ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: TURTONS MILL CHIMNEY
STATE: HAWAII
YEAR: 1912
THIRD ORDER

SOURCE: G-SP156

DEGREES LATITUDE: 20° 52' 54.02"
DEGREES LONGITUDE: 156° 40' 43.76"

ELEVATION: METERS

STATE COORDINATES (ECEF)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 2</td>
<td>5102</td>
<td>495,650.44</td>
<td>199,155.32</td>
<td>- 0 00' 16&quot;</td>
</tr>
</tbody>
</table>

* PLAN AziMUTH HAS BEEN COMPUTED BY THE θ i j. j FORMULA NEGLECTING THE SECOND TERM.

TRANSFORMATION PARAMETERS:

<table>
<thead>
<tr>
<th>TO STATION OR OBJECT</th>
<th>DEGREES AZIMUTH</th>
<th>PLANE AZIMUTH*</th>
<th>CODE</th>
</tr>
</thead>
</table>

Q0 014
HORIZONTAL CONTROL DATA

QUAD 201564
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 30' TO 157° 00'
DIAGRAM H 416 MAUI

OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION
U

STATE
HAWAII

YEAR
1912

THIRD
ORD

SOURCE
G-SP136

DECLARATIVE LATITUDE 20° 57'00.22
DECLARATIVE LONGITUDE 196° 52' 08.82
ELEVATION SCALED 305 METERS

STATE COORDINATES (FEMA)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z (UNO. 4) ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>544,655.62</td>
<td>224,012.96</td>
<td>+ 0 02 49</td>
</tr>
</tbody>
</table>

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE Z-UNO. 4 FORMULA NEGLCETING THE SECOND TERM.

TO STATION OR OBJECT

DECIMAL AZIMUTH FROM SOUTH

PLANE AZIMUTH FROM SOUTH

CODE

| 00 008 |
HORIZONTAL CONTROL DATA

QUAD 201564
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 30' TO 157° 00'
DIAGRAM 416
MAUI

STATION 1154

SEE STATION KAEA

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: USLHS MARK NEAR KAEA
STATE: HAWAII
YEAR: 1962
SECOND ORDER

SOURCE: G-13124
NO OBSERVATION CHECK ON THIS POSITION

<table>
<thead>
<tr>
<th>GEOGRAPHIC LATITUDE:</th>
<th>GEOGRAPHIC LONGITUDE:</th>
<th>ELEVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>20° 47' 07.48''</td>
<td>156° 37' 59.44''</td>
<td>23 Meters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X (FEET)</th>
<th>Y (FEET)</th>
<th>Z (FOOT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>357,542.41</td>
<td>146,127.41</td>
<td>- 0 06 22</td>
</tr>
</tbody>
</table>

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE Z FORMULA NEGLICING THE SECOND TERM

TO STATION OR OBJECT

<table>
<thead>
<tr>
<th>GEODETIC AZIMUTH (Formulas)</th>
<th>PLANE AZIMUTH* (Formulas)</th>
<th>CODE</th>
</tr>
</thead>
</table>

POSITION DETERMINED BY TRAVERSE FROM STATION KAEA

QF 375
# Horizontal Control Data

**Name of Station:** Maiehu Church Buff Spire  
**State:** Hawaii  
**Year:** 1912  
**Third Order**

**Source:** G-SP156

## Geographic Coordinates

<table>
<thead>
<tr>
<th>State &amp; Zone</th>
<th>Code</th>
<th>X</th>
<th>Y</th>
<th>H Plane Azimuth</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>552,952,12</td>
<td>212,854,25</td>
<td>+ 0'03'19</td>
</tr>
</tbody>
</table>

**Notes:**  
- Plane Azimuth has been computed by the $\theta = \arctan \left( \frac{\Delta Y}{\Delta X} \right)$ formula neglecting the second term.

---

**Recovery Note, Triangulation Station:**

Maiehu Church Buff Spire, State: Hawaii  
County: Maui

**Established by:** J.C.G.  
**Year:** 1912  
**Locality:** Wailehu District

**Recovered by:** R.P. Adams  
**Year:** 1962

Special mention as to the errors of the original description: Buff spire of the Hawaiian Church in the Village of Wailehu, about 22 miles northwest of Kahului. The church is of masonry construction, and more than 60 years old.

This is apparently the same as "Buff Spire" located in 1912 as it is the only spire in the village.

