

H12046

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

*Type of Survey* Hydrographic Survey

*Field No.* N/A

*Registry No.* H12046

### LOCALITY

*State* Hawaii

*General Locality* North Pacific Ocean

*Sublocality* Honolulu Harbor

2009

### CHIEF OF PARTY

Paul Turner, PS, NOAA

### LIBRARY & ARCHIVES

DATE

|   |   |                                     |
|---|---|-------------------------------------|
| U.S. DEPARTMENT OF COMMERCE<br>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION<br><br><b>HYDROGRAPHIC TITLE SHEET</b>   |   | REGISTRY No<br><br><b>H12046</b>    |
| <b>INSTRUCTIONS</b> – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.  |   | FIELD No: N/A                       |
| State <u>Hawaii</u>   |   |                                     |
| General Locality <u>North Pacific Ocean</u>   |   |                                     |
| Sub-Locality <u>Honolulu Harbor</u>   |   |                                     |
| Scale <u>1:2,500</u>  | Date of Survey <u>April 18 - May 03, 2009</u> |                                     |
| Instructions dated <u>3/17/2009</u>   | Project No. <u>S-T342-Ahi-09</u>              |                                     |
| Vessel <u>R/V Ahi</u>   |   |                                     |
|   |   |                                     |
| Chief of party <u>Paul Turner</u>   |   |                                     |
| Surveyed by <u>Paul Turner, Kurt Brown, Joyce Miller</u>  |   |                                     |
| Soundings by <u>Reson 8101</u>  |   |                                     |
| SAR by <u>Fernando Ortiz</u>  |   | Compilation by <u>Annie Raymond</u> |
| Soundings compiled in <u>Feet</u>   |   |                                     |
| REMARKS: <u>All times are UTC. UTM Zone 4N</u>  |   |                                     |
| <u>The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and end notes in red were generated during office processing. Page numbering may be interrupted or non sequential.</u> |   |                                     |
| <u>All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via <a href="http://www.ngdc.noaa.gov/">http://www.ngdc.noaa.gov/</a>.</u>   |   |                                     |

# **Descriptive Report to Accompany Hydrographic Survey H12046**

Project S-T342-Ahi-09

Honolulu Harbor

Hawaii

April - May, 2009

**NOAA Research Vessel AHI**

## **Introduction**

This project was conducted in collaboration with the National Ocean Service – Office of Coast Survey (OCS), National Marine Fisheries Service – Coral Reef Ecosystem Division (CRED), and the U.S. Army Corps of Engineers (USACE) in order to provide contemporary hydrographic data to update the nautical charts and products in Honolulu Harbor and approaches to Honolulu, Hawaii. All supporting data from this project was acquired aboard the NOAA R/V Ahi by OCS representatives utilizing a RESON 8101 swallow water multibeam sonar system. CRED representatives assisted with daily vessel operations and data collection as necessary and a copy of all standard raw and processed bathymetric data was provided to CRED and USACE. This project provided contemporary hydrographic data to update the nautical charts in the area and support sound navigational decision-making for all mariners entering the channels and ports of Honolulu, HI.

## **A. AREA SURVEYED**

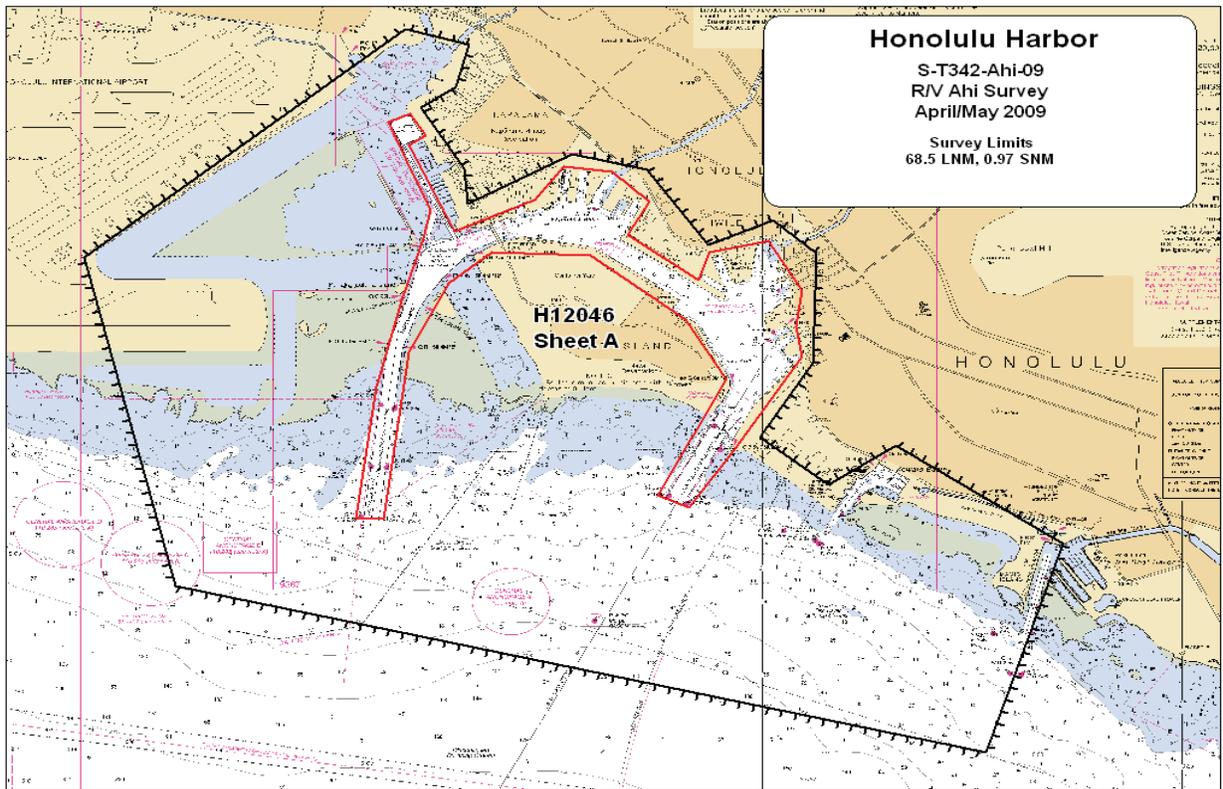
This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions S-T342-Ahi-09 dated March 17, 2009 and all other applicable direction<sup>1</sup>, with the exception of deviations noted in this report.

The survey area was located in the Honolulu Harbor and entrance channels to Honolulu Harbor, Hawaii. This survey corresponds to Sheet A in the sheet layout provided with the Letter Instructions, as shown in Figure 1 below.

Data acquisition was conducted from April 18 to May 3, 2009 (DN108 to DN122).

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<sup>1</sup> NOS Hydrographic Surveys Specifications and Deliverables (April, 2008), OCS Field Procedures Manual for Hydrographic Surveying (May 2008), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.



**Figure 1: H12046 Survey Area**

| H11674 Statistics                             |      |
|---|------|
| Linear Nautical Miles of Mainscheme Multibeam | 68.5 |
| Linear Nautical Miles of Cross-lines          | 9.2  |
| Total Square Nautical Miles                   | 0.97 |
|   |      |

**Table 1: H12046 Statistics**

Complete MBES coverage was obtained in the entire survey area with the exception of certain pier faces, slip(s), and berths where large moored ships, tug boats, and/or shoals prevented survey operations. The multibeam data was examined and shows no evidence of significant features in those areas. <sup>1</sup>

