulation.*

(End of table)

**NOAA Form 78-31**

**JF 357**
HORIZONTAL CONTROL DATA

by the National Ocean Survey
OLD HAWAIIAN DATUM

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

JUN 1957

TRaverse DESCRIPTION OF TRANSMITTER STATION

NAME OF STATION: EGG 2
STATE: HAWAII
COUNTY: Maui
Island: Kahoolawe
YEAR: 1963
DESCRIPTION BY: L.F. Yam, Scy
NOTES: 1. HEIGHT OF TRANSMITTER ABOVE STATION MARK 0 METER.

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

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>MEANS</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW 2</td>
<td>NE</td>
<td>00 00 00</td>
<td>52 00 00</td>
</tr>
<tr>
<td>12a R.M. No. 1</td>
<td>NW 65.05</td>
<td>23.846</td>
<td>134 45 39</td>
</tr>
<tr>
<td>12b R.M. No. 2</td>
<td>SW 66.54</td>
<td>20.890</td>
<td>134 45 39</td>
</tr>
</tbody>
</table>

Station is located at the northeast end of Kahoolawe Island, about 1-1/2 miles southeast from the northernmost point of the island; on the slope above the rock bluff at Hakiwana Point, at about 60 feet above sea level.

Station is reached by making skiff landing in the cove at Hakiwana Point and paddling south up onto the rocky bluff on south side of the cove.

Station mark is a standard disk stamped "EGG 2 1963", cemented in a drill hole in a small, flat, bedrock outcrop that projects about 2 feet. It is in the middle of the slope and about 225 feet southwest of edge of bluff.

Reference mark number one is a standard disk stamped "EGG 2 NO 1 1963", cemented in a drill hole in a 5 x 5-foot bedrock outcrop that projects about 1 foot. It is 4-1/2 feet lower than station.

Reference mark number two is a standard disk stamped "EGG 2 NO 2 1963", cemented in a drill hole in a 5 x 8-foot bedrock outcrop that projects about 2 feet. It is about 4 feet higher than station.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: EGG 2
STATE: HAWAII
YEAR: 1963
SECOND: 1953

SOURCE: G-13244

PRIMAR L LATITUDE 19° 30' TO 21° 30'
PRIMAR L LONGITUDE 156° 30' TO 157° 30'
DIAGRAM NP 416 MAI1
HORORIZONTAL CONTROL DATA

NAME OF STATION: ERR 2
STATE: Hawaii
COUNTY: Island of Oahu

CHIEF OF PARTY: H. J. Seaborg
YEAR: 1963

DISTANCE AND DIRECTIONS TO ADJACENT MARKS, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>BEARING</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 2  Light on pole on building</td>
<td>NE</td>
<td>200</td>
<td>352.2</td>
</tr>
<tr>
<td>Concrete Observation Tower</td>
<td>SE</td>
<td>1.5 mile</td>
<td>51</td>
</tr>
<tr>
<td>RM 2</td>
<td>NE</td>
<td>0.6 mile</td>
<td>47</td>
</tr>
<tr>
<td>RM 3</td>
<td>N</td>
<td>2 mile</td>
<td>27</td>
</tr>
</tbody>
</table>

Station is located on a small, grassy, flat topped knoll, about 42 meters above mean sea level, and near the northeast corner of Nuuanu Island. The station is about 0.4 mile south of the northwestern shoreline of the island and about 0.2 mile east of the westerly shoreline of the island.

To reach the station from the southerly end of the beach at Smuggler Cove on the west end of the island, peak cross-country about 1.1 mile north-northeast to small grassy knoll and station.

Station is located about 60 feet south of the north edge of the knoll, and about 25 feet east of the west edge of the knoll. Station is marked by a standard disk, stamped ERR 2 1963, cemented in a drill hole in a 2-foot diameter section of rock overlying that projects about 4 inches.

No underground mark was established.

Reference mark number 1 is a standard disk, stamped ERR 2 WO 1 1963, cemented in a drill hole in the top of a 3-2 feet section of rock overlying that projects about 6 inches. Mark is north of the station and at about the same elevation.

Reference mark number 2 is a standard disk, stamped ERR 2 WO 2 1963, and cemented in a drill hole at the top of a 2.5 feet boulder that projects about 10 inches. Mark is near the westerly edge of the knoll, south-southwest of the station, and at about the same elevation.

No distances were obtained to reference marks.
HORIZONTAL CONTROL DATA

by the
National Ocean Survey
Old Hawaiian Datum

STATION 1027
HAWAI'I
LATITUDE 20°30' T0 21°00'
LONGITUDE 156°30' TO 157°00'
DIAGRAM NF-416 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION FOREST RESERVE BDRY PARK
STATE HAWAI'I YEAR 1950

EDGEOG 9311
EDGEOG OBSERVATION CHECK ON THIS POSITION

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (X + Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>515,282.15</td>
<td>233,155.34</td>
<td>0 00 58</td>
</tr>
</tbody>
</table>

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE Z (X + Y) FORMULA NEGLECTING THE SECOND TERM.

POSITION DETERMINED BY TRAVERSE FROM STATION KAEO

QGE 432
HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

SEE STATION ANU

HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 30' TO 157° 00'
DIAGRAM NO 4-16 MALI

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION FOREST SERVICE BDY MDO
STATE: HAWAII
YEAR: 1950
SECOND ORDER

SOURCE G-9311
NO OBSERVATION CHECK ON THIS POSITION

DEGREES LATITUDE 20° 46' 28.670
DEGREES LONGITUDE 156° 33' 00.656
ELEVATION SCALED 626 METERS

STATE COORDINATES (NO)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z 1000 + E- ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>539,779.49</td>
<td>178,451.57</td>
<td>+ 0° 02' 29&quot;</td>
</tr>
</tbody>
</table>

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE G-9311 FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT

<table>
<thead>
<tr>
<th>DEGREES AZIMUTH (FROM NORTH)</th>
<th>PLANE AZIMUTH (FROM NORTH)</th>
<th>CODE</th>
</tr>
</thead>
</table>

POSITION DETERMINED BY TRAVERSE FROM STATION ANU

QE 433
Gale (Lanai Island, F. G. Engle, 1927).—About 6 feet back from edge of red earth bluff which overlooks the western shore of Lanai. Station reached by turning south from the government road at a point east of the hill called Kanepuu, along a fence line near a pineapple field to the stretch of eroded ground, and continuing west to edge of bluff. Marked according to note 4, standard disk in boulder which projects several inches above the ground. Two reference marks, note 120, standard reference disks in boulders, were set at the following distances and azimuths from the station: No. 1, 6,545 meters (21.47 feet), 196° 04'; No. 2, 6,860 meters (22.1 ft) 295° 06'.

Gale (Maui County, Hawaii, F. G. Engle, 1927; O. W. S., 1931)

—Description should be rewritten as follows:

Station is on the NW part of Lanai Island, about 1/4 mi. W of a hill called Kanepuu, about 1 mi. W of a road, and about 15 ft. back from the edge of a prominent, red-earth bluff which overlooks the W shore of Lanai.

Station is reached by turning W from the Government road at Kanepuu Hill, going over the top of Kanepuu Hill and then down about 1/4 mi. to the edge of the bluff.

It is marked with a standard station disk set in a boulder which projects several in. above the ground. Two reference marks are standard reference mark disks set in boulders at the following distances and azimuths from the station:

R.M. 1 is 6,545 m. (21.47 ft) at 196° 04'.
R.M. 2 is 6,860 m. (22.1 ft) at 295° 06'.

(continued on next page)
Station mark was recovered in good condition. Both reference marks one and two have been destroyed; they were set in small, 12-inch boulders which had the earth eroded from around them by the wind, and they were found setting on top of the ground. Two new reference marks, number three and four, were established. A complete description follows:

Station is located about 1-1/2 miles airline northwest of Lanai City and 1015 meters west of Keaau Park, near the west edge of the bare, red mesas that overlooks the west coast of the island.