---

**Adjusted Horizontal Control Data**

**Name of Station:** Maiehu Church Buff Spire  
**State:** Hawaii  
**Year:** 1912  
**Third Order**

**Source:** G-SP156

## Geographic Coordinates

<table>
<thead>
<tr>
<th>State &amp; Zone</th>
<th>Code</th>
<th>X</th>
<th>Y</th>
<th>H Plane Azimuth</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>552,952,12</td>
<td>212,854,25</td>
<td>+ 0'03'19</td>
</tr>
</tbody>
</table>

**Notes:**  
- Plane Azimuth has been computed by the $\theta = \arctan \left( \frac{\Delta Y}{\Delta X} \right)$ formula neglecting the second term.
HORIZONCAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

JUN 1768
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

Waihee (Maui Island, J. C. Gauger, 1912).—In northwestern Maui, on the summit of the most prominent hill in the ridge on the northwest side of Waihee Valley. Station may be reached by following one of the first three ridges northwest of the Waihee stream. Pack animals can follow the cattle trails for nearly two-thirds of the distance up the hill, but the final climb is through an almost impenetrable growth of ferns, vines, and tropical growth. The station is on the northern shoulder of the summit about 100 meters back from the abrupt downslope. Subsurface mark is a bottle set in concrete 2 1/2 feet below the surface of ground. Surface mark is a 5-inch drain tile pipe set flange down in a block of concrete and projecting 5 inches above surface. The pipe is filled with cement and centered with a standard bronze station mark.

RECOVERY NOTE, TRIANGULATION STATION

HORIZONCAL CONTROL DATA

Table: 1

<table>
<thead>
<tr>
<th>NAME OF STATION</th>
<th>WAIMEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR</td>
<td>1912</td>
</tr>
<tr>
<td>STATE</td>
<td>HAWAII</td>
</tr>
<tr>
<td>NAME RECOVERED BY</td>
<td>J. C. Gauger</td>
</tr>
<tr>
<td>SOURCE</td>
<td>G-9311</td>
</tr>
</tbody>
</table>

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

The station was recovered, as described, in good condition. Pack animals can no longer be used on the lower slopes of the station hill because of the heavy growth of jungle vegetation which has grown up since 1932. The building party spent 4 days clearing a trail to this station and 1 more day in recovering the old station disk. Two reference marks were established. A new description follows:

The station is located near the summit of a brush and fern covered hill, named Landilili, which lies about 5 miles northwest of Waiheka, about 2.5 miles northeast of Kea crater, about 1.5 miles west of (magnetic), and on the crest of the long ridge which lies just north of the Waiheka River. Ground of slightly higher elevation lies about 100 feet north of the station. The station is about 30 feet east of a cliff and a lens tree. A tangle of rotting ferns, about 2 feet deep, covers the hill and makes future recovery difficult.

To reach the post office from Waiheka: go easterly, toward Kahului for one block; turn left, onto Market street, and go northwest and north for 3.6 miles; pass through the village of Waiheka and continue westerly, toward Kahului, for 2.2 miles; turn left past a large fence, a sign reading 'Boy Scout Camp', and go north and west for 1.1 miles to the Boy Scout Camp and the end of truck travel.

From this point pack southwest for about 200 feet and go through a board gate, follow a dim trail northwest, keeping to the left hand side of a small draw, for about 0.3 mile to the crest of the ridge which overlooks the Waiheka River Canyon; bear right and follow the crest of the ridge, westerly, for about 1.0 mile to a small swampy meadow; bear right, cross over a small stream, and pack southwest for about 0.3 mile to the flat summit of a lower spur ridge; go to the left and follow the crest of the spur ridge, southwesterly, for about 0.3 mile to the summit of the hill and the station.

The station is a standard disk, unstacked, set in the top of a 5 inch tile pipe which is about flush with the surface of the ground.

References mark number 1 is a standard disk, stamped WAIMEE NO 1 1949, set in the top of a 3 inch concrete pipe which projects about 1 foot. It is located at about the same elevation as the station.

Reference mark number 2 is a standard disk, stamped WAIMEE NO 2 1949, set in the top of a 3 inch cast iron soil pipe which projects about 1 inch. It is located at about the same elevation as the station.

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>BEARING</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONOLUA</td>
<td>N</td>
<td>4 miles</td>
<td>00° 00' 00&quot;</td>
</tr>
<tr>
<td>HAY 1928</td>
<td>N</td>
<td>14.862'</td>
<td>214° 57' 00&quot;</td>
</tr>
<tr>
<td>R. N. No. 1</td>
<td>N</td>
<td>19.000'</td>
<td>266° 22' 21&quot;</td>
</tr>
</tbody>
</table>

(continued on next page)
Station was recovered and all marks found in good condition. A complete description follows:

Station is located about 3 miles west-northwest of Waihe'e and 1 mile southwest of Maluhia Camp, on a brushy hill of about 2563 feet elevation, named Laniiili.

To reach station, from the junction of Main and Market Streets in Wai'uku, go north on Market Street, continuing on State Highway 33, for 3.6 miles to Waihe'e Village; continue on the highway for 3.1 miles to sign on left "CAMP MALUHIA". Follow macadam drive left for 0.75 mile to locked chain gate; pass through gate and continue for 0.4 mile to second gate. Pass through gate and keep ahead past houses, for 50 yards, to fork. Take left fork and go 0.05 mile to board gate to right of 2 water tanks. Pass through gate and go up steep grade (with 4-wheel-drive) for 0.15 mile to end of truck travel at a right curve, in guava trees. Park south up trail about 1/4-mile to pali, then go right, following along ridge line about 1 mile to small meadow, go right across meadow, and up other side, about 1/4-mile, to top and station. NOTE: Key for locked gates was obtained at Camp caretaker's house. A 3-hr. pack if trail is open; it soon becomes overgrown with ulu fern.