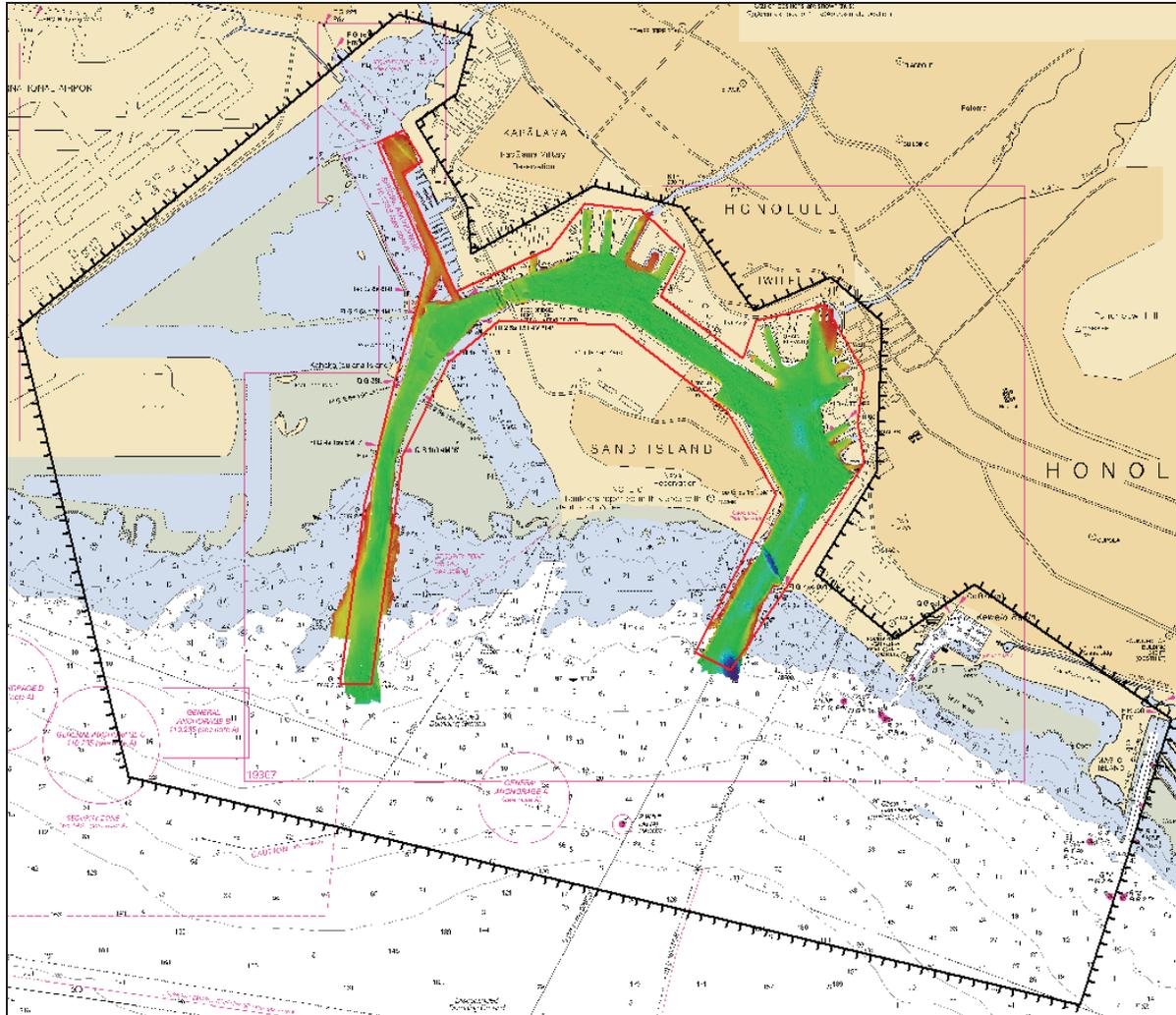


Figure 2: SWMB Coverage

## B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, the R/V AHI, quality control procedures and data processing methods are described in the *S-T342-Ahi-09 Data Acquisition and Processing Report (DAPR)*, submitted under separate cover. Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections.

A 0.8m Z-Value offset was applied to the CARIS .hvf file to correct for an ISS 2000 0.8m Settlement and Squat value. The value was included in the software upgrade that was installed just prior to the beginning of this survey.

**Final approved water levels were applied to this survey on June 15, 2009.** See Section C for additional information.

## B1. Equipment

R/V AHI was the only vessel used during survey H12046. Specifications for the AHI are listed in Table 2.

| R/V AHI                                     |                         |
|---|-------------------------|
| <b>Hull Registration Number</b>             | F-2505                  |
| <b>Builder</b>                              | Safe Boat International |
| <b>Length Overall</b>                       | 25 feet                 |
| <b>Beam</b>                                 | 10 feet                 |
| <b>Draft, Maximum</b>                       | 3.3 ft                  |
| <b>Cruising Speed</b>                       | 15 knots                |
| <b>Max Survey Speed</b>                     | 6 knots                 |
| <b>Primary Echosounder</b>                  | RESON 8101              |
| <b>Sound Velocity Equipment</b>             | SBE 19                  |
| <b>Attitude &amp; Positioning Equipment</b> | POS/MV V4               |
| <b>Type of operations</b>                   | MBES                    |

**Table 2: AHI Specifications**

No vessel configurations used during data acquisition deviated from the DAPR.

## B2. Quality Control

Data quality for survey H12046 was evaluated through examination of CUBE surfaces that were generated from raw soundings. Internal consistency and integrity of the data were manually examined by the Hydrographer in CARIS subset mode. Soundings and surfaces in overlapping coverage and outer beams were reviewed for systematic errors and excessive noise. The data were found consistent in comparisons between day-day, and line-line coverage.<sup>2</sup>

### Data Logging

At the location of the Survey in the Honolulu, midnight UTC occurred at 2:00 PM local time. DNs on acquisition logs and in CARIS are named according to the DN occurring after midnight UTC. For example, if data was logged beginning on DN113, starting at 10am local time, and continued past 2:00 pm local into DN114, data for that day was later separated into DN\_113 and DN\_114 respectively.

Due to the way data was logged in the ISS-2000 system, separate commands were required to stop data logging and change line names. The command to change line names was missed on several lines so that what should have been two separate lines appear as a single line in CARIS. These single lines do not contain data in the section connecting the line segments as logging had stopped in between lines.<sup>3</sup> An example of a line collected without changing line names is show in Figure 3.

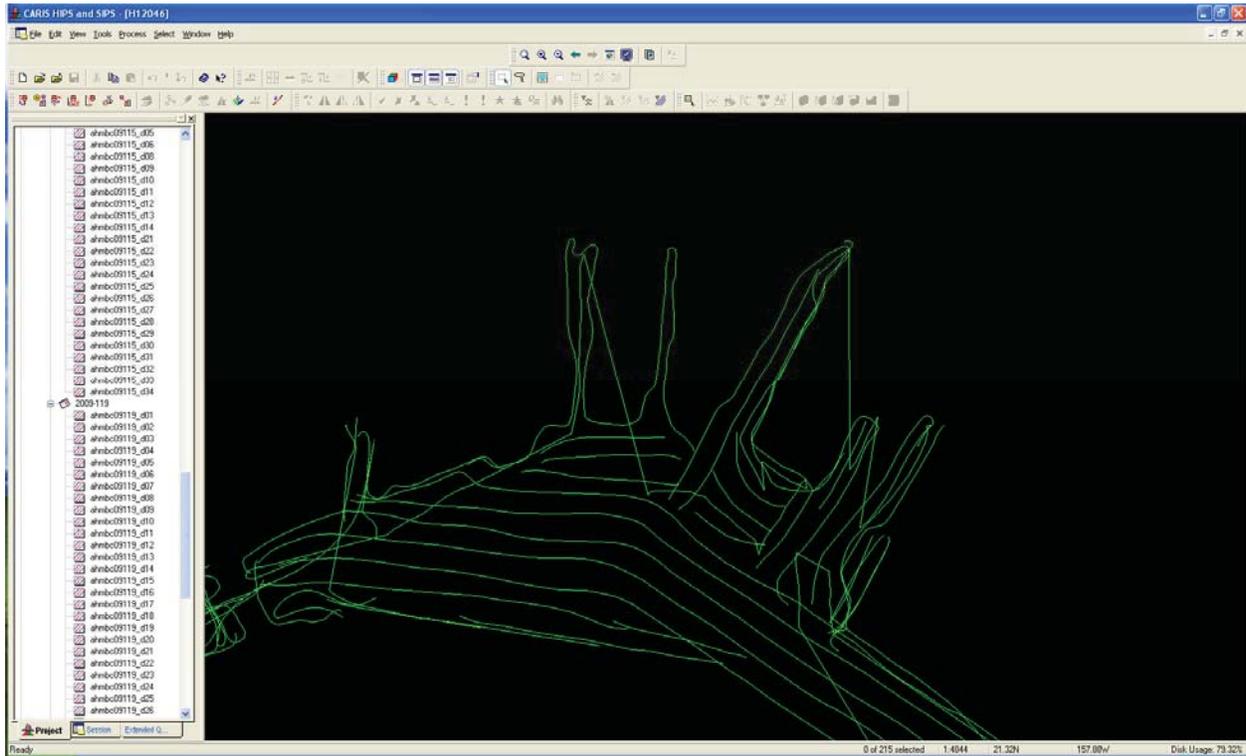


Figure 3 – Example of error in line logging.

## Crosslines

Multibeam crosslines totaled 9.2 linear nautical miles (lnm), comprising 13.4% of the 68.5 lnm of total MBES hydrography. The main scheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode and agreed well with differences of 0.4 meters or less. Greater variability was observed in the X-Lines comparison in the entrance channels, most likely related to the sloping topography of the dredged areas.<sup>4</sup>

Cross-line agreement with main scheme data meet the vertical accuracy requirements as stated in the *NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSDM)*.<sup>5</sup>

## Junctions

No contemporary surveys junction with H12046.<sup>6</sup>

## Coverage Assessment

Coverage assessment was determined using a one meter resolution BASE surface.