To reach station from the post office in Lanai City, go northwest on Lanai Avenue for 0.05 mile; turn left and go 0.15 mile to crossroad. Turn right and go 0.5 mile to end of paved road. Continue ahead, on graded road, for 0.8 mile to a crossroad. Continue ahead on dirt road for 3.1 miles to end of fields. Continue ahead on dirt road for 0.95 mile to fork. Take right fork through ironwood trees for 0.75 mile to dim left fork, just before passing through a tree row which crosses main road. Turn left and go 0.1 mile to large, corrugated metal rain-drain on right. Continue ahead for 0.1 mile to dim right fork. Take the right fork and follow road westerly across red, eroded area for 1.0 mile to prominent grassy hummock on right of road. Go right, leaving road, and go westerly 0.1 mile to edge of mesa and station.

Station mark is a standard disk stamped "GALE 1979", cemented in a drill hole in a 1-foot boulder that projects 3 inches above ground. It is 5.3 feet southeast of a white witness post and 18 feet east of edge of mesa.

Reference mark number three is a standard disk stamped "GALE RD 3 1927 1969", braced to the top of a 1-1/2-inch iron pipe that is set in cement and projects 3 inches above ground. It is about 1-1/2 feet higher than station mark.

Reference mark number four is a standard disk stamped "GALE RD 4 1927 1969", braced to the top of a 1-1/2-inch iron pipe that is set in cement and projects 3 inches above ground. It is about 1 foot lower than station mark.

Station KANEOHOO (HNB) 1879 1962 will serve as the azimuth mark.
<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X (meters)</th>
<th>Y (meters)</th>
<th>Z (feet)</th>
<th>P (angle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>545,838.11</td>
<td>207,766.26</td>
<td>0' 02' 53&quot;</td>
<td></td>
</tr>
</tbody>
</table>

"Plane azimuth has been computed by the azi, ϕ, formula neglecting the second term."
<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (North)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>544,036.50</td>
<td>214,173.42</td>
<td>+3'02.46</td>
</tr>
</tbody>
</table>

*Planck's constant has been computed by the Δ (A, ε, M, Ψ) formula neglecting the second term.

<table>
<thead>
<tr>
<th>TO STATION ON OBJECT</th>
<th>GEODETIC AZIMUTH (True north)</th>
<th>PLANCK AZIMUTH (True north)</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 050</td>
<td></td>
<td>166.7</td>
<td>1031</td>
</tr>
</tbody>
</table>

**HORIZONTAL CONTROL DATA**

by the National Ocean Survey

**ADJUSTED HORIZONTAL CONTROL DATA**

**NAME OF STATION**: GAY 2

**STATE**: HAWAII

**YEAR**: 1912

**THIRD ORDER**

**SOURCE**: G-SP156

**GEODETIC LATITUDE**: 20° 55' 22.70

**GEODETIC LONGITUDE**: 156° 32' 15.75

**ELEVATION**: 0.00 Meters

**STATE COORDINATES (USGS)**

**METERS**

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (North)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>544,036.50</td>
<td>214,173.42</td>
<td>+3'02.46</td>
</tr>
</tbody>
</table>

**NO TEXT**
HORIZONTAL CONTROL DATA

by the National Ocean Survey
OLD HAWAIIAN DATUM

LATTITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 30' TO 157° 00'
DIAGRAM NG 416 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GIL 2
STATE: HAWAII
YEAR: 1962
SECOND ORDER

SOURCE: G-13124

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

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: GIL 2
STATE: HAWAII
COUNTY: MAUI
CHIEF OF PARTY: H. J. Seaborg
YEAR: 1962
Island: Lanai

HORIZONTAL COORDINATE

OBJECT

Bearing
Distance

KARUA
NNE
28.83
26.262

R. M. No. 1
SSW
56.77
57.304

BM 26 M (USGS) (R. M. No. 2)

The station is located about 7.0 miles north-northeast of Lanai City, on a small rocky knoll that is about 30 ft. above sea level, and in the foundation of an old lighthouse. To reach from the Post Office in Lanai City, go northwest on Kamehameha Ave., and State Highway 44 for 5.0 miles to two board gates on the left, to a side road on the left and sign “SHIFTON BADGE”. Turn left and follow road northwesterly for 1.5 miles to a group of beach homes. Continue on the road for 0.4 miles to the end of the road at a small concrete foundation. From here pock about 30 yards west to a small rise and a old concrete foundation.

The station mark is a standard disk stamped, GIL 2 1962, cemented in a drill hole in the center of the concrete foundation.

REFERENCE MARKS:

R.M. No. 2
Cemented in a drill hole in a boulder that projects 1.5 feet, about 52 feet south of the south edge of the concrete foundation and one foot lower than the station.

BM 26 M (USGS) is a standard USGS disk stamped, BM 26 M 1963, cemented in a drill hole in a boulder that is about 85 feet north-northeast of the north edge of the concrete foundation and 15 feet lower than the station.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: GIL 2
STATE: HAWAII
COUNTY: MAUI

RECOVERY BY: R. J. Newson
YEAR: 1968

5.2 miles bearing 017° from Lanai City, Lanai

Detailed information on the course of the original survey, including marks found, unmarked, changes made, and other pertinent facts:

Recovered in good condition as previously described. No search was made for reference marks.

FORM CDS4-128 (1-64)
ENVIRONMENTAL SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY

OF 357
Goat (Kahoolawe Island, J. F. Pratt, 1904).—Near the south side of Kahoolawe, on a rocky grassy hilltop about 200 meters from the edge of the bluff, between and somewhat nearer the most western of the two deep coves on that side of the island. Marked by flagpole driven in the ground with small stones piled around its base.

GOAT (Maui County, Hawaii, J. F. Pratt, 1904; O. W. S., 1939) -- Station is at Goat Island.

A 5-ft. cairn of rocks with a 2- by 4-in. center pole was erected over the probable station location from evidence on the ground of a previous pole signal.

### Adjusted Horizontal Control Data

**Name of Station**: Goat

**State**: Hawaii

**Year**: 1944

**Third Order**

**Source**: G-SP156

<table>
<thead>
<tr>
<th>Geodetic Latitude</th>
<th>Elevation</th>
<th>Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°31'02.43''</td>
<td>66,882.20</td>
<td>0'00.45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State &amp; Zone</th>
<th>Code</th>
<th>x</th>
<th>y</th>
<th>z-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>512,307.92</td>
<td>66,882.20</td>
<td>+0'00.45</td>
</tr>
</tbody>
</table>

*Plane azimuth has been computed by the A U N G. A. formula neglecting the second term.*

<table>
<thead>
<tr>
<th>To Station or Object</th>
<th>Geodetic Azimuth (from north)</th>
<th>Plane Azimuth (from north)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>GO 186</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GREY 2
STATE: HAWAII
YEAR: 1963
SECOND ORDER

SOURCE: G-13249

GEODETIC LATITUDE: 20°32'36.6211"
GEODETIC LONGITUDE: 156°32'33.3440"
ELEVATION: 172.2 METERS
565 FEET

STATE COORDINATES (Hawaii)

STATE & ZONE CODE X Y X Y ORIG. X ANGLE
HI 2 5102 542,450.48 73,322.08 + 0 02 37

DISTANCE FROM STATION TO OBJECT

GEODEETIC AZIMUTH (Plane angle)
PLANE AZIMUTH (True angle)
CODE

BLOW 2 140°36'02.7 140°33'26" 5102

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: GREY 2
STATE: HAWAII
COUNTY: Maui
Island: Kahoolawe

HEIGHT OF OBSERVER ABOVE STATION BASE: 0.5 METERS
HEIGHT OF OBSERVER ABOVE ELEVATION: 0.5 METERS

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

OBJECT BEARING DISTANCE DIRECTION

<table>
<thead>
<tr>
<th>Station</th>
<th>R.M. No. 1</th>
<th>0.5</th>
<th>140°36'02.7</th>
<th>140°33'26&quot;</th>
<th>5102</th>
</tr>
</thead>
<tbody>
<tr>
<td>12a</td>
<td>R.M. No. 2</td>
<td>0.5</td>
<td>140°36'02.7</td>
<td>140°33'26&quot;</td>
<td>5102</td>
</tr>
</tbody>
</table>

Station is located on the southeast peninsula of Kahoolawe Island about 5/4 of a mile east of the beach in Becks Cove, about 600 meters west from Salmon Point and 25 meters south from the edge of the cliff.