Station mark is a standard disk, unstamped, set in the top of a concrete-filled, 7-inch-diameter, sewer pipe that projects 2 inches from ground. It is near the northeast end of the long, narrow, top of the hill. 20 feet southeast of the cliff and 30 feet southeast of a small, lone tree that sets on steep side of the hill.

Reference mark number one is a standard disk stamped "WAIHEE NO 1 1949" set in the top of a 3-inch-diameter, concrete-filled pipe that projects 2 feet from ground. It is at about same elevation as station mark.

Reference mark number two is a standard disk stamped "WAIHEE NO 2 1949" set in the top of a 2-inch iron pipe that projects 4 inches from ground and is about 4 inches higher than station mark.

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

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

**NO ORIGINAL TEXT**

**RECOVERY NOTE, TRIANGULATION STATION.**

- **NAME OF STATION:** WAIHEE CHURCH YELLOW SPIRE
- **HAWAII**
- **COUNTY:** MAUI
- **Established by:** J. C. D.
- **Year:** 1912
- **Locality:** WAILUKU DISTRICT
- **Revised by:** R. D. AHMAD
- **Year:** 1912

Detailed statement as to the form of the original description: The spire of the Hawaiian Church in the village of Waihe, about 4 miles N W of Kahului. The church is of masonry construction, more than 40 or 50 years old.

**ADJUSTED HORIZONTAL CONTROL DATA**

**NAME OF STATION:** WAIHEE CHURCH YELLOW SPIRE

**STATE:** HAWAII

**YEAR:** 1912

**THIRD ORDER**

**SOURCE:** G-SP150

| STATE & ZONE | CODE | X     | Y     | Δ X = Δ Y = 0°00'13"
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>551,182.46</td>
<td>214,178.58</td>
<td>0 03'13&quot;</td>
</tr>
</tbody>
</table>

* Plane azimuth has been computed by the Δ X = Δ Y formula neglecting the second term.

**STATE COORDINATES (FNM)**

**TO STATION OR OBJECT**

**GEODETIC AZIMUTH (FROM POINTS)**

**PLANE AZIMUTH (FROM POINTS)**

**CODE**
NO ORIGINAL TEXT

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 201564 STATION 1158
HAWAII
Latitude 20° 30' to 21° 00'
Longitude 156° 30' to 157° 00'
DIAGRAM MF 4-16 MAUI

NO ORIGINAL TEXT

RECOVERY NOTE. TRIANGULATION STATION.

NAME OF STATION: WAHEE MILL STACK
STATE: HAWAII
COUNTY: MAUI

ESTABLISHED BY: J.G.R.
YEAR: 1912
LOCALITY: MAUNA DISTRICT
REMOVED BY: J.G.R.
YEAR: 1930

This apparently the same as "Wahoe Chimney".

State of Hawaii must be used for every entries appended.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WAHEE MILL STACK
STATE: HAWAII
YEAR: 1912
THIRD CHECK

STATE & ZONE: HI 2

COORDINATES (MAUI)

STATE CODE X Y DGRS. MINS.
HI 2 5192 552.421.30 218.185.46 + 0 03 18

PLANE ALTIMETER HAS BEEN COMPUTED BY THE S-NO. 7 FORMULA NEGLIGERING THE SECOND TERM.

NOTES ON OBJECT

GEODETIC ALTIMETER (Feet above)

PLANE ALTIMETER (Feet above)

QD 074
NO ORIGINAL TEXT

DEPARTMENT OF COMMERCE

RECOVERY NOTE, TRIANGULATION STATION.

HISTORY OF STATION:

WAIKAPU CHURCH

STATE: HAWAII

COUNTY: MAUI

Established by: E. C. Adams

Year: 1899

LOCALLY: WAILUKU DISTRICT

Registered by: E. C. Adams

Year: 1929

Detailed statement as to the origin of the original description:

The old Hawaiian Church in the village of Waiakapu about 33 miles southwest of Kahului Harbor. The church is more than 60 years old.