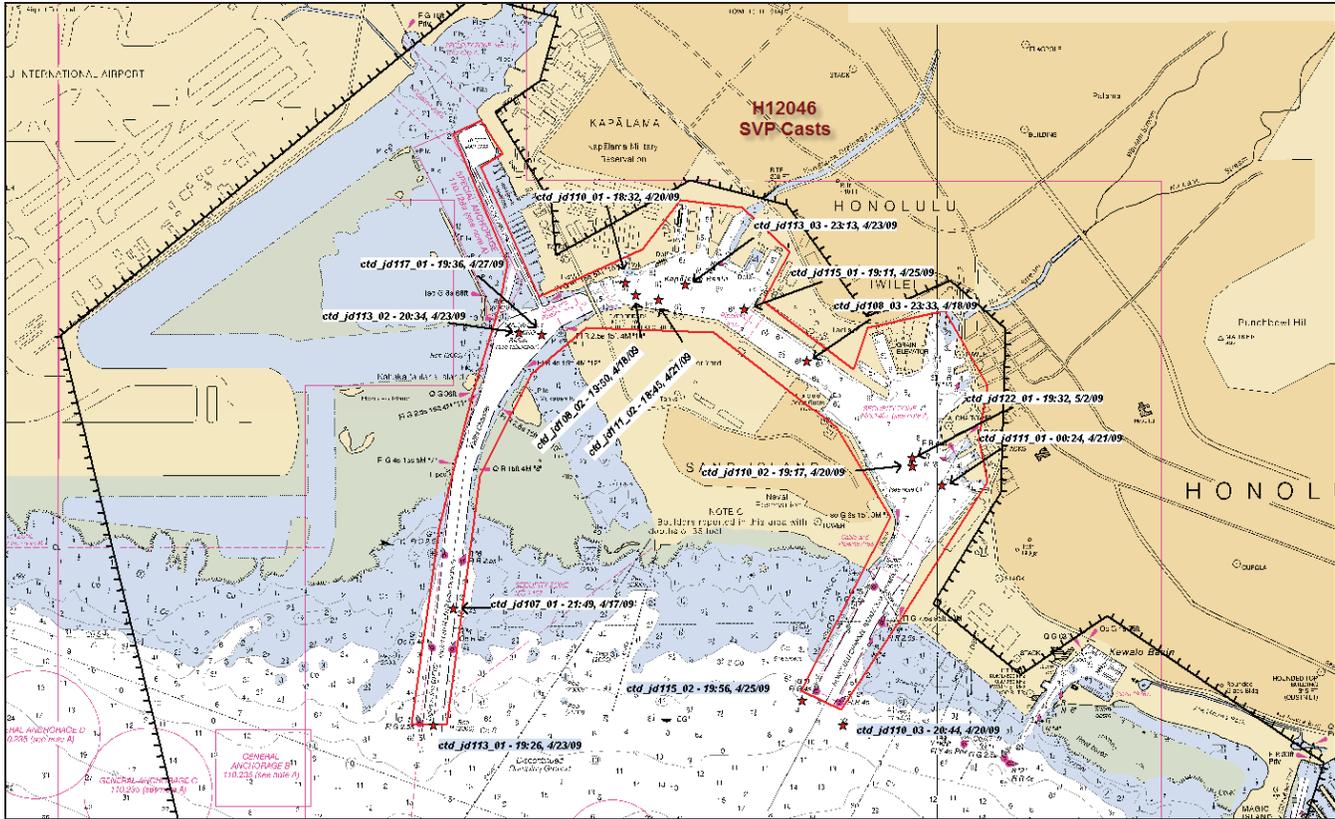
Several small holidays exist throughout the surface, mainly occurring in the outer beam areas between lines. All holidays were examined in CARIS using Subset Editor and Side Scan Editor for small features, no features or contacts were identified in the Side Scan Editor and the holidays were deemed insignificant.<sup>7</sup>

## Trueheave

True heave was collected for all data during survey operations for S-T342-Ahi-09. However, due to a bug in the CARIS software related to logging trueheave past the UTC time change,(which occurred at 2:00 pm local Honolulu time), the trueheave file(s) do not correctly apply to all of the data. Given the survey area and calm sea state, true heave was not applied to the DN\_109 and no significant heave artifacts were observed.<sup>8</sup>

## Sound Velocity

All sound velocity data were applied during data collection as described in the S-T342-Ahi-09 Data Acquisition and Processing Report. Sound velocity was not applied in CARIS and no CARIS .svp files exist for the survey. Sound velocity data remains in converted file (.cnv) format. The ISS-2000 software did not allow the extension of the sound velocity data based on the slope of the curve. As a result, CTDs were only taken in the deeper regions of the survey area where depths were deeper than the expected survey depth. The figure below displays the names, positions, and times for each CTD cast applied to H12046:



Raw Seacat (.hex) files and the .cnv files are located in Separate II - Sound Speed Data in the Separates for this report.

### Accuracy Standards

Uncertainty values in the CUBE surface were generally close to 0.2 meters. Uncertainty values exceeding 0.3 meters exist in isolated spots throughout the finalized CUBE surface and are the result of high standard deviation from steeply sloped bottom features such as the side of dredged areas or coral heads. Data from survey H12046 meet data accuracy specifications as stated in the *HSSDM*.<sup>9</sup>

### B3. Corrections to Echo Soundings

Data reduction procedures for survey H12046 conform to those detailed in the DAPR.

### B4. Data Processing

Data processing procedures for survey H12046 conform to those detailed in the DAPR.

A single fieldsheet was created to encompass survey H12046, and contains a single one meter CUBE surface, H12046\_1m\_Cube and one finalized surface, H12046\_1m\_Final. The fieldsheet area of coverage is shown in Figure 4.

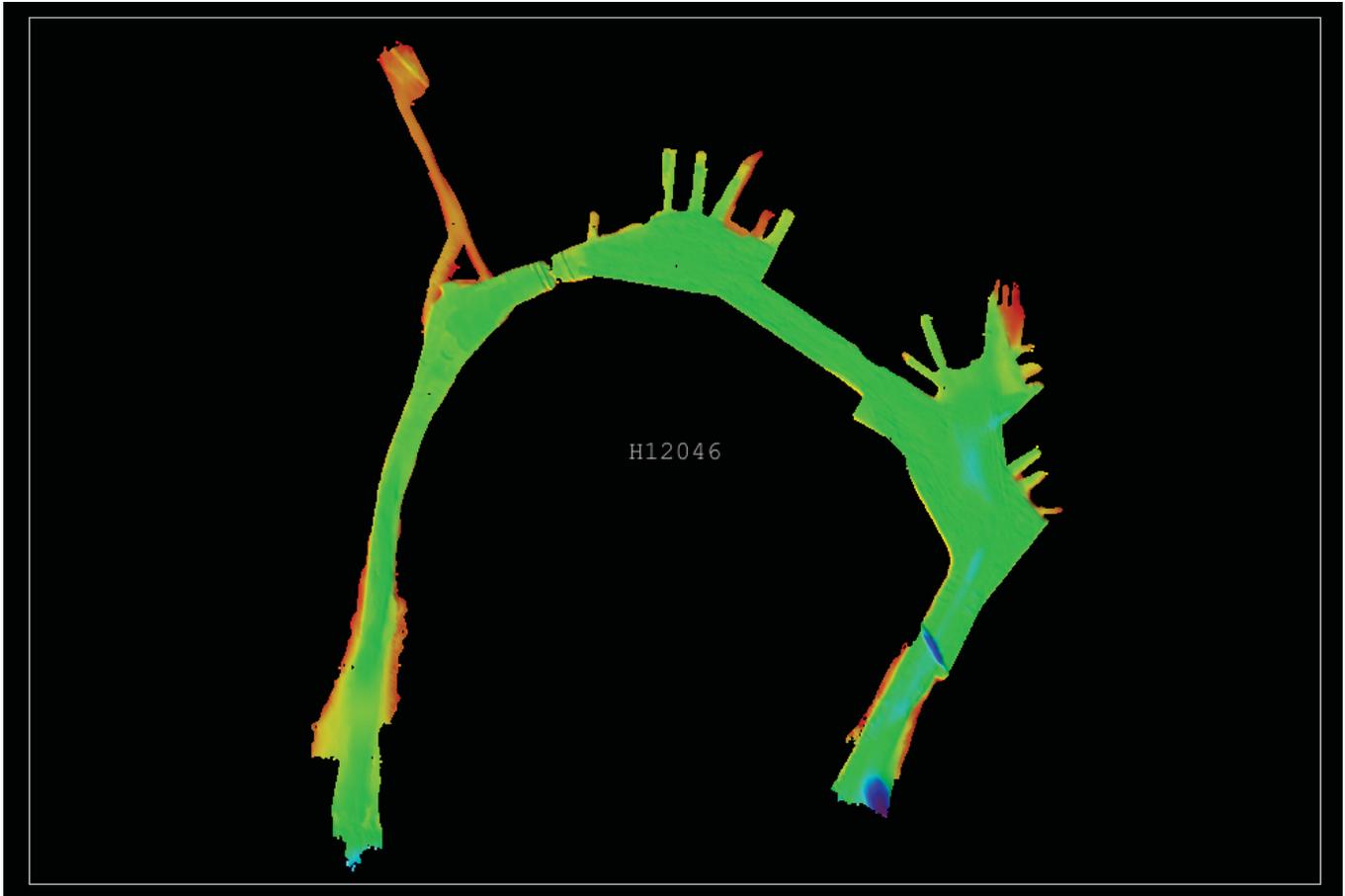


Figure 4 - Fieldsheet H12046

A one meter resolution BASE surface was chosen as the highest resolution surface the data would support without creating significant gaps in coverage.

### Designated Soundings

Soundings were designated on many of the coral heads, shoaling areas, and pilings/submerged obstructions in the survey area but not all. The most significant features in a particular area were selected for designated soundings reflecting their shoal point. Many other areas with less shoal depths were examined in the multibeam data but no soundings were designated on their shoal point. In these cases the least depth on the feature was adequately represented in the BASE surface or, if not, the least depth was not deemed significant in relation to nearby features whose shoal depths were designated. All designated soundings were selected based on a detailed examination of the multibeam data in subset mode. In general, noisy outer beam data was not selected as a designated sounding.<sup>10</sup>

### C. HORIZONTAL AND VERTICAL CONTROL

Horizontal control work was not done during Survey H12046 and a Horizontal and Vertical Control report was not written for this survey.

## **Horizontal Control**

The horizontal datum for this project is the World Geodetic System of 1984 (WGS84), Zone 4.

Horizontal position was determined using a Global Positioning System (GPS) corrected by U.S. Coast Guard differential GPS (DGPS) beacon stations. Beacons were selected by automatic range in the CSI Wireless, MBX-3S DGPS system.