1-foot above the ground and is about 1-foot below the level of the station.

*References in notes to maps and charts are to the U. S. Geological Survey's Map 10354.

Note that no altimetric leveling is being done.
Hak (Maui Island, J.C. Gaugier, 1912).—On northeastern coast of West Maui, in Kilapali District, on the top and near the extreme end of the narrow ridge forming Mokelua Point, about 10 meters back from the precipitous slope to the shore line. Marked by a 6-inch drainpipe pipe cemented Range down into the sandstone with about 5 inches projecting above surface. Pipe is filled with concrete and centered with standard bronze disk.

RECOVERY NOTE, TRIANGULATION STATION

STATE: HAWAII
YEAR: 1912
FIRST ORDER

ADJUSTED HORIZONTAL CONTROL DATA

STATE COORDINATES (FEDS)

STATE & ZONE COOK X Y Z
HI 2 5102 546,594.12 -237,924.75 +0.02 56

PLAN AXISSYS HAS BEEN COMPUTED BY THE "A " "B " "C " FORMULA NEGLIGATING THE ECCENTRICITY "}

OLAX 2

TO STATION OR OBJECT GEOIDIC AXISSYS PLANES AXISSYS
OLAX 2

GE 351

(continued on next page)
## HORIZONTAL CONTROL DATA

**by the NATIONAL GEODETIC SURVEY**

**OLD HAWAIIAN DATUM**

**QUAD 201564**

**STATION 1035**

### RECOVERY NOTE, TRIANGULATION STATION

**NAME OF STATION:** HAK

**ESTABLISHED BY:** J.G. Gauger

**YEAR:** 1912

**STATE:** Hawaii

**RECOVERED BY:** N.C. Munson

**YEAR:** 1969

**COUNTY:** Maui

**Island:** Maui

**HEIGHT OF TELESCOPE ABOVE STATION MARK:** 1.28 Meters

**HEIGHT OF LIGHT ABOVE STATION MARK:** Meters

---

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>Bearing</th>
<th>1950 Distance</th>
<th>Direction</th>
<th>1969 Distance</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLAI 2</td>
<td>NW</td>
<td>21.511</td>
<td>7.471</td>
<td>27</td>
<td>01</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>NW</td>
<td>35.856</td>
<td>10.929</td>
<td>107</td>
<td>40</td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>SW</td>
<td>35.856</td>
<td>10.929</td>
<td>27</td>
<td>01</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>NW</td>
<td>21.501</td>
<td>7.463</td>
<td>107</td>
<td>41</td>
</tr>
</tbody>
</table>

Station was recovered and all marks found in good condition, however the distances and compass directions to the reference marks were listed wrong in the 1950 description. The 1969 distance and direction is correct.

A complete description follows:

Station is located about 7 miles north-northeast of Waialua, on Kauai Point, at about 270 feet elevation, on a grassy-topped point about 3/4-mile northeast, down-ridge, from Puu Olai.

To reach station from the junction of Main and Market Streets in Waialua, go north on Market Street, continuing on State Highway 33, for 3.6 miles to Waialua Village. Continue on the highway, which later becomes a winding, gravel road, for 5.9 miles to pipe gate on right, at milepost 10 and power pole No. 2k. Go through the gate and down farm road for 0.3 mile to house. Pass through wire gate to left of house and follow pasture road, passing through 3 more gates, for 0.75 mile to end of truck travel at fence and end of pasture. Park down steep hill, then across gulch and up other side, about 1/2-mile to station. NOTE: The route to reach station in 1950 is now quite overgrown.

Station mark is a standard disk unstamped, set in the top of a 6-inch diameter, concrete-filled, sewer pipe projecting 7 inches from ground. It is 27 feet southwest of the prominent, gray sandstone outcrop on end of ridge-top.

Reference mark number one is a standard disk stamped "HAK NO 1 1949", cemented in a drill hole in the sheer bedrock edge of the 270-foot cliff, on west side of hilltop and 6.9 feet lower than station mark.

Reference mark number two is a standard disk stamped "HAK NO 2 1949", cemented in a drill hole in a grey sandstone ledge that projects 2 feet from ground, and is 2 feet lower than station mark.

*Note: Some of the forms must be used for every station recovered.*

---

*Note* - One of these forms must be used for every station recovered.
**HORIZONTAL CONTROL DATA**

by the
National Ocean Survey
OLD HAWAIIAN DATUM

**NAME OF STATION:** HUA
**STATE:** HAWAI
**COUNTY:** Kauai
**Island:** Kauai
**Dated by:** J.R.L.
**NOTE:**

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>MEANING</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Station is on the west end of Kauai Island on a small hill about ½ mile west of Smuggler Cove.

Station is best reached by taking a shift landing in Smuggler Cove then parking northeast along the small road for about ½ mile. The station is about 200 yards northeast of the road at this point and can be seen from the road. The station can also be seen from Smuggler Cove.

- The station is the center of a 4.5 inch iron pole which is on top of and extends 4.50 meters above a concrete lookout post. The lookout post is 4.50 meters high and has a rim around the top which is 5.00 x 5.00 meters and 0.50 meters thick.
- The top of the building is covered with tar and crushed gravel. A metal ladder is located on the north side of the building near the west door. Three metal poles are located around the south, west, and north sides and on top of this second building.
- The north pole is located at a distance of about 30 feet from the lookout post. The south pole is at a distance of about 100 feet from the lookout post. The east pole is at a distance of about 30 feet from the lookout post. The west pole is at a distance of about 100 feet from the lookout post.
- The iron rod which forms the station is painted with white and red stripes. There are two metal rings on the pole with a red ball at the top. This light was observed.

There are no nearby marks at this station.

---

**ADJUSTED HORIZONTAL CONTROL DATA**

**NAME OF STATION:** HAN
**STATE:** HAWAI
**YEAR:** 1963
**SECOND ORDER**

**SOURCE:** G-13245

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>D (N.O)</th>
<th>H1 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI 2</td>
<td>5102</td>
<td>496.01771</td>
<td>46.930.09</td>
<td>-0.0015</td>
<td></td>
</tr>
</tbody>
</table>

*PLANE ADJUSTMENT HAS BEEN COMPUTED BY THE Z-COR. D FORMULA NEGLECTING THE SECOND TERM*

**STATE COORDINATES (F.W.S.)**

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>E</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI 2</td>
<td>5102</td>
<td>496</td>
<td>46.930</td>
</tr>
</tbody>
</table>

**DISTANCE AND DIRECTION TO ADJACENT MARKS, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION**

**NOTE:**

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

*Directions angle measured clockwise from the true north.*

**U.S. SURVEYING MANUAL CORRECTION**

**QF 402**
HORIZONTAL CONTROL DATA

NO ORIGINAL TEXT

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HANAKAAO (HSG) 085 BY HSG 085

STATE: HAWAII 156 41 00.306

YEAR: 1961 0 215.211.07

SECOND ORDER - 0 00 22

SOURCE: G-9311

ADJUSTED HORIZONTAL CONTROL DATA

DISTANCES AND DIRECTIONS TO ASHNOH MARE: REFERENCE MARES AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>MEASUREMENT</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAIKULU 2 1950</td>
<td>S</td>
<td>13.092'</td>
<td>109</td>
</tr>
<tr>
<td>MARINI (HSG) 1882</td>
<td>W</td>
<td>17.265'</td>
<td>220</td>
</tr>
<tr>
<td>LAINA (HTS) 1919</td>
<td>S</td>
<td>12.992'</td>
<td>109</td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>S</td>
<td>13.961'</td>
<td>110</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>W</td>
<td>22.683'</td>
<td>45</td>
</tr>
</tbody>
</table>

A 4-inch, chiseled cross in bedrock was found at the approximate location for the station, and subsequent observations proved it to be the station. It was then re-marked with a standard disk, two reference marks were established and a witness post was set.

Station is located about 3 miles north of Lahaina, 3/4 mile south-southwest of Puuolii Village, and 1 mile east-southeast of the Kamaole Hotel, on the south side of a cane road, on a brush-covered ridge which has a long row of very large boulders hidden in the koa brush.