HORIZONTAL CONTROL DATA

PHASE 1956

STATION 1159

MAUI

HAWAII

LATITUDE: 20° 30' TO 21° 00'

LONGITUDE: 156° 30' TO 157° 00'

DIAGRAM: 40-16 MUI

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION:

WAIKAPU CHURCH

STATE: HAWAII

YEAR: 1899

THIRD ORDER

SOURCE: G-SP15b

GEODETIC LATITUDE: 20° 31' 38.051

GEODETIC LONGITUDE: 156° 30' 44.102

ELEVATION: METERS

STATE COORDINATES (EAST)

<table>
<thead>
<tr>
<th>STATE-ZONE</th>
<th>CODE</th>
<th>A</th>
<th>B</th>
<th># OF X = ANGLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>5524.020</td>
<td>191519.89</td>
<td>0° 0' 0&quot;</td>
</tr>
</tbody>
</table>

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ FROM THE E FORMULA NEGLECTING THE SECOND TERM*

<table>
<thead>
<tr>
<th>TO STATION OR OBJECT</th>
<th>GEODETIC AZIMUTH FROM WMD</th>
<th>PLANER AZIMUTH FROM WMD</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>G0 555</td>
</tr>
</tbody>
</table>
HORIZONTAL CONTROL DATA

NAME OF STATION: MAIKULU 2
STATE: HAWAII
YEAR: 1950
FIRST ORDER

SOURCE: G-9311

STATE COORDINATES (UTM)

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>UTM X</th>
<th>UTM Y</th>
<th>ELEVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI 2</td>
<td>5102</td>
<td>510,446,11</td>
<td>230,224.91</td>
<td>424.3</td>
</tr>
</tbody>
</table>

PLANE AZIMUTH HAS BEEN COMPUTED BY THE \( \cos \theta = \cos \alpha \cos \phi \) FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT | GEOGRAPHIC AZIMUTH (from south) | PLANES AZIMUTH (from south) | CODE |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MANNIKI</td>
<td>23 01 18.5</td>
<td>23 00 39</td>
<td>5102</td>
</tr>
</tbody>
</table>

REFERENCES:

1. Reference mark number 1 is a standard disk, stamped MAIKULU 2 1950, braced to the top of a 2-inch iron pipe which projects about 1 foot.

2. Reference mark number 2 is a standard disk, stamped MAIKULU 2 1950, braced to the top of a 2-inch iron pipe which projects about 1 foot. It is located at about the same elevation as the station.

The Survey Mark is the top center of a 2-inch iron pipe which projects about 1 foot. It is located at about the same elevation as the station.

The station is located on the summit of a low, brush-covered, knoll which lies, in mature land, about 7 miles northeast of Lahaina, about 4.5 miles south of Lipoa Point, about 3.5 miles east of Lahaina Point, about 0.16 mile south of a track road and 75 feet northwest of a wire fence.

To reach from the Courthouse in Lahaina: go northeast, on the road which leads toward Honolua, for 9.6 miles; turn right onto a dirt road, and go eastward through the pineapple fields, for 1.15 miles; pass to the right hand side of a small shack and continue, eastly, for 0.65 mile; turn left and go northward for 0.46 mile; turn right, onto a dirt track road, and follow up grade for 0.26 mile; pass through a board gate and continue up grade for 0.5 mile to a board gate on the right; turn left and follow the cleared road, eastly, for 0.5 mile to the crest of a low ridge; turn right and go southeast, across country, for 0.15 mile to the summit of the low knoll and the station.

The station is a standard disk, stamped MAIKULU 2 1950, braced to the top of a 2-inch iron pipe which projects about 1 foot.
HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY

WAIKULU (continued)

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

NAME OF STATION: WAIKULU 2
ESTABLISHED BY: C.L. Hussey
YEAR: 1950
STATE: Hawaii
COUNTY: Maui
ISLAND: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK: 1.5 METERS
HEIGHT OF LIGHT ABOVE STATION MARK: 1.5 METERS

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>MANINI (HGS) 1882-1950</td>
<td>NW</td>
<td>18.242</td>
<td>5.560</td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>NW</td>
<td>16.250</td>
<td>4.954</td>
</tr>
<tr>
<td>Survey mark</td>
<td>NW</td>
<td>22.110</td>
<td>7.095</td>
</tr>
<tr>
<td>MANINI (HGS) 1882-1969</td>
<td>NW</td>
<td>18.233</td>
<td>5.548</td>
</tr>
<tr>
<td>R.M. No. 1</td>
<td>NW</td>
<td>18.233</td>
<td>5.548</td>
</tr>
<tr>
<td>Survey pipe</td>
<td>NW</td>
<td>16.204</td>
<td>4.955</td>
</tr>
<tr>
<td>Hawa Point Light 1912</td>
<td>NNW</td>
<td>2.165</td>
<td>0.650</td>
</tr>
<tr>
<td>R.M. No. 2</td>
<td>NNE</td>
<td>25.097</td>
<td>7.650</td>
</tr>
</tbody>
</table>

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

To reach station from the post office in Lahaina, go northeast on Panana Street for 0.2 mile; turn left and go northeast on State Highway 30 for 7.0 miles to side road right, at power pole No. 87. Go right for 50 yards to private pineapple field crossed; continue ahead, keeping along right side of pineapple fields, for 3.2 miles to top of grade at edge of pineapple field. Turn right and go 0.5 mile to station in grassy area. Station mark is a standard disk stamped "WAIKULU 2 1950", braced to the top of a 2-1/2-inch iron pipe that projects 10 inches from ground. It is about 500 feet west-northwest from the upper boundary fance of the pineapple land, 75 yards southwest of edge of pineapple field, and 3 feet northwest of a white witness post.