No horizontal control stations were established for this survey and horizontal dilution of precision (HDOP) was monitored daily. The observed HDOP values did not exceed 4.0.

## **Vertical Control**

The vertical datum for this project is Mean Lower-Low Water (MLLW). The primary tide station at Honolulu, HI (161-2340) served as control for datum determination and as the primary source for water level correctors for survey H12046 during acquisition.

A request for delivery of final approved water level data (smooth tides) for survey H12046 was forwarded via email to N/OPS1 on May 14, 2009. A copy of the request is included in Appendix IV.

The Tide Note for Hydrographic Survey H12046 was received on June 12, 2009. The Tide Note for Hydrographic Survey H12046 states that preliminary zoning is accepted as the final zoning correctors. Final approved water levels consist of verified water level data downloaded from the CO-OPS website for station Honolulu in file 1612340.tid, and the tide zoning information in file T342AHI2009CORP.zdf. The Tide Note for Hydrographic Survey H12046 and ancillary correspondence are included in Appendix IV.<sup>11</sup>

It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during the survey acceptance review.

## **D. RESULTS AND RECOMMENDATIONS**

### **D.1 Chart Comparison**

Survey H12046 was compared with charts 19367 (39th Ed.; April, 2008, 1:5,000), 19369 (6<sup>th</sup> Ed.; October, 2006, 1:20,000), and 19357 (24<sup>th</sup> Ed.; June, 2008, 1:80,000).

#### **Chart 19367**

Depths from survey H12046 generally agreed within one to three feet with depths on chart 19367 with the specific exceptions described below.<sup>12</sup>

Shoaling is occurring in the Honolulu Entrance Channel near red Buoy #4, (R N“4”). A 23.6 ft sounding was designated at 21°17'40.28N - 157°52'15.51W. Shoaling is arching out approximately 40 ft. from the established channel limits. See Figure 5 & 6. <sup>13</sup>

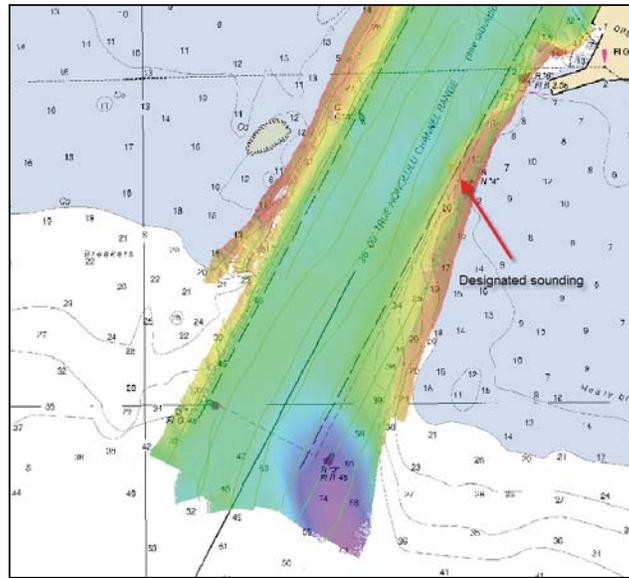


Figure 5

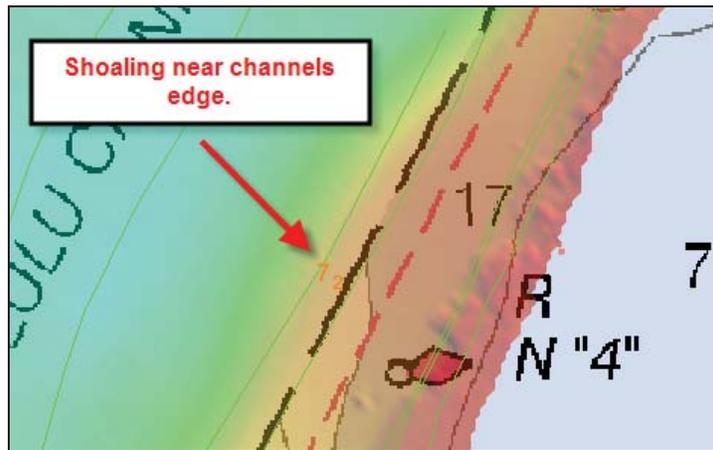


Figure 6

The charted sewer line running across the Honolulu Harbor Entrance Channel is mischarted.<sup>14</sup>  
See Figure 7

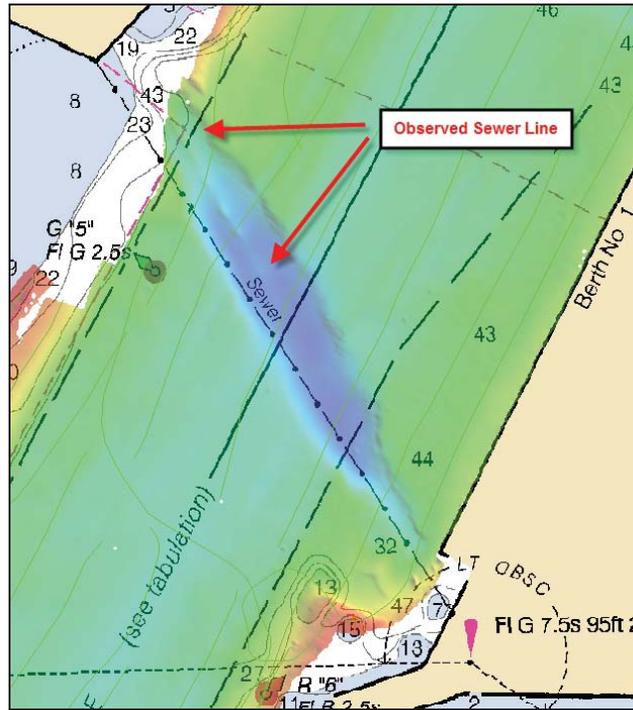


Figure 7

A 10.6 ft. sounding was designated over a charted 15 ft. sounding in the entrance to Honolulu Harbor at: 21-17-45.39n / 127-52-10.5w.<sup>15</sup> See Figure 8

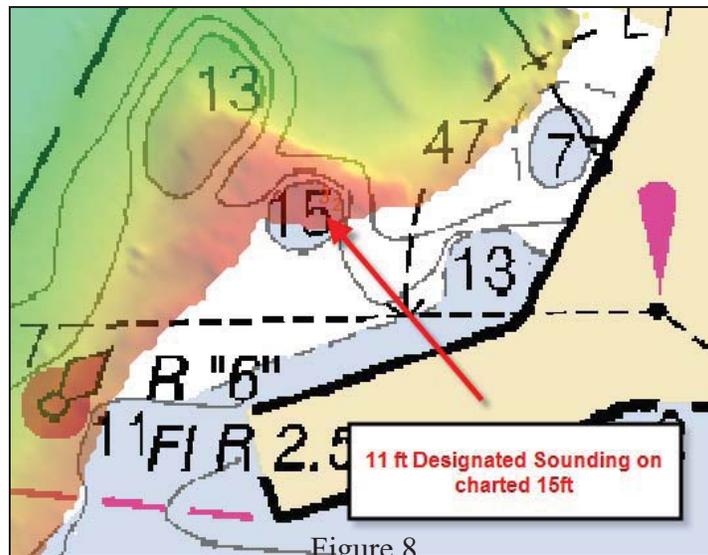


Figure 8

AWOIS number 53747 – *Subm obstn*, was not visible in the data, recommend removing the submerged obstruction symbol and text.<sup>16</sup> See Figures 9 & 10.