To reach station from the post office in Lahaina, go northeast on Papaulau Street for 0.2; turn left and go north on State Highway 30 for 1.25 miles to Waihihi Street. Turn right and go 0.3 mile to crossroad; turn left and follow main cane road for 0.3 mile; take right fork and continue for 1.9 miles to power pole No. 66. Turn right and go up grade for 0.05 miles to station on right at top of grade.

Station mark is a standard disk stamped "HANAKAAO HSG 1961 1969", cemented in a drill hole at the center of the original cross, in a 4 x 10-foot bedrock outcrop projecting 1 foot above ground. It is 165 feet east from the main road by power pole 66, 27 feet south of center line of side road, 65 feet west of end of the brush and boulder row, 40 feet north of a 10-inch pipeline at edge of cane field, 1.8 feet south of a white witness post, and across road from east end of the koa brush patch on north side of road.

Reference mark number one is a standard disk stamped "HANAKAAO HSG 1961 NO 1 1969", cemented in a drill hole in the top of a large boulder that projects 6 feet above ground, and is 1 foot higher than station mark.

Reference mark number two is a standard disk stamped "HANAKAAO HSG 1961 NO 1 1969", cemented in a drill hole in the top of a 6-foot boulder that projects 4 feet from ground. It is at same elevation as station mark.

*Note 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: Out of these forms must be used for every surveying operation.
**HORIZONTAL CONTROL DATA**

by the
National Ocean Survey
OLD HAWAIIAN DATUM

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

**DESCRIPTION OF TRIANGULATION STATION**

**NAME OF STATION:** HAUA
**STATE:** Hawaii
**COUNTY:** Maui
**CHIEF OF PARTY:** Harold J. Seiber
**YEAR:** 1962
**SURVEY INDUSTRY:** Hawaii
**REFERENCE FRAME:** WGS 84
**COORDINATE SYSTEM:** State Plane Hawaii
**UNITS:** Feet
**MEASUREMENT ERROR:** 0.05

**UNIT:** Second
**SCALE:** 1:50,000
**REFERENCE MARKS:** HAUA NO 1 1962

- **HAUA NO. 1:** E 20.97', N 6.39', D 126° 34' 10".
- **HAUA NO. 2:** E 10.25', N 3.125', D 231° 09' 39".

Station is located about 5-1/2 miles air line east-northeast of Lanai City and 3/4 mile north-northwest of old Keomoku Village; at about 300 feet elevation, on the ridge running up along the northeast side of Keohole.

To reach station from the post office in Lanai City, go northerly on Highway 44, for 0.8 miles to end of paved road. Continue on Highway 44, dirt road, for 3.3 miles to old fence line crossing road. Continue on road for 2.1 miles to gate at home in treas on right, just after making a right turn. Continue on road for 0.3 miles to wide, sandy wash on right, with fence 50 yards right of road, and end of truck travel. Park up wash, through kiai grove, then up along flat-topped ridge to station, a distance of about 1/2 mile from road.

Station mark is a standard disk stamped "HAUA 1962", cemented in a drill hole in a boulder that projects 4 inches above ground. It is 19.3 feet south-southeast of a 3-foot pine, about 150 yards north of a loco, windseep kiai tree, and about 1/8 mile northeast of Haun Gulch.

Reference mark number one is a standard disk stamped "HAUA NO 1 1962", cemented in a drill hole in a boulder that projects about 1-1/2 feet above ground. It is about 2 feet higher than the station.

Reference mark number two is a standard disk stamped "HAUA NO 2 1962", cemented in a drill hole in a boulder that projects 1 foot above ground. It is about 3 feet higher than the station.

**NOTE:** Packing time about 20 minutes.

---

**ADJUSTED HORIZONTAL CONTROL DATA**

**NAME OF STATION:** HAUA
**STATE:** Hawaii
**YEAR:** 1962

**SOURCE:** G-13124

**COORDINATE SYSTEM:** State Plane Hawaii
**ELEVATION:** 79.2 Meters

**STATE COORDINATES:**

<table>
<thead>
<tr>
<th>State &amp; Zone</th>
<th>Code</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI 2</td>
<td>5102</td>
<td>440,378.62</td>
<td>193,198.91</td>
</tr>
</tbody>
</table>

- **PLANE ADJACENT HAS BEEN COMPUTED BY THE 2-OH-Q FORMULA NEGLECTING THE SECOND TERM**

**TO STATION OR OBJECT**

| HAUA NO. 1 | 137 48 55.5 | 113 58 40 | 5102 |

**NOTE:**

- Refer to section on concealment and error prescriptioens of triangulation
- Intersect error only, when no comparison leading to false answer
- (0.000) = ± 0.000

**QF 365**
HORIZONTAL CONTROL DATA

by the National Ocean Survey
OLD HAWAIIAN DATUM

HAWAII

LATITUDE
20° 30' TO 21° 00'

LONGITUDE
156° 30' TO 157° 00'

DIAGRAM
NF 4-16 MAUI

HEKILI (Maul Island, Hawaiian Government Survey, 1879;
R. W. Woodworth, 1922)—On western coast of West Maui, in Lahaina District,
land of Olowalu, about 500 meters east from the Olowalu Mill, 50 meters back
from the shore line, in a dense growth of agerob and oakum trees which make
it (in 1925) unoccupiable and invisible from any other station, or from along the
shore line. Marked by a concrete post with cross in top set flush with surface,
and surrounded by a cairn of stones.

RECOVERY NOTE, TRIANGULATION STATION

The station was recovered, as described, in good condition. This station
was marked with a standard disk, set in the center of the carved cross which was the
original station. High trees prevented the occupation of this station. A 2.6 foot pole, on
the top of a 50 foot wooden tower was used as an intersection target. A new description
follows.

The station is located about 500 meters southeast of Olowalu, about 500
meters east of the abandoned Olowalu Mill (abandoned in 1931) and about 50 meters north-
east of Hekili Point in a dense grove of trees.

The station is a standard disk, stamped Hekili 1949, set in the top of
a concrete post which is about flush with the surface of the ground.

No reference marks were set at this station.

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>H</th>
<th>V</th>
<th>H DIFF. + V DIFF.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>515,586.32</td>
<td>173,549.13</td>
<td>+ 0 00 58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: A Planalt has been computed by the P.C.D. formula neglecting the second term.

QO 356

(continued on next page)
HORIZONTAL CONTROL DATA
by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

HEKILI (continued)

NAME OF STATION: HEKILI
ESTABLISHED BY: HOS
RECOVERED BY: R.C. Munson
YEAR: 1879
STATE: Hawaii
YEAR: 1969
COUNTY: Maui
HEIGHT OF TELESCOPE ABOVE STATION MARK: METERS
HEIGHT OF LIGHT ABOVE STATION MARK: METERS
DISTANCES AND DIRECTIONS TO ALIGNMENT MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>BEARING</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.M. No. 1</td>
<td>E</td>
<td>10.705</td>
<td>1.355 (Compass As.)</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>W</td>
<td>533</td>
<td>1.887</td>
</tr>
</tbody>
</table>

NOTE: Compass azimuth (direction from true south) was measured with a Brunton Compass because trees block all lines.

Station mark was recovered in good condition; it was 1/4 inches below ground surface, but the old tower was still standing, marking the location. Two reference marks were established and a witness post was set. A complete description follows:

Station is located about 6 miles southeast of Lahaina, 1/4-mile southeast of Olowalu Store, and 1400 feet west-southwest of Camp Pecusa Girls' Camp, at Hekei Point, 90 feet north from seashore, in a dense kiau grove, and in a prominent, curving row of stones about 90 feet long, 8 feet wide, and 2 feet high, which is probably an old fence. The kiau trees are up to 75 feet high and all lines are heavily blocked.

To reach station from the post office in Maluku, go south on State Highway 30 for 1.3 miles to junction with State Highway 31; continue on Highway 30 for 7.75 miles to sign "Camp Pecusa" on left. Take left fork and go 0.3 mile on track road along edge of cane field to log in road and end of track trial. Walk southerly 100 feet to station in trees.

Station mark is a standard disk stamped "HEKILI 1900", set in the top of a 2-inch-square, concrete monument 1/4 inches below ground surface. It is 100 feet southwest from log in cane road, 35 feet west of east end of stone row, 30 feet east of angle in stone row, and 4 feet south of a white witness post.