Reference mark number one is a standard disk stamped "WAIKULU 2 NO 1 1950", braced to the top of a 2-1/2-inch iron pipe that projects 10 inches from ground. It is 5.1 feet south of the Survey pipe and 14 inches lower than station mark.

Reference mark number two is a standard disk stamped "WAIKULU 2 NO 2 1950", braced to the top of a 2-1/2-inch iron pipe that projects 12 inches from ground and is at about same elevation as station mark.

Survey pipe is a badly-rusted, 2-3/4-inch iron pipe, projecting 2 feet from ground, and is at about 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 in oil field of the recovery note.

NOTE - One of these forms must be used for every station recovered.
NO ORIGINAL TEXT

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

HORIZONTAL CONTROL DATA
by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 201564
STATION 1161
HAWAII
LATITUDE 20° 30’ TO 21° 00’
LONGITUDE 156° 30’ TO 157° 00’
DIAGRAM Nº 416
MAUI

RECOVERY OF TRIANGULATION STATION
NAME OF STATION: WAILUKU
STATE: Hawaii
COUNTY: Maui

CHIEF OF PARTY: G.T. Humphrey
YEAR: 1950
DESCRIBED BY: G.B.G.
NOTE: LOWEST TELESCOPE LIGHT SHINES BRIGHT.
WEATHER: WEATHER:
WEATHER:
WEATHER:

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></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Located on the north coast of Central Maui, Wailuku District, about 1 mile, airplane, north of the town of Wailuku, on the highest point on the range of sand hills east of the Wailuku-Waiehu Road, about 1200 feet north of angle in Puuohala Road.

Station was established in 1907 by S.M. Kanakaualii, and marked with a 3.5 inch galvanized pipe set in sandstone rock with 6 inches projecting above the surface. It was remarked in 1929 by Y.S. Seward with a 3/4 inch galvanized pipe set in concrete pier. Top of pier five inches below surface of ground and covered with one inch of soil. Over which was built a type B Hawaii Triangulation Station Monument.

The center of the pipe target holder was used as the station.

To reach from the intersection of Main and Market Streets in Wailuku; go north on Market Street toward Waiehu for 1.0 mile, turn right on plantation road and go 0.05 miles, turn left and go 0.1 mile. From here park east up slope to top of ridge and station.

RECOVERY NOTE, TRIANGULATION STATION
NAME OF STATION: WAILUKU
STATE: Hawaii
COUNTY: Maui

ESTABLISHED BY: S.M.K.
YEAR: 1907
RECOVERED BY: R.G. Munson
YEAR: 1958

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:
Island: Maui

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

Station was recovered in good condition. Located about 1 mile north of Wailuku, 1200 feet north-northeast of Mill Reservoir, 400 feet east of Kahikili Highway, and on the highest point of the sand hills along the east side of Kahikili Highway, at about 327 feet elevation.

To reach station from the intersection of Main and Market Streets in Wailuku, go north on Market St. for 0.5 mile to crossroad in Happy Valley; continue straight ahead, on Kahikili Highway, for 0.45 mile to crossroad. Turn right and go 0.05 mile to crossroad; turn left and go north along base of hills for 0.15 mile to end of truck travel. Pack uphill about 150 yards to top and station.

Station is marked by a Type B signal, with the 6 x 6-foot, concrete platform flush with ground. A red and white metal target extends 8 feet above platform. Station is the center of the 2-1/2-inch iron pipe which holds the target.
HORIZONTAL CONTROL DATA

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MAILUKU CHINNEY
STATE: HAWAII
YEAR: 1912
THIRD ORDER

SOURCE: G-SP156

DEGREES

GEODETIC LATITUDE: 20° 32' 35.19"
GEODETIC LONGITUDE: 156° 30' 21.60"

ELEVATION:

METERS

STATE COORDINATES (FHOI)

STATE & ZONE | X | Y | Z
--------- | --- | --- | ---
HI 2 | 5102 | 554,3842.84 | 203,437.18 | + 0'03'26"

*PLANE AZIMUTH HAS BEEN COMPUTED BY THE \( \pi \) OR \( \frac{\pi}{2} \) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT | GEODETIC DISTANCE (From north) | PLANE DISTANCE (From north) | CODE
--------- | --- | --- | ---
QO 071 |  |  |  

NO TEXT
NO ORIGINAL TEXT

RECOVERY NOTE, TRIANGULATION STATION
The station is the top and center of a steel smoke stack at the Wailuku Sugar Company Mill in the town of Wailuku, built in 1906.