Figure 9

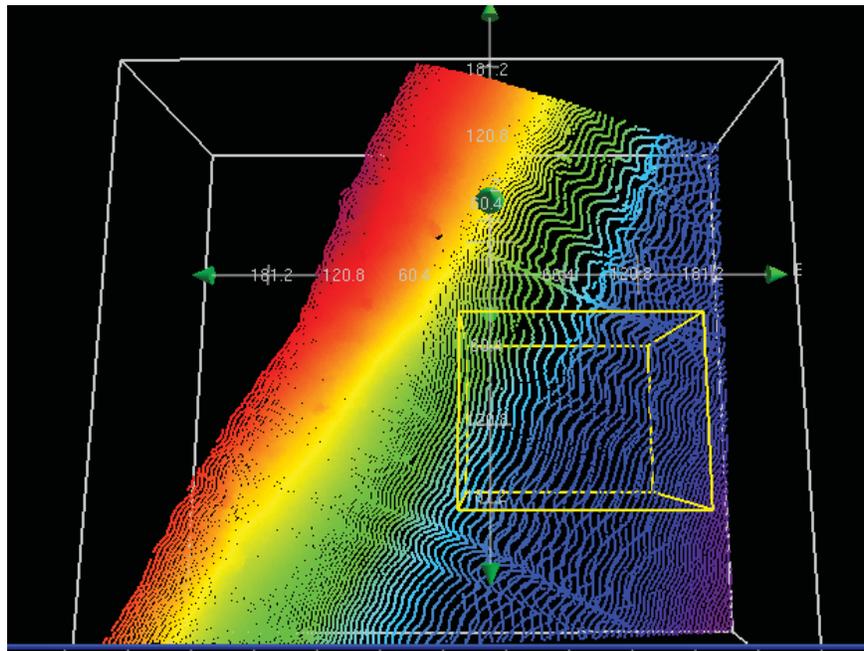


Figure 10



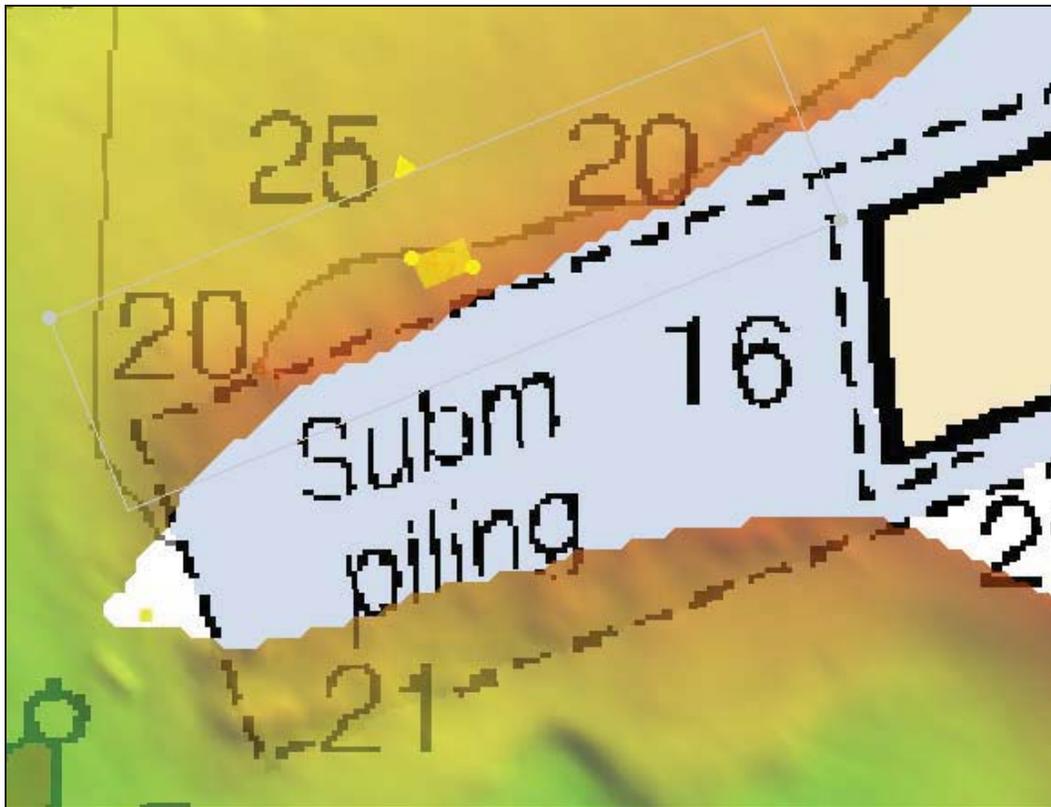


Figure 13

The charted Dol in front of Pier No 36 was not visible in the data, recommend removing the symbol and text "Dol" from: 21-18-57.14 n / 157-52-40.94 w.<sup>19</sup> See figure 14

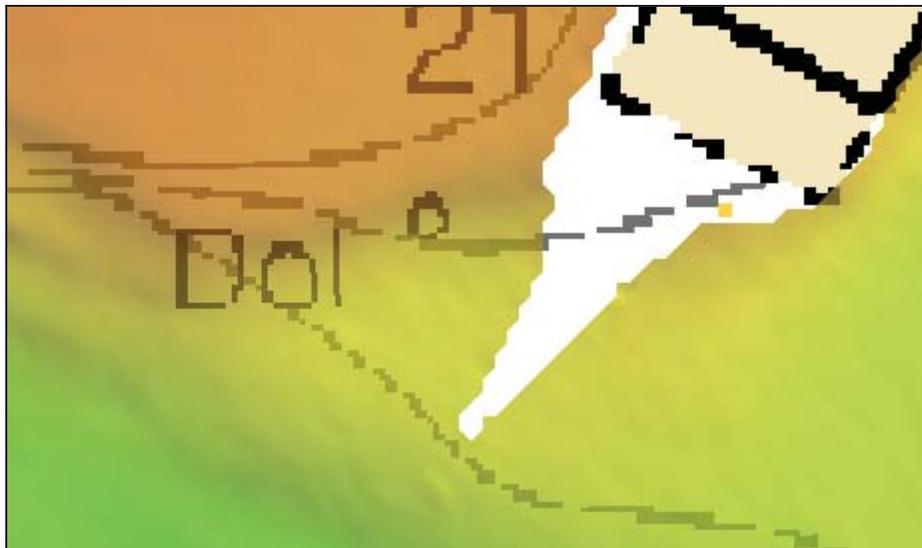


Figure 14

Four charted Dolphins in front of Pier No. 37 where not visible in the data, recommend removing the symbol(s) and text “Dolphins” from the chart. <sup>20</sup> See Figure 15

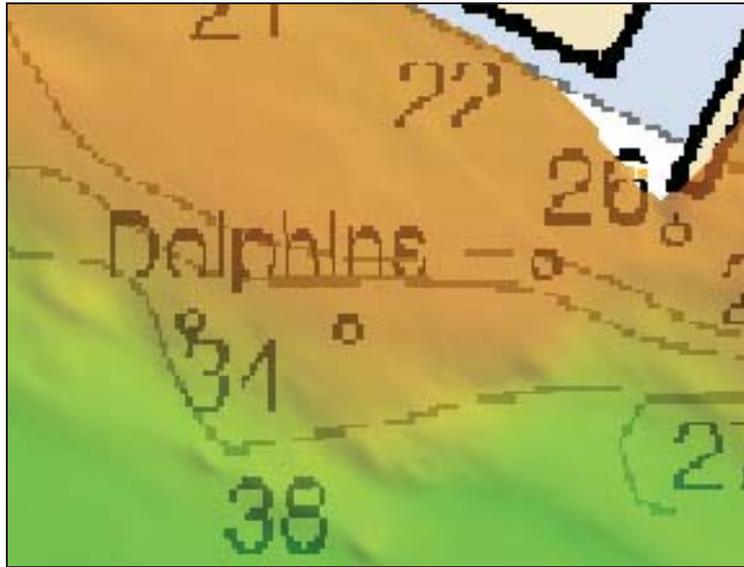


Figure 15

The charted dolphin in front of the Dry Dock, near Berth No. 40 was not visible in the data, hydrographer recommends removing the symbol and text “Dol” at approximately: 21-19-00.62 n / 157-52-58.62w. <sup>21</sup> See Figure 16

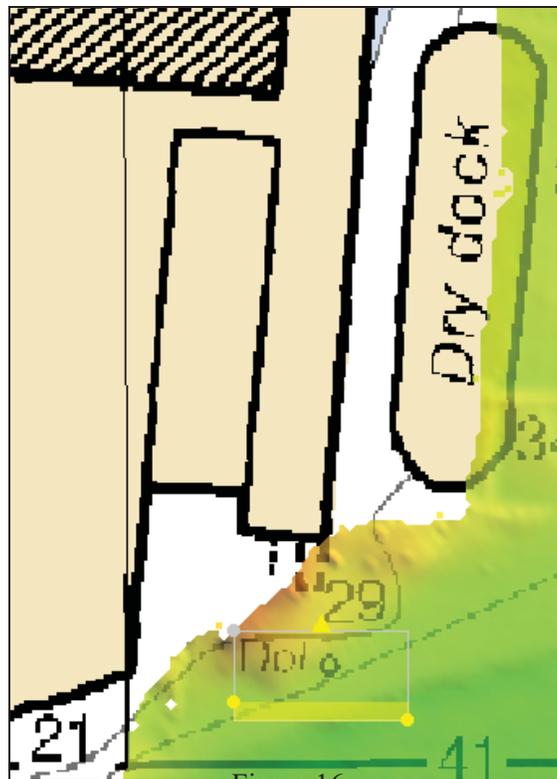


Figure 16

An uncharted submerged wreck or obstruction was located along the shoreline between Berth No. 45 and Berth No 40C. A 19.4ft sounding was designated on the shoal point at 21-18-59.43n / 157-53-02.68w. The object resembles a small barge or platform and is located along the shoreline posing little threat to vessel traffic in the Kapalama Basin.<sup>22</sup> See Figures 17 & 18