Reference mark number one is a standard disk stamped "HEKILI HOS 1879 NO 1 1969", cemented in a drill hole in a 2-foot boulder that projects 6 inches above ground. It is set in the stone row, 24 feet west of east end of the row and 2 feet higher than station mark.

Reference mark number two is a standard disk stamped "HEKILI HOS 1879 NO 2 1969", cemented in a drill hole in a 20-inch boulder that projects 10 inches from ground. It is set in the stone row, 24 feet east from the angle where row changes direction, and is 20 inches higher than station mark.

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

NOTE: Out of these forms must be used for every station recovered.

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

QUAD 201564 STATION 1039
LATITUDE 0 70 0 0
LONGITUDE 0 70 0 0
DIAGRAM
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HII DOLE
STATE: Hawaii
COUNTY: Maui
Island: Lanai

Chief of Party: Harold J. Seaborg
Year: 1962

Distances and Directions to Adjacent Marks, Reference Marks and Prominent Objects Which Can Be Seen From the Ground at This Station

<table>
<thead>
<tr>
<th>Object</th>
<th>Bearing</th>
<th>Distance</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>POU MARO</td>
<td>1879 1927</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>NW</td>
<td>17.05</td>
<td>5,330</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>NW</td>
<td>20.90</td>
<td>6,372</td>
</tr>
</tbody>
</table>

Station is located about 1 1/2 miles in a straight line due southeast of Lanai City, on a rise that has a long row of 15-foot piers running along its northwestern edge and is the highest point along the southeast ridge of Hii Plateau.

To reach station from the post office in Lanai City, go southeast on Lanai Avenue for 0.4 mile to paved T-intersection. Continue straight ahead, on track road along left side of power line and ditch, for 0.3 mile to city dump. Turn left and follow wide, graded road down to ravine and up other side for 0.3 mile to pineapple field on top of hill. Go left and follow road along left side of field for 0.4 mile to fork. Take right fork, crossing pineapple field and then following along right side of field, for 0.3 mile to rim of hill. Take the right fork and go 0.1 mile along low ridge to station.

Station is marked by a 1 1/2-inch iron pipe that is set in the center of a 2-foot-diameter, concrete monument which is flush with the ground and has the word "HII" inscribed in the cement. It is 11.4 feet northeast of a white concrete post, 27 feet northwest of a concrete pole that is 1 foot in diameter, 10 feet northeast of a ridge of hill and 97 yards east-southeast of a low eucalyptus tree. Station elevation is about 1,450 feet.

Reference mark number one is a standard disk stamped "HII No. 1 1962", braced to the top of a 1 1/2-inch iron pipe that is set in cement and projects 12 inches above ground. It is about 1 1/2 feet west-northwest of a small hummock, in bare dirt area and is at about same elevation as station mark.

Reference mark number two is a standard disk stamped "HII No. 2 1962", braced to the top of a 1 1/2-inch iron pipe that is set in cement and projects 18 inches above ground. It is about 1 foot higher than the station mark.

Station was recovered and all marks found in good condition as described in 1962. The distance and direction to the reference marks were checked and found to be correct.

HORIZONTAL CONTROL DATA

ADJUSTED HORIZONTAL CONTROL DATA

INDEX OF STATION: HII DOLE
STATE: Hawaii
YEAR: 1962

SOURCE: G-13124

DEGREES: 10 49' 31.359
DEGREES: 156 34 16.992

ELEVATION: 558.6
METERS: 1964 F.E.T.

STATE COORDINATES (FEET)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (ON E = ANGLE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>418,700.46</td>
<td>175,741.79</td>
<td>- 0.05 05</td>
</tr>
</tbody>
</table>

* Plane Dihedron has been computed by the 2 U. H. T. Formula. See also the Second Term.

TO STATION OR OBJECT

DEGREES (DMS) | PLANE DIHEDRON | CODE |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30° 58' 25.2&quot;</td>
<td>320 57 30</td>
<td>5102</td>
</tr>
</tbody>
</table>

Recover notes, if any, in the Department of Commerce.

QF 363
HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

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

NAME OF STATION: HONOLUA
STATE: HAWAII
COUNTY: Maui

CHIEF OF PARTY: G.T. NAGLE
YEAR: 1950
DESCRIPTION OF TRIANGULATION STATION

HEIGHT OF STRATUM ABOVE STATION BASE 1.180 Meters
HEIGHT OF MOUNTAIN ABLE STATION BASE 0.680 Meters

SUBJECT-STATE MARK DISTANCES AND DIRECTIONS TO ADJACENT BASE, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE CIRCLING AT THE STATION

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>SUBJ.</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAHIA 1812</td>
<td>S 15.395</td>
<td>3.075</td>
<td>0 00 00.0'</td>
</tr>
<tr>
<td>Reference mark No. 2</td>
<td>E 14.270</td>
<td>5.020</td>
<td>363 26 49.3'</td>
</tr>
</tbody>
</table>

Located in West Maui, Lahaina District, on the land of Honolua, about 4.5 miles in from the coast and 0.5 miles east of Honolua Stream, on the west end of a high wooded peak and slightly lower than the highest point.

Station is a standard disk set in cement in the top of a 2½ inch galvanized pipe projecting one foot above the ground. Stamped HONOLUA 1949.

Reference mark No. 2 is east of the station. A standard disk cemented to the top of a 2½ inch galvanized pipe projecting 1½ inches. Stamped HONOLUA NO 1 1949.

Reference mark No. 3 is south of the station. A standard disk cemented to the top of a 2½ inch galvanized pipe projecting one foot. Stamped HONOLUA NO 2 1947.

To reach from the court house in Lahaina go northeast on paved coast highway 13.0 miles to mile post 3; turn right and follow plantation road along left edge of pineapple field for 0.7 miles, turn left through a gate and follow old road for 0.9 miles to curved salt trough, continue south across country along edge of canyon for 1.2 miles to a fence corner in a Ronulvorn grove and N.T.T. From here followdim trail south along ridge, passing to right of first round hill about half way to station.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLUA
STATE: HAWAII
YEAR: 1950
FIRST "ORDER" S-9311

<table>
<thead>
<tr>
<th>GEOGRAPHIC LATITUDE</th>
<th>GEOGRAPHIC LONGITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>23° 37' 42.73&quot; N</td>
<td>156° 36' 26.858&quot; W</td>
</tr>
</tbody>
</table>

ELEVATION: 800.77 Meters

STATE COORDINATES (FORSAN)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X (FORSAN)</th>
<th>Y (FORSAN)</th>
<th>Z (IN. OF E.-W. AXIS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>528,200.54</td>
<td>228,290.01</td>
<td>+ 0 01 16</td>
</tr>
</tbody>
</table>

PLAN AZIMUTH HAS BEEN COMPUTED BY THE METHOD OF FORMULA APPLYING THE SECOND TYPH.

TO STATION OR OBJECT

<table>
<thead>
<tr>
<th>GEOGRAPHIC AZIMUTH</th>
<th>PLAN AZIMUTH</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAHIA</td>
<td>283° 05' 38.9&quot;</td>
<td>5100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GEOGRAPHIC AZIMUTH</th>
<th>PLAN AZIMUTH</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAHIA</td>
<td>283° 04' 23&quot;</td>
<td>5100</td>
</tr>
</tbody>
</table>

5100

\* Refer to notes in exordium of triangulation and state publications of triangulation.
\*1 Measured on the field, referred to field station.
\*2 Measured on the field.
\*3 Measured on the field.
HORIZONTAL CONTROL DATA

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

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HONOPU
STATE: HAWAII
COUNTY: MAUI
ISLAND: MAUI

CHIEF OF PARTY: H.J. Seaburg
YEAR: 1962
DESCRIPTOR: J.R.P.

NOTE: Topographic map, underground-station mark,

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

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>MEASUREMENT</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIEI</td>
<td></td>
<td>00 00 00.0</td>
<td></td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td></td>
<td>13.265</td>
<td>00 00 00.0</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td></td>
<td>166 58 39.6</td>
<td></td>
</tr>
</tbody>
</table>

Station is located about 4.0 miles west of Lai City, about 3.0 miles north of the wharf, on the west coast of the island at about 850 feet elevation.