RECOVERY OF TRIANGULATION INTERSECTION STATION
The station was recovered in good condition as described by C.T. M in 1950 except that the stack is now aluminum colored with black paint on the top 10 feet.
**ADJUSTED HORIZONTAL CONTROL DATA**

<table>
<thead>
<tr>
<th>NAME OF STATION</th>
<th>MAUI: KAAHUMANU CH SPIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATE</td>
<td>HI</td>
</tr>
<tr>
<td>ELEVATION</td>
<td>20</td>
</tr>
<tr>
<td>METERS</td>
<td>535.316692</td>
</tr>
<tr>
<td>FEET</td>
<td>201947.63</td>
</tr>
<tr>
<td>E 0053.24</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE COORDINATES (U.S.)</th>
</tr>
</thead>
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<tr>
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<tr>
<td>554116.92</td>
</tr>
<tr>
<td>201947.63</td>
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<tr>
<td>0053.24</td>
</tr>
</tbody>
</table>

**HORIZONTAL CONTROL DATA**

**NO ORIGINAL TEXT**

**RECOVERY NOTE, TRIANGULATION STATION**

**NAME OF STATION:** Wailuku, Kaahumanu Church, Spire

**STATE:** HI | COUNTY: Maui

**ELEVATION:** 20-35-21.33

**METERS:** 535.316692

**FEET:** 201947.63

**E 0053.24**

**NAME OF STATION:** Wailuku, Kaahumanu Church, Spire

**STATE:** HI | COUNTY: Maui

**ELEVATION:** 20-35-21.33

**METERS:** 535.316692

**FEET:** 201947.63

**E 0053.24**

**NAME OF STATION:** Wailuku, Kaahumanu Church, Spire

**STATE:** HI | COUNTY: Maui

**ELEVATION:** 20-35-21.33

**METERS:** 535.316692

**FEET:** 201947.63

**E 0053.24**
HORIZONTAL CONTROL DATA
by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

STATE: HAWAII
YEAR: 1962
SECOND ORDER

SOURCE: G-13124

GEODETIC LATITUDE: 20°51'53.672"
GEODETIC LONGITUDE: 156°30'58.783"
ELEVATION: 374 ± 2 METERS
1228 FEET

STATE & ZONE CODE X Y 2 OR G M AT ANGLE
HI 2 5102 426.141.25 153.110.24 -0.04 37

PLANAR AIMING HAS BEEN COMPUTED BY THE 2 OR G M FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT GEODETIC AIMING PLANAR AIMING CODE
MUNRO 42 51 25.8 42 56 03 5102

NOTE: A 4-wheeled vehicle is required to drive to station.

Station is located about 3-1/2 miles airline northeast of Lanai City and 2 miles southwest of Zeno Point, on the summit of Wamaku Mountain, a prominent, bare hill of about 1200 feet elevation that rises above the grassy slopes which run up to the slopes from the northeast coast of the island.

To reach station from the post office in Lanai City, go north on Highway 44 for 0.5 miles to end of paved road at sign "SHIPWRECK BEACH." Continue on dirt road, Highway 66, for 1.5 miles to gate on right. Continue ahead for 0.5 mile to fork just after rounding sharp right curve. Take right fork, straight ahead, leaving main road and going southwest up draw, for 0.5 mile to edge of trees. Continue southwest on track road up along open slopes for 2.5 miles to end of hill. Bear left along rim of hill for 0.5 mile, then go down across saddle to a point on north side of hill, a distance of 0.15 mile, to top of hill and station.

Station mark is a standard disk stamped "WAMAKU 1962," breaded to the top of a 1-1/2-inch iron pipe that is set in cement and projects 5 inches above ground. It is on the east side of the hill, about 6 feet above ground, and 59 feet northeast of a cairn on the west side.

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

Reference mark number two is a standard disk stamped "WAMAKU NO 2 1962," cemented in a drill hole in a 2 x 3-foot, oval-shaped boulder that projects about 1 inch above ground. It is 22.3 feet northwest of the cairn, 4 feet lower than the station mark and on the north side of a large boulder that extends about 10 feet higher than the mark.

Station Lab will serve as the azimuth mark.

NOTE: A 4-wheel-drive vehicle is required to drive to station.

* Refers to notes in columns of triangulation and state publications of triangulation.
** Direction angle measured clockwise, referred to initial station.
---

JOHN M. HANBUSCH
SURVEY FIELD SUPERVISOR

JUN 1970
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

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

NAME OF STATION: WAMAKU
STATE: HAWAII
COUNTY: LANAI
ISLAND: LANAI

YEAR: 1962

HISTORY:
- 1962 - SURVEY OF HAWAIIAN CASSETTE MARK
- 1962 - SURVEY OF HAWAIIAN CASSETTE MARK
- 1962 - SURVEY OF HAWAIIAN CASSETTE MARK
- 1962 - SURVEY OF HAWAIIAN CASSETTE MARK

HORIZONTAL CONTROL DATA

QUAD: 201564
STATION: 1165
HAWAII
LATTITUDE: 20°33' TO 21°00'
LONGITUDE: 156°30' TO 157°00'
DIAGRAM: HR 416 MAUI
**HORIZONTAL CONTROL DATA**