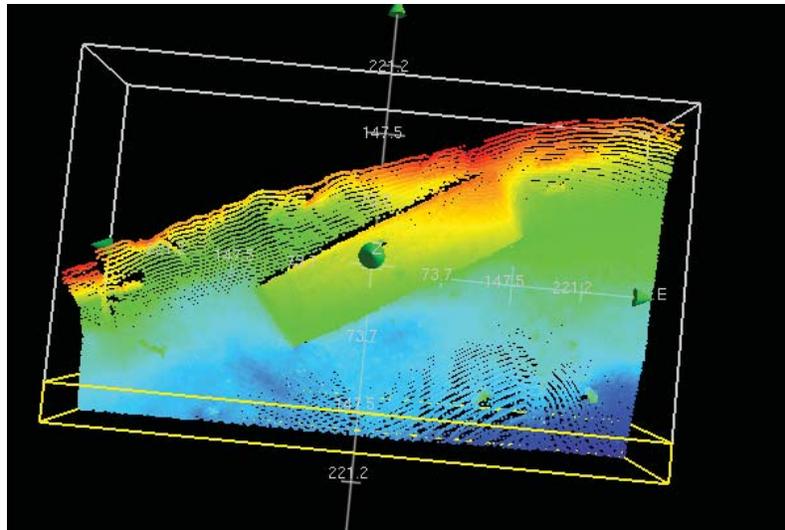


Figure 17

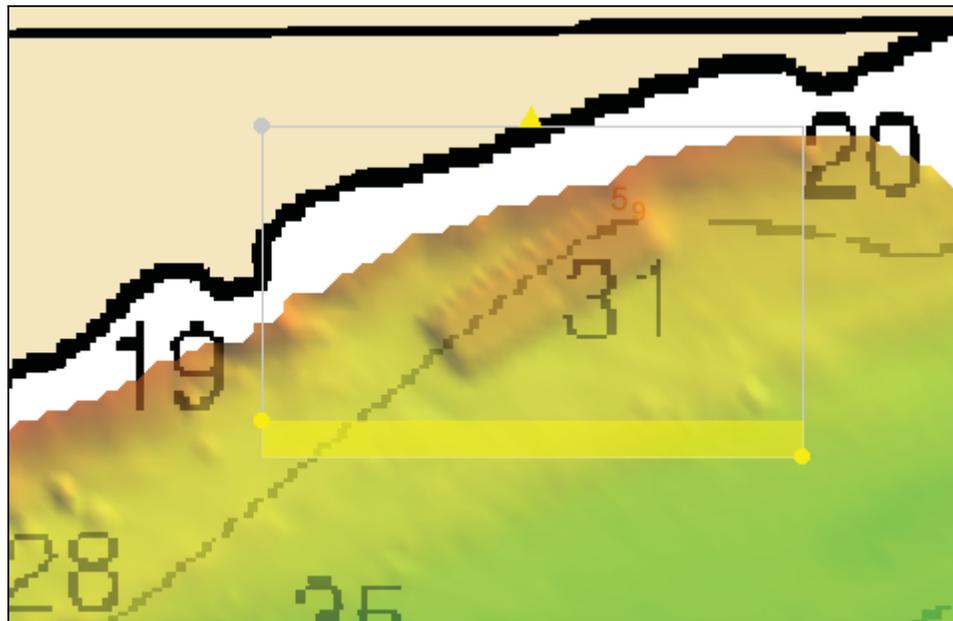


Figure 18

Possible submerged obstruction with a 22.9 ft designated sounding at: 21-18-57.69n / 157-53-4.49w. Item is located near the shoreline just outside the 30ft contour, which is currently mischarted and will need to be re-aligned with the updated sounding data.<sup>23</sup> See Figures 19 & 20

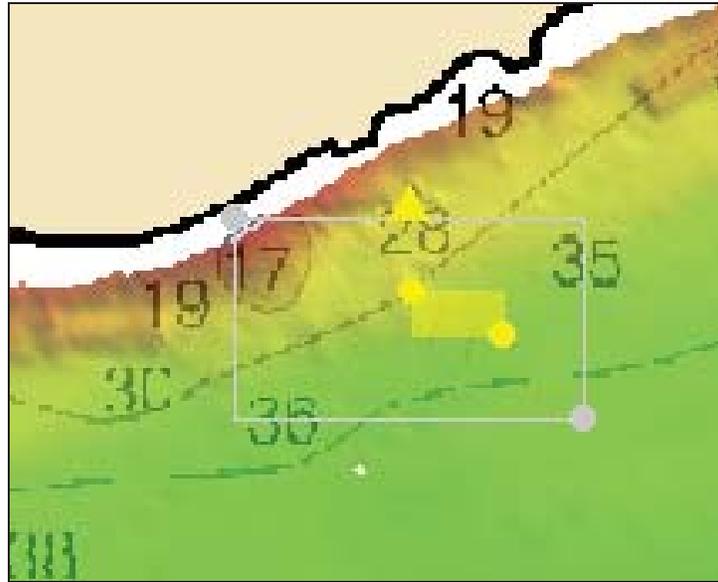


Figure 19

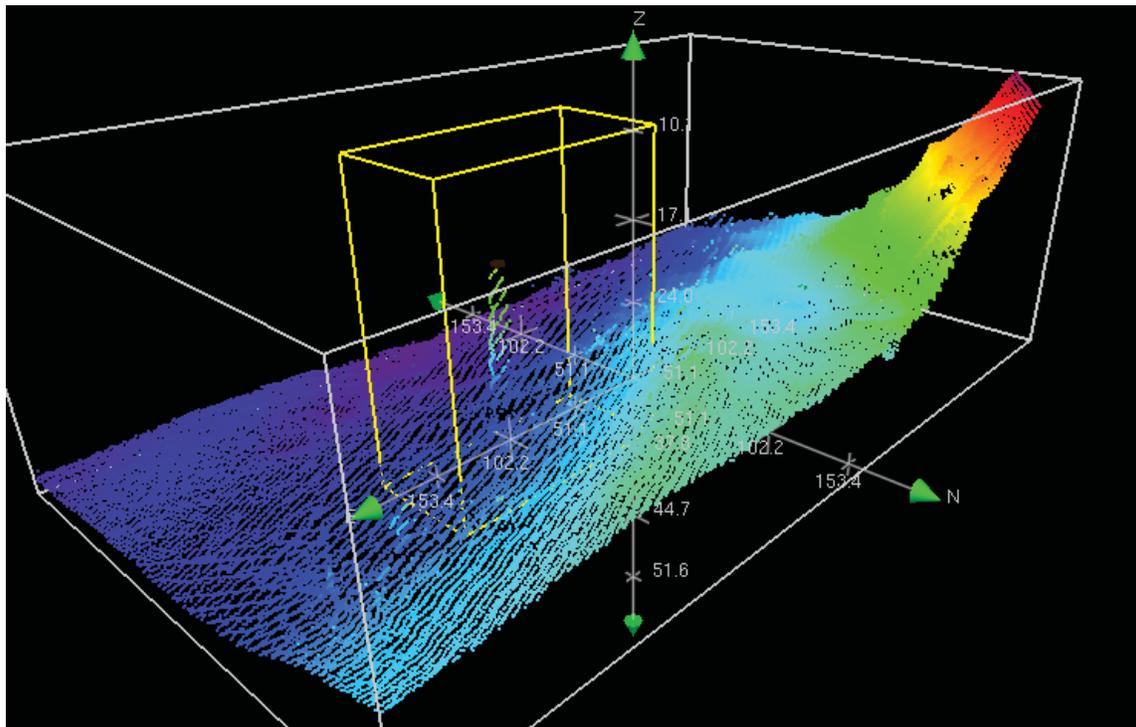


Figure 20

An uncharted obstructed was located in the data just East of the bridge. A designated sounding of 20.65 ft was selected in position: 21-18-54.9 n / 157-53-14.9w. Item is located along shore just outside of a 30ft. contour and appears to be a dredge mound from the nearby cable and pipeline area.<sup>24</sup> See Figures 21 & 22

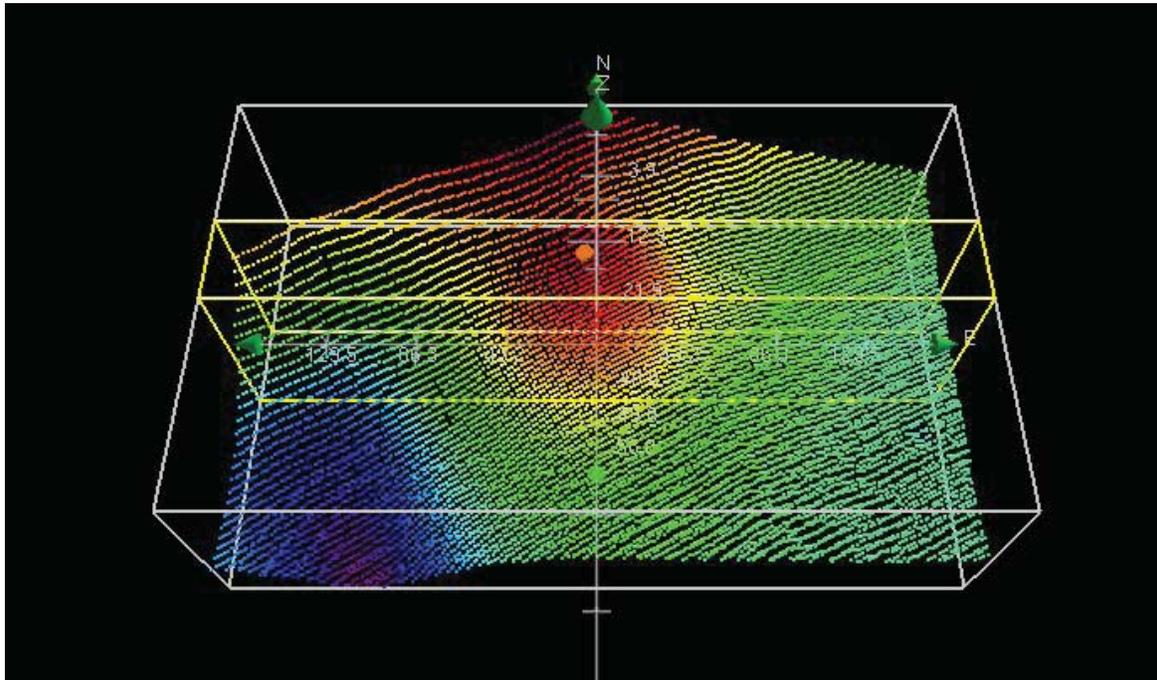


Figure 21

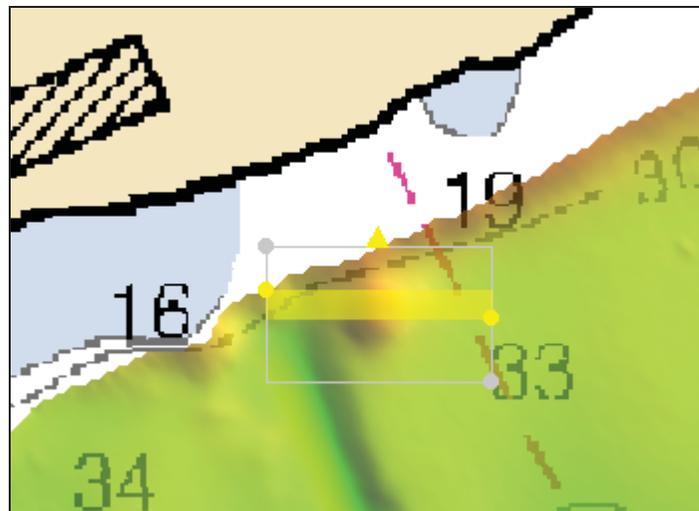


Figure 22

Obstruction located under the bridge with a designed sounding depth of 21.1 ft at 21-18-51n / 157-53-17w. Obstruction appears to be a large mound, but does not pose significant danger to surface navigation as this feature is located under a fixed bridge with a 14 ft. clearance. The shoal point is 21.1 ft and the surrounding depths are in the mid 30's, however, the bridge clearance limits vessel traffic with any significant draft.<sup>25</sup> See Figure 23