To reach the station from the Post Office in Lai City, go northwest for 0.05 mile, turn left and go northeast for 0.15 mile to Frazier Ave. Turn right on Frazier Ave., and then go northwest for 0.15 mile to the end of paved road. Continue ahead on wide, graded road, which bears to the left for 0.8 mile to a crossroad, continue ahead on main traveled road for 2.45 miles to a fork at the end of the pineapple field. Take right fork and follow road along the edge of the field for 0.3 mile to track road on the left. Turn left and follow track road westerly down slope 0.55 mile, cross pipeline and continue for 0.2 mile to the station on the right at a large rock cairn.

Station mark is a standard disk stamped, HONOPU 1962, cemented in a drill hole in red rock outcrop that projects about 4 inches, 30 feet northwest of the road, 28 feet south of the cairn, 10 feet east of a small keawe tree, and 3 feet north of a white witness post.

Reference mark No. 1 is a standard disk stamped, HONOPU No. 1 1962, cemented in a drill hole in a boulder that projects about 8 inches and about level with the station.

Reference mark No. 2 is a standard disk stamped, HONOPU No. 2 1962, cemented in a drill hole in bedrock that projects 2 inches and about 2 feet higher than the station, 12 feet southwest of the cairn.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOPU
STATE: HAWAII
YEAR: 1962

SOURCE: G-13124

ELEVATION: 287.1 METERS
975 FEET

STATE COORDINATES (Foot)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>352,327.85</td>
<td>181,928.65</td>
</tr>
</tbody>
</table>

* Plane azimuth has been computed by the press formula reflecting the second term.

TO STATION OR OBJECT | GEODETIC AZIMUTH (From north) | FLAT AZIMUTH (From north) | CODE |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>KIEI</td>
<td>355 49 39.9</td>
<td>355 56 24</td>
<td>5102</td>
</tr>
</tbody>
</table>

OF 376
HORIZONRAL CONTROL DATA

BY THE NATIONAL OCEAN SURVEY, NATIONAL GEOIDIC SURVEY

NAME OF STATION: HONDOAE
STATE: HI
YEAR: 1962
SECOND: 1962

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HONDOAE
STATE: HI
YEAR: 1962
SECOND: 1962

HEIGHT OF TELESCOPE ABOVE STRATION MARK: 1.19 METERS

ELEVATION: 0.0 METERS

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

OBJECT | DISTANCE | DIRECTION
--------|---------|---------
2N 2033 | 1146.8 | 00 00
R.M. No. 1 | 115.8 | 00 00
R.M. No. 2 | 10.75 | 00 00

Station is located about 8 miles air line north of Lunal City, at Pokahola Point on a sand ridge about 20 feet above sea level, overlooking the promonent black rock point.

To reach station from the post office in Lunal City, go northwest on Lunal Avenue for 0.5 mile; turn left and go 0.15 mile to crossroad, turn right and go 0.5 mile to end of paved road. Continue ahead on wide, graded road for 0.8 mile to a crossroad. Turn right and follow main road through pineapple fields for 3.1 miles to end of fields. Continue ahead for 0.95 mile to fork. Take right fork through ironwood trees for 0.95 mile to fork. Take right fork and follow track road for 4.2 miles to fork down on coastal sand flats. Take left fork and follow sandy road westward behind sand dunes for 1.5 miles to fork at old windmill tower. Take left fork and go 0.2 mile to end of road at fishing shacks. Head westward on trail along crest of low sand ridge for about 150 yards to high bank knoll and station.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONDOAE
STATE: HI
YEAR: 1962
SECOND: 1962

DEGREES LATITUDE: 20 55 55.591
DEGREES LONGITUDE: 156 59 25.845

ELEVATION: 0.0 METERS

STATE COORDINATES: (feet)

HI 2

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>COORD</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI 2</td>
<td>5102</td>
<td>217620.11</td>
<td>389484.81</td>
</tr>
</tbody>
</table>

PLATE ADJUSTMENT COMPUTED BY THE F. H. G. FORMULA NEGLECTING THE DETERMINATION TERM

TO STATION OR OBJECT | DEVIATION (feet) | PLATE ADJUSTED (feet) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BM 27 N USGS</td>
<td>277.02 42.6</td>
<td>277.09 49</td>
</tr>
</tbody>
</table>

GF 354

0 201564
STATION 1043
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 30' TO 157° 00'
DIAGRAM NF 416 MAUI
NO ORIGINAL TEXT

HOPE (Maui County, Hawaii, J.P.F., 1904; O.W.S., 1932)

It is located on the SW coast of Kahoolawe, on the edge of the bluff, and 21.0 m. from Kahoolawe Light which bears 69°19'30" (True).

Station is marked by a 2-in. iron pipe set in a 12-in. square concrete block. Station mark was set by the Lighthouse Service.
## HORIZONTAL CONTROL DATA

**State:** Hawaii  
**Year:** 1899  
**Third Order**

### Geodetic Data
- **Latitude:** 20° 58' 37.58"  
- **Longitude:** 156° 32' 19.01"

<table>
<thead>
<tr>
<th>State &amp; Zone</th>
<th>Code</th>
<th>X</th>
<th>Y</th>
<th>Δ X deg Δ Y angle</th>
</tr>
</thead>
</table>
| HI 2         | 5102 | 543.885.93 | 233.835.08 | + 0° 02' 45"

---

### Plane Table Coordinates

<table>
<thead>
<tr>
<th>To Station/Object</th>
<th>Geodetic Azimuth (True North)</th>
<th>Plane Azimuth* (True North)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q0 028</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HORIZONITAL CONTROL DATA

NAME OF STATION: MUMP

STATE: HAWAII
YEAR: 1904
THIRD ORDER

NO OBSERVATION CHECK ON THIS POSITION

DESCRIPTIVE LATITUDE: 20°51'58.51"
DESCRIPTIVE LONGITUDE: 156°32'13.84"
ELEVATION: 50 METERS

<table>
<thead>
<tr>
<th>STATE COORDINATES (Hawaii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATE &amp; ZONE</td>
</tr>
<tr>
<td>HI 2</td>
</tr>
</tbody>
</table>

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE * FORMULA, NEGLCETING THE SECOND TERM.

<table>
<thead>
<tr>
<th>TO STATION OR OBJECT</th>
<th>GEOGRAPHIC AZIMUTH (FROM MEAS.)</th>
<th>PLANE AZIMUTH * (FROM MEAS.)</th>
<th>CODE</th>
</tr>
</thead>
</table>

GO 205
ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HYDRO SIGNAL NR OLOMALU

STATE: HAWAII

YEAR: 1953

G-9311

STATE COORDINATES (Foot):

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>513,827.48</td>
<td>173,759.72</td>
<td>+ 0.0052</td>
</tr>
</tbody>
</table>

* PLAN ARNUTH HAS BEEN COMPUTED BY THE 2 (HDD) FORMULA NEGLECTING THE SECOND TERM.

POSITION DETERMINED BY TRAVERSE FROM STATION OLOMALU

QE 435
NO ORIGINAL TEXT

KAEA USPLMS (Maui County, Hawaii, J.B.M., 1914; O.W.S., 1931)

The station is located on the SW promontory of Lanai Island, and E of the first bight S of Kahaluu Point. It is marked by a caimn of rocks, whitewashed. A tripod signal, boarded up and whitewashed, was erected over the station. The best means of approach is to land on the W side of the bight and cross the stream bed, then go up the side of the bluff, and cross to the signal which is only 1/4 mi. from the bight. No permanent station mark or reference marks were found or placed.

(U.S.L.H.S., 1933)—Abstract of letter from F.A. Edgecomb, Supt. of Lighthouses:

In connection with the preliminary survey of a site for a light station on Palono Point, SW coast of Lanai Island, a party of the U.S. Lighthouse Service found a 1/2-in. brass pipe set in a small deteriorated block of concrete, marking what is thought to be triangulation station KAEA.

This mark was surrounded by a new block of concrete 16- by 16- by 12-in. (high), and a new 5/8-in. brass pin set in the new concrete block directly over the old pipe. The letters "U.S.L.H.S." were stamped in the top of the new concrete block.