**DESCRIPTION OF TRIANGULATION STATION**

**NAME OF STATION:** West Point  
**STATE:** Hawaii  
**COUNTY:** Maui  
**CHIEF OF PARTY:** W. L. Waywell  
**YEAR:** 1969  
**SOURCE:** G-12955

**DATE OF SURVEY:** JUN 1970  
**U.S. DEPARTMENT OF COMMERCE**  
**NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**  
**NATIONAL OCEAN SERVICE**  
**NATIONAL GEOGRAPHIC SURVEY**

**ADJUSTED HORIZONTAL CONTROL DATA**

**NAME OF STATION:** West Point  
**STATE:** Hawaii  
**YEAR:** 1969  
**HEIGHT:** 8 meters

**SOURCE:** G-12955

**DEVIATION:** 8 meters

**STATE COORDINATES (Stat):**

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
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<td>556,483.30</td>
<td>109,512.95</td>
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<td>00' 15.40</td>
</tr>
</tbody>
</table>

*Plane Azimuth has been computed by the **θ + δ + H** formula neglecting the second term.*

**TO STATION OR OBJECT**  
**DEVIATION FROM MEAN (in) || PLANES ADJOINT **

**SOURCE:** QF 250
### Adjusted Horizontal Control Data

**Name of Station:** MET  
**State:** HAWAII  
**Year:** 1904  
**Third Order**

**Source:** S-SP15e

<table>
<thead>
<tr>
<th>Geodetic Latitude</th>
<th>Elevation</th>
<th>Meters</th>
</tr>
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<tbody>
<tr>
<td>20°34'57.294&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>196°37'35.752&quot;</td>
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</tbody>
</table>

**State Coordinates (Foot):**

<table>
<thead>
<tr>
<th>State Zone</th>
<th>Code</th>
<th>X (ft)</th>
<th>Y (ft)</th>
<th>Plane Azimuth Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI-2</td>
<td>5102</td>
<td>513,705.27</td>
<td>99,926.41</td>
<td>0°00'51&quot;</td>
</tr>
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</table>

*Plane azimuth has been computed by the $\phi$-Wn.D. formula reflecting the second term.*

<table>
<thead>
<tr>
<th>To Station or Object</th>
<th>Geodetic Azimuth (From Station)</th>
<th>Plane Azimuth (From Station)</th>
<th>Code</th>
</tr>
</thead>
</table>
HORIZONTAL CONTROL DATA

**NAME OF STATION:** WET 2  
**STATE:** HAWAII  
**COUNTY:** KUAUI

**CHIEF OF PARTY:** H.J.S.  
**YEAR:** 1963  
**Described by:** R.K.H.

**NOTE:**
- Height of GEDM Levels at Station 1096.4 feet
- Height of MSL Levels at Station 26.3 feet

### OBJECTS

<table>
<thead>
<tr>
<th>No.</th>
<th>OBJECT</th>
<th>MEASUREMENTS</th>
<th>DISTANCE</th>
<th>DIRECTION</th>
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</thead>
<tbody>
<tr>
<td>12a</td>
<td>LOW 1963 (on Mt. Ika Kekalaulu)</td>
<td>46.39</td>
<td>5800</td>
<td>0 00 00.0</td>
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<tr>
<td>12a</td>
<td>LOW 1963 (on Mt. Ika Kekalaulu)</td>
<td>SE</td>
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<td>KAHOLALAI 1963 (on Mt. Kauaiala)</td>
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<td>36 53 10.8</td>
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<td>KIKI 1963 (on Kikia Island)</td>
<td>26.91</td>
<td>41 200</td>
<td>32 32 36</td>
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<tr>
<td>12b</td>
<td>KIKI 1963 (on Kikia Island)</td>
<td>SW</td>
<td>338 30 26.1</td>
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<tr>
<td>12b</td>
<td>KIKI 1963 (on Kikia Island)</td>
<td>SN</td>
<td>138 200</td>
<td>00.1</td>
</tr>
<tr>
<td>12b</td>
<td>KIKI 1963 (on Kikia Island)</td>
<td>SW</td>
<td>200 00</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Station is located on a small point on the north shore of Kahoolawe Island. The station is 1200 meters northeast of Ahuru Bay, 2200 meters southeast of Kaulu Bay, and 400 meters northeast of the bottom of Kaukika Gulch. The mark is located 60 feet south and 30 feet above the MSL on the edge of a rocky knoll about 100 feet inland from the top of the 20-foot bluff forming the general shoreline on this point. WET 2 is located 1200 feet southeast of former station WET 1 which is located on the extreme point of the bluff, 10 feet from the edge of the bluff, and marked by a pole supported by a pile of rocks.

Station mark is staked WET 1963, and set with concrete in a drill hole in a patch of exposed bedrock 4 feet in diameter and level with surrounding ground. No underground or witness marks were established.

Reference mark 1 is a standard disc staked WET 1963 NO 1 set with concrete in a drill hole in a large rock on the edge of the same knoll approximately level with the station.