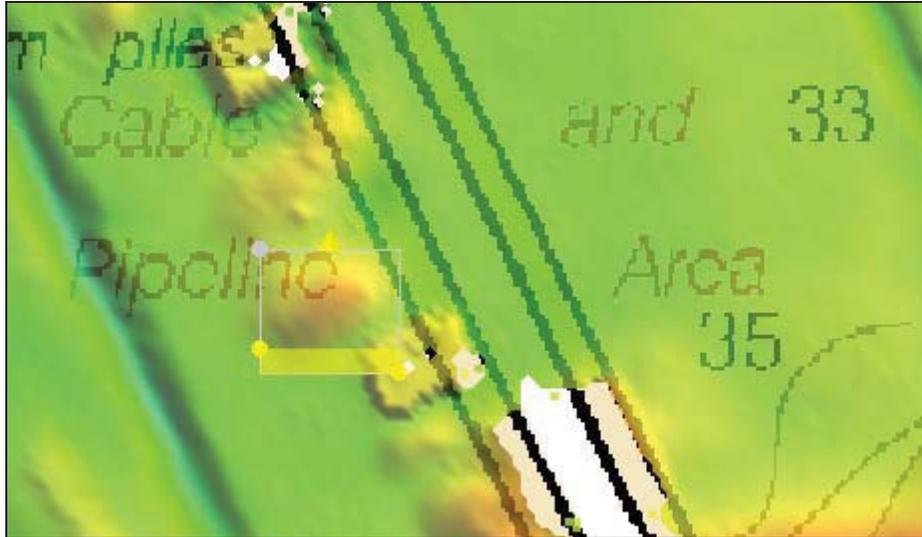
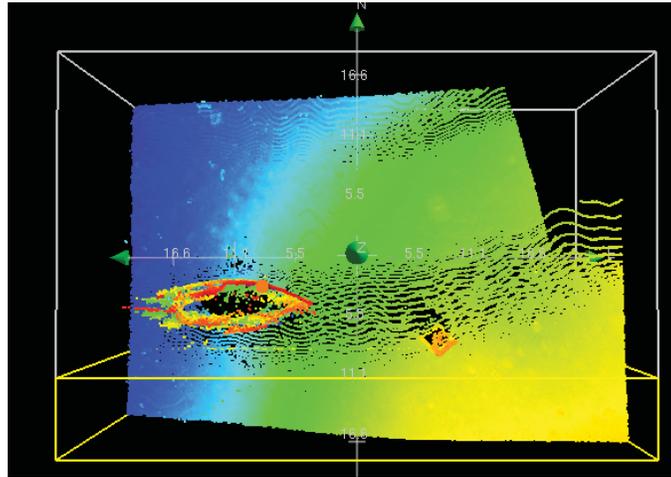


Figure 23

Visible wreck located in anchorage area, centered approximately: 21-18-52.7 n / 157-53-34.3w. Two mast's are visible above the water line at all times and stages of the tide cycle.<sup>26</sup> See Figures 24 & 25



**Figure 24**



**Figure 25**

Four uncharted submerged wrecks were located within the anchorage area to the west of the Keehi Lagoon Barge Channel, this particular area is known by the local mariners to have numerous uncharted wrecks.<sup>27</sup> Soundings were designated on each wreck on the shoalest point of the wreck using CARIS Sub-set Editor.

Each wreck is described below, refer to Figure 26 for reference.

- |   |   |
|---|---|
| <ol style="list-style-type: none"><li>1. Approximately 60 ft x 20 ft,<br/>Designated sounding depth of 17.9 ft<br/>21-18-54.1n / 157-53-35.2w</li><li>2. Approximately 60 ft x 20 ft,<br/>Designated sounding depth of 12.7 ft<br/>21-18-52.1n / 157-53-35.2w</li></ol> | <ol style="list-style-type: none"><li>3. Approximately 45 ft x 20 ft,<br/>Designated sounding depth of 16.5 ft<br/>21-18-52.1n / 157-53-37.2w</li><li>4. Approximately 60 ft x 20 ft,<br/>Designated sounding depth of 11.6 ft<br/>21-18-49.7n / 157-53-37.1w</li></ol> |
|---|---|

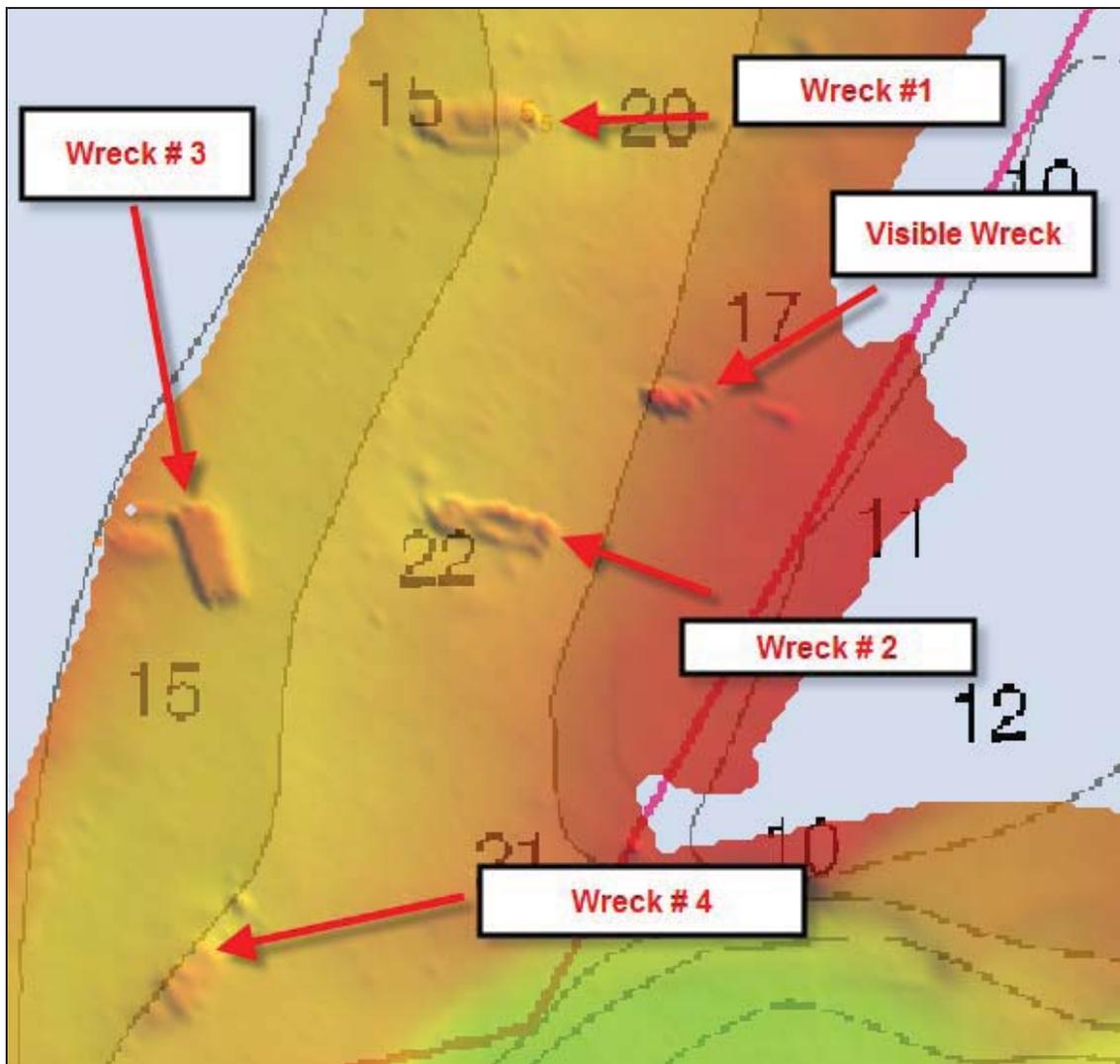


Figure 26

The charted obstruction in position: 21-18-47.9 / 157-53-36.2 is charted correctly, remove the text *Rep (2000)*.<sup>28</sup> See Figure 27