(continued on next page)
HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY

OLD HAWAIIAN DATUM

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

KAE'A USPHS (continued)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAE'A (USPHS)
Established by: J.B.M.
Year: 1914
Recovered by: H.J. Seaborg
Year: 1962
State: Hawaii
County: Maui
Island: Lanai

Height of telescope above station mark: 119 feet
Height of light above station mark: 116 feet

Distances and directions to closest marks, reference marks and prominent objects which can be seen from the ground at the station:

<table>
<thead>
<tr>
<th>Object</th>
<th>Bearing</th>
<th>Distance Feet</th>
<th>Distance Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUU MARS (MB)</td>
<td>SE</td>
<td>14.49</td>
<td>4.39</td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>SE</td>
<td>211.12</td>
<td>64.34</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>SE</td>
<td>19.06</td>
<td>5.78</td>
</tr>
</tbody>
</table>

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

Station is located about 7-1/2 miles airline southeast of Lana'i City, on Palana Point, the southernmost part of Lana'i Island, on the summit of a rocky knoll of 75 feet elevation, 200 feet north of a track road.

To reach station from the intersection of Highways 64 and 413 at the south edge of Lana'i City, go southerly on Highway 64 for 1.5 miles to a fork where the main road turns left, at sign "POLPOY BAY". Continue ahead on right fork for 0.5 miles to end of paved road at rain gauge 54A. Continue ahead on graded road for 1.5 miles to a minor crossroad; continue ahead to a crossroad just after crossing a drainage dale, a distance of 0.4 mile. Turn left and go 0.6 mile to end of pineapple field. Turn right and follow road westerly along south edge of field for 1.75 miles to a reverse-t on left. Turn sharp left and follow banded road downhill for 0.65 mile to beginning of rocky terrain. Continue on rough road for 1.75 miles to station on knoll to right of road.

Station mark is a 1/2-inch iron pin set in the center of a 15-inch-square concrete block that projects 1 foot above ground. It is 425 feet east-northeast of the Palana Point Light and about 200 feet north of south shoreline.

Reference mark number one is a standard disk stamped "KAE'A NO 1 1914 1962", cemented in a drilled hole in bedrock that projects 1 foot above ground. It is at same elevation as station.

Reference mark number two is a standard disk stamped "KAE'A NO 2 1914 1962", cemented in a drilled hole in a boulder that projects 1 foot above ground. It is about 1 foot lower than the station.

The USPHS mark is a 1/2-inch metal pin set in the top of a 15-inch-square concrete monument that projects 1 foot above ground. It is at south edge of the track road, on shoreline bluff.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAE'A (USPHS)
Established by: J.B.M.
Year: 1914
Recovered by: C.K. Yoshino
Year: 1974
State: Hawaii
County: Maui Island

Distance and direction from nearest town:

7.5 miles southwest of Lana'i City

Detailed statements as in the format of the original description, including marks found, changes made, and other pertinent facts.

Station and reference marks were recovered as described in the 1962 recovery note. Distances measured to the reference marks checked with distances in the recovery note.
DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY  
HORIZONTAL CONTROL DATA  
by the  
National Ocean Survey  
OLD HAWAIIAN DATUM  

QUAD 201564  
HAWAII  
LATITUDE 20° 30' TO 21° 00'  
LONGITUDE 156° 30' TO 157° 00'  
DIAGRAM NF 4-16 MAUI  

NAME OF STATION: KALO  
STATE: HAWAII  
YEAR: 1950  
YEARLY  

CHIEF OF PARTY: G. P. Hoagland  
DESIGNATED MARK: 

DISTANCES AND DIRECTIONS TO ADJACENT MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE STATION:

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>MEASURING</th>
<th>DISTANCE</th>
<th>DIRECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLAHLULU E</td>
<td>00 00 00</td>
<td>6,976</td>
<td>E 00 00 00</td>
</tr>
<tr>
<td>VLAHLULU E</td>
<td>108 33 15</td>
<td>6,976</td>
<td>E 00 00 00</td>
</tr>
<tr>
<td>VLAHLULU E</td>
<td>214 53 32</td>
<td>6,976</td>
<td>E 00 00 00</td>
</tr>
<tr>
<td>VLAHLULU E</td>
<td>335 33 55</td>
<td>6,976</td>
<td>E 00 00 00</td>
</tr>
<tr>
<td>VLAHLULU E</td>
<td>446 34 04</td>
<td>6,976</td>
<td>E 00 00 00</td>
</tr>
</tbody>
</table>

The station is located on the summit of a low, wooded hill which lies about 0.3 miles northeast of Lahaalua, about 0.4 miles east of Banana Point, about 0.4 miles south southeast of Lipoa Point and about 0.2 miles west of Honolua Stream.

To reach the courthouse in the city of Lahaina; go northerly, on the road which leads toward 'Ehialoha, for 10.3 miles; pass the Lahiana School and continue north for 0.4 mile; turn right, onto a dirt road, and go easterly, through the pineapple fields, for 0.8 mile; turn left and go northerly, crossing over a deep gully, for about 0.3 mile; turn right and follow along the right hand side of the pineapple fields for 1.7 miles; turn left, onto a board road and go easterly, on a truck road, for 0.4 mile; pass through a board gate at a small cornfield and follow the truck road easterly for 0.7 mile to the end of truck travel.

From this point pass to the left, northeasterly, for about 0.2 miles to the summit of the hill and the station.

The station is a standard disk, stamped KALO 1950, braced to the top of a 2½ inch iron pipe which projects about 18 inches.

REFERENCE MARKS 1 is a standard disk, stamped KALO NO 1 1950, braced to the top of a 2½ inch iron pipe which projects about 6 inches. It is located at about the same elevation as the station.

REFERENCE MARK 2 is a standard disk, stamped KALO NO 2 1950, braced to the top of a 2½ inch iron pipe which projects about 8 inches. It is located at about the same elevation as the station.

The forest Reserve boundary monument is the center of a 5 inch iron pipe which projects about 5 feet. A steel plate on the top is stamped KALO. It is located about 5 feet lower than the station.

(continued on next page)
HORIZONTAL CONTROL DATA
by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

NAME OF STATION: KAEO
ESTABLISHED BY: C.T. Hunsicker YEAR: 1950 STATE: Hawaii
RECOVERED ON: R.C. Hunsicker YEAR: 1969 COUNTY: Maui
Island: Maui
HEIGHT OF TELESCOPE ABOVE STATION MARK = 1.7 METERS;
HEIGHT OF LIGHT ABOVE STATION MARK = 1.7 METERS.

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

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>BEARING</th>
<th>DISTANCE FEET</th>
<th>DISTANCE METERS</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAIIKULU 2 1950 DISTANCE and DIRECTION:</td>
<td>0° 00′ 00″</td>
<td>00</td>
<td>00</td>
<td>00.0</td>
</tr>
<tr>
<td>Forest Reserve Boundary Mark</td>
<td>NW</td>
<td>22,720</td>
<td>6,869</td>
<td>108° 33′ 13″</td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>E</td>
<td>14,385</td>
<td>4,385</td>
<td>305° 32′ 32″</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>S</td>
<td>14,385</td>
<td>4,385</td>
<td>305° 32′ 32″</td>
</tr>
<tr>
<td>WAIIKULU 2 1969 DISTANCE and DIRECTION:</td>
<td>0° 00′ 00″</td>
<td>00</td>
<td>00</td>
<td>00.0</td>
</tr>
<tr>
<td>Punukoli, Central Power Co. stack</td>
<td>NW</td>
<td>22,720</td>
<td>6,869</td>
<td>108° 33′ 13″</td>
</tr>
<tr>
<td>Forest Reserve Boundary Mark</td>
<td>NW</td>
<td>22,720</td>
<td>6,869</td>
<td>108° 33′ 13″</td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>E</td>
<td>14,385</td>
<td>4,385</td>
<td>305° 32′ 32″</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>S</td>
<td>14,385</td>
<td>4,385</td>
<td>305° 32′ 32″</td>
</tr>
</tbody>
</table>

Station mark and both RMs were recovered in good condition. The top of the Forest Reserve Boundary Mark pipe has rusted off and the plate with the letters on it was found on the ground. The difference in distance to the pipe was noted and checked; the 1969 distance is correct.