Reference mark 2 is a standard disc staked WET 1963 NO 2. The mark is directly inland of the station and set with concrete in bedrock level with surrounding ground and approximately level with the station.

---

**ADJUSTED HORIZONTAL CONTROL DATA**

**NAME OF STATION:** WET 2  
**YEAR:** 1963  
**SOURCE:** G-13244

**DESCRIPTIVE LATITUDE:** 20° 34' 57.1033"  
**DESCRIPTIVE LONGITUDE:** 156° 37' 34.7068"  
**ELEVATION:** 10.0 METERS  
**52 FEET**

<table>
<thead>
<tr>
<th>STATE CODE</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI 2</td>
<td>5102</td>
<td>513,804,58</td>
<td>50,507,1c</td>
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</tbody>
</table>

1. Plane Azimuth has been computed by the equation of formula neglecting the second term.

<table>
<thead>
<tr>
<th>TO STATION OR OBJECT</th>
<th>GEODETIC AZIMUTH FROM STATION</th>
<th>PLANE AZIMUTH FROM STATION</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW 2</td>
<td>255 40 55.1</td>
<td>255 40 04</td>
<td>5102</td>
</tr>
</tbody>
</table>

**QF 410**
HORIZONTAL CONTROL DATA

WIND (Lanai, Island, F. G. Engle, 1927)—On western coast of Lanai, on rub of earth and large rocks which projects sharply from the hillside. It is a little below the bluff-line, and is reached by walking southeast from station Gale. (See description of Gale.) It is not visible from Gale. Marked according to note 5, standard disk in concrete in boulder. Two reference marks, note 12c, standard reference disks in concrete in boulders, were set at the following distances and azimuths from the station: No. 1, 2.87 meters (9.42 feet), 227° 44'; No. 2, 2.483 meters (8.18 feet), 111° 14'.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION WIND
ESTABLISHED BY F.G.E. YEAR 1927 STATE Hawaii
RECOVERED BY H.D. Seaborg YEAR 1964 COUNTY: Maui

ADJUSTED HORIZONTAL CONTROL DATA

STATE HAWAII YEAR 1947 THIRD ORDER

STATE & ZONE CODE X Y Z "THETA, 4, ANGLE"
HI 2 5102 388.411.04 194.230.94 0 0 568.5

*Plane azimuth has been computed by the "θ, W, Z, θ, θ" formula neglecting the spherical term.

HORAE.

QUAD 201.9464 STATION 1169
HAWAII
LATITUDE 20° 30' TO 21° 30'
LONGITUDE 156° 30' TO 157° 00'
DIAGRAM NO 616 MAID
HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WRECK

STATE: HAWAII
YEAR: 1900
THIRD ORDER

SOURCE: G-SP156

<table>
<thead>
<tr>
<th>GEODETIC LATITUDE</th>
<th>ELEVATION</th>
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<tbody>
<tr>
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<td>METER</td>
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<tr>
<td>156°41'34.052</td>
<td>FEET</td>
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</table>

<table>
<thead>
<tr>
<th>STATE &amp; ZONE</th>
<th>CODE</th>
<th>X</th>
<th>Y</th>
<th># ON ∆ H ANGLE</th>
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<td>491,081.69</td>
<td>200,491.90</td>
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*PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\Delta$ OR $\Delta H$ FORMULA DEDUCTING THE SECOND TERM.

<table>
<thead>
<tr>
<th>TO STATION OR OBJECT</th>
<th>GEODETIC AZIMUTH</th>
<th>PLANE AZIMUTH</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

QO 019
HORIZONTAL CONTROL DATA

WRECK (Maui County, Hawaii, O.W.S., 1931) -- Station is the highest point of an old partly submerged wrecked ship. It is located on the N side of Lanai Island about 1 mi. W of Light Tower. Just E of the station, there is a small break in the coral reef fringing the shore.

This is an intersection station.

RECOVERY NOTE. INTERSECTION STATION

NAME OF STATION: WRECK
ESTABLISHED BY: O.W.S., YEAR: 1931
RECOVERED BY: H.S. Seaborg, YEAR: 1962, COUNTY: Maui, ISLAND: Lanai

A section of an old wreck is visible in the approximate location of the station. It appears to be a section of one side of a ship and projects only a few feet above water.

A later wreck, a large, grey transport ship that appears to be a World War II type, lays about 1/4 mile east. See description for that intersection station.

NAME OF STATION: WRECK
STATE: HAWAII
YEAR: 1931
THIRD ORDER

SOURCE: G-1432

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<tr>
<th>GEOGRAPHIC LATITUDE</th>
<th>20° 55' 30.582'</th>
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<tbody>
<tr>
<td>GEOGRAPHIC LONGITUDE</td>
<td>156° 55' 01.016'</td>
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</table>

ELEVATION: 11.0 FT

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<td>414,528.25</td>
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*Tables of data have been compiled by the A.O. W. FERRALL, REFLECTING THE SECOND ORDER.

QF 134