Station is located about 3 miles southeast of Honokaa and 7-1/2 miles northeast of Lahaina, on the summit of Puu Kaeo, a brushy hill of about 1683 feet elevation that lies about 1/2-mile south of the upper end of the pineapple fields.

To reach station from the post office in Lahaina, go northeast on Papeaua Street for 0.2 miles; turn left and go north on State Highway 30 for 10.3 miles to pineapple field on right. Turn right and follow field road along right side of pineapple fields for 3.2 miles to head of a draw. Bear right, across field, then left for 0.25 mile to board gate on right, at rain gauge. Park anotherly along old road about 1/2-mile to top of grade where road goes down to right. Go left about 100 yards to crest of ridge, then left on old trail for 30 yards; go right, leaving trail, up fern-covered slope about 50 feet to station.

Station mark is a standard disk stamped "KAEO 1950", braced to the top of a 2-inch iron pipe that projects 14 inches from ground.

Reference mark number one is a standard disk stamped "KAEO NO 1 1950", braced to the top of a 2-inch iron pipe that projects 6 inches from ground and is 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "KAEO NO 2 1950", braced to the top of a 2-inch iron pipe that projects 1 foot from ground.

Forest Reserve Boundary Mark is a 3-inch-diameter, iron pipe, with rusted, jagged top, that projects 4 feet from ground. A metal plate with letters F R N on it, and affixed to a metal cap, was found by the pipe.

NOTE: Top of hill is covered with dense uhiai fern and some low, scattered, ohia brush, and lines are easily cleared.

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

NOTE - One of these forms must be used for every station recovered.
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KAHEA
STATE: Hawaii
COUNTY: Maui
Island: Maui

Chief of Party: Harold J. Seborg
YEAR: 1962
Described by: R.F. Hanson

3

OBJECT


HAIKA

120
R.M. No. 2

ME

8.03

2.450

90

10

43

120
R.M. No. 1

SE

16.70

4.260

209

58

96

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

HAIKA

Station is located about 6-1/2 miles airline east of Lanai City and 1-1/4 miles southeast of old Keopu Village; on a small tree-covered hill of about 45 feet elevation. It is about 200 yards southwest of the northeast coast of the island and 150 yards southwest of an old well and coconut grove, in a densely wooded area.

To reach station from the post office in Lanai City, go north on Highway 44, for 0.6 miles to an end of paved road. Continue on dirt road, Highway 44, along coast of island for 0.5 miles to old Keopu Village. Continue on the road for 1.4 miles to a fork. Take left fork and continue along shoreline for 0.65 mile to old well on right, and a triangle below on coconut trees, just after making a right jog. From here pass southwest through kiau trees for about 150 yards to low hill and station.

Station mark is a standard disk stamped "KAHEA 1962", cemented in a drill hole in a 3-foot boulder that projects about 5 feet above ground. It is 23 feet east of a large, 6-foot boulder that has some smaller boulders surrounding it. Reference mark number one is a standard disk stamped "KAHEA NO 1 1962", cemented in a drill hole in a 3 x 4-foot boulder that projects about 8 inches above ground. It is about 5 feet lower than station mark. Reference mark number two is a standard disk stamped "KAHEA NO 2 1962", cemented in a drill hole in a 3 x 3-foot boulder, about 1-1/2 feet lower than the station mark.

ADJUSTED HORIZONTAL CONTROL DATA

STATE: HAII
YEAR: 1962

SOURCE: G-13124

DEGREES LATITUDE: 20° 05' 24.426
DEGREES LONGITUDE: 154° 46' 15.874
ELEVATION: 14' 2" METERS
147' 37" FEET

STATE COORDINATES (DEG)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 1</td>
<td>5102</td>
<td>447,293.43</td>
<td>184,087.72</td>
<td>- 0.01 18</td>
</tr>
</tbody>
</table>

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE 

HORIZON FORMULA IN THE FORMULAS IN THE SECOND SHEET OF THIS FORM.

TO STATION OR OBJECT

HAIKA

DEGREES AZIMUTH (Plane)

131° 24' 54.0"

131° 28' 12" 5102

QF 266
Kaholo (Maui County, Hawaii), F. G. Engle, 1927.—On the southwest coast of Lanai Island. Marked by 500-pound boulders, with 3/4-inch drill hole in center of equilateral cement triangle approximately 8 inches on side, and marked "C. & G. S. 1914." Reference marks, note 12e, standard reference disks in boulders, are at the following distances and azimuths from the station: No. 1, 13.91 meters (45.6 feet); No. 2, 2.08 meters (10.1 feet), 97° 43'.

Kaholo (Maui County, Hawaii, F. G. Engle, 1927; W.S., 1931) — Station is on the SW coast of Lanai Island. It was not visited, no top of hill was used for hydrography. No signal was over this point.

<table>
<thead>
<tr>
<th>NAME OF STATION</th>
<th>KAHOLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESTABLISHED BY</td>
<td>B.N.</td>
</tr>
<tr>
<td>RECOVERED BY</td>
<td>B. H. Seborg</td>
</tr>
<tr>
<td>COUNTY</td>
<td>Maui</td>
</tr>
<tr>
<td>ISLAND</td>
<td>Lanai</td>
</tr>
<tr>
<td>YEAR</td>
<td>1927</td>
</tr>
<tr>
<td>YEAR</td>
<td>1962</td>
</tr>
<tr>
<td>NAME</td>
<td>KAHOLO</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>BEARING</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUI MANU (HIG)</td>
<td>1879 1927</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.N. No. 1</td>
<td>S</td>
<td>45° 52'</td>
<td>13.875</td>
</tr>
<tr>
<td>B.N. No. 2</td>
<td>E</td>
<td>10° 08'</td>
<td>3.069</td>
</tr>
<tr>
<td>LANAI VOL (LH)</td>
<td>NE</td>
<td>0.9 mile</td>
<td>32° 19'</td>
</tr>
</tbody>
</table>

Station mark and reference mark number two were recovered and found in good condition. Reference mark number one had been removed from the drill hole. The station was originally marked by a 1-1/2-inch-diameter drill hole at the center of a cement triangle. A new station disk and a new reference mark disk were set. A complete description follows:

Station is located about 6 miles southwest of Lanai City and 1-1/4 miles south-southwest of the mouth of Kasilapu Harbor, on the summit of a ridge of about 400 feet elevation, which about 1/2 mile west of a slightly higher ridge.

To reach station from the junction of Highways 44 and 41 at the south edge of Lanai City, go westward on Highway 44 for 3.6 miles to pined left fork. Turn left and follow winding road southward for 4.2 miles to a dirt road right, at a pasture on right. Turn right and go 0.4 mile to fork. Take left fork through pineapple fields for 0.5 mile to fork. Take right fork and go 0.1 mile to edge of field. Bear left and follow road along west side of fields for 0.35 mile to top of hill, 100 yards before reaching the Lanai Vol installation. Turn right and follow track road westward across flat top of hill and down other side for 0.75 mile to fork at old gate. Take right fork and go over range for 0.3 mile to gate at bottom of grade. Continue on track road for 0.3 mile to dim right fork. Take the right fork and go 0.05 mile to top of low rise and station.

Station mark is a standard disk stamped "KAHOLO 1927 1962", cemented in a drill hole at the center of a 6-inch, cement triangle on the top of a 2-foot-diameter boulder that projects 3 inches above ground. It is 4.2 feet southeast of a white wire fence post, 36.2 feet northeast of an old concrete foundation that sits at the center of a concrete foundation blocks of an old tower, and 735.4 feet southwest of railroad No. 57.

Reference mark number one is a standard disk stamped "KAHOLO N.D. 1927 1962", cemented in the original drill hole, in a 30-inch-diameter, red rock outcrop that projects 1 foot above ground. It is 274.4 feet southwest of the southeast end of the concrete stairway foundation and about 2 feet lower than the station.

Reference mark number two is a standard disk stamped "KAHOLO 1927", cemented in a drill hole in a 30-inch-diameter, red bedrock outcrop that projects 8 inches above ground. It is about 10 inches lower than the station.

Station and reference mark were recovered as described in good condition.

NOTE: All of these marks must be used for every survey recovered.