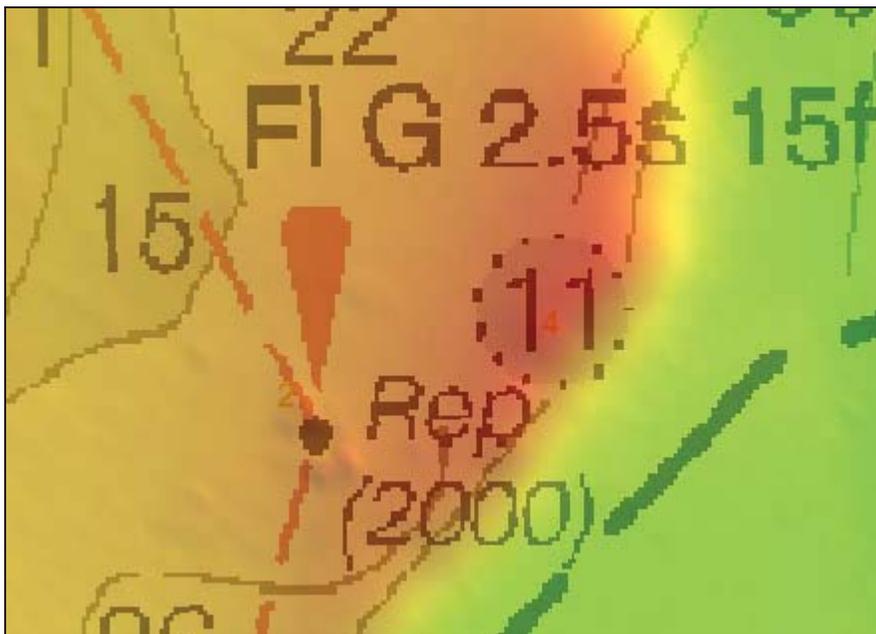


Figure 27

The two charted dolphins in front of Wharf 1 are not visible in the data and should be removed from the chart. Position Approximately: 21-18-18.9 / 157-52-15.6<sup>29</sup> See Figure 28

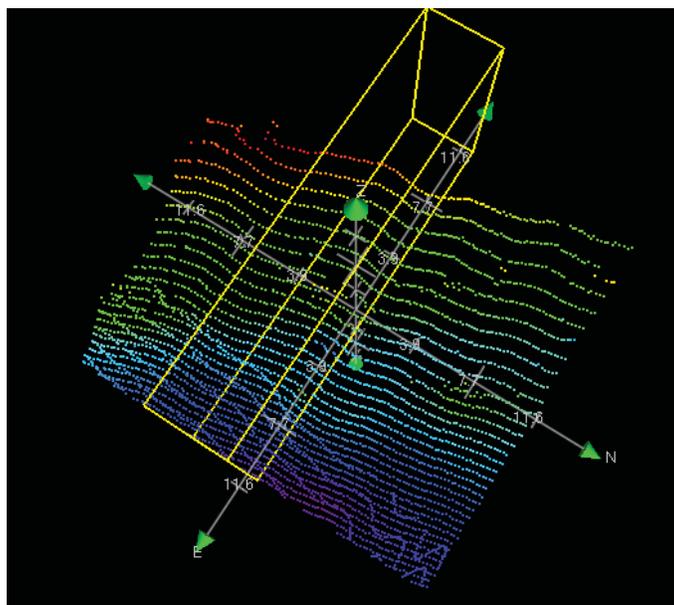


Figure 28

Three charted dolphins in position (approximately center position of the three dols) 21-18-16.3 / 157-52-14.3 are not visible in the data and should be removed from the chart.<sup>30</sup> See Figure 29, 30, & 37

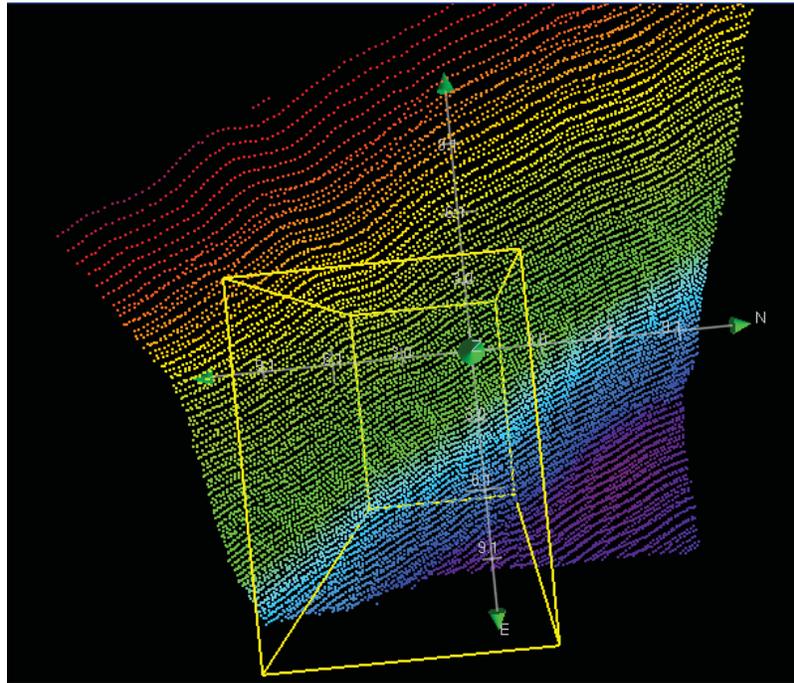


Figure 29

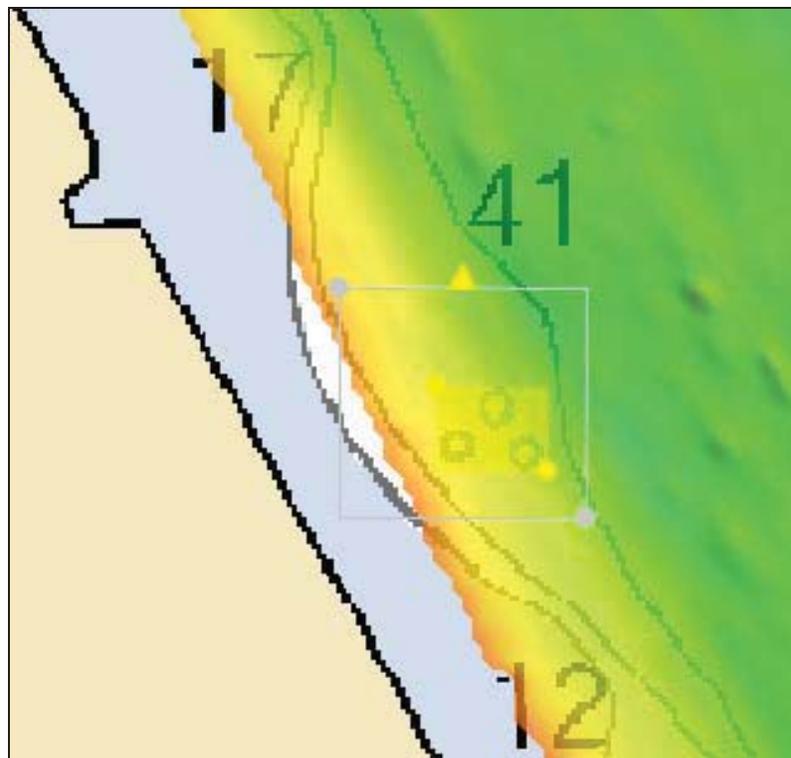


Figure 30

Three charted dolphins in position (approximately center position of the three dols) 21-18-14.5 / 157-52-13.3 are mis-charted, the shoalest sounding on the group of five dolphins was designated, position: 21-18-14.9 / 157-52-13.8.<sup>31</sup> See figure 31, 32, & 37

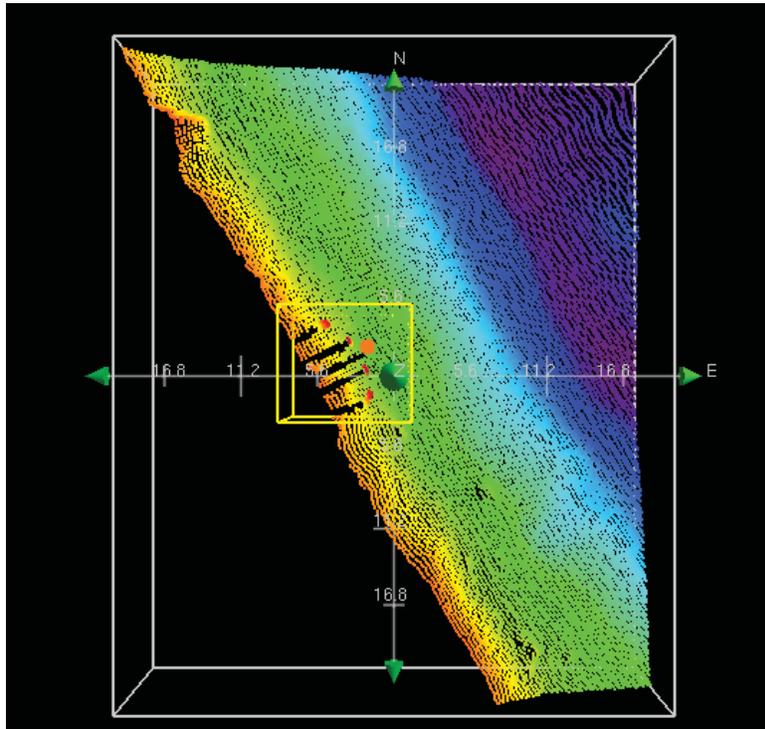


Figure 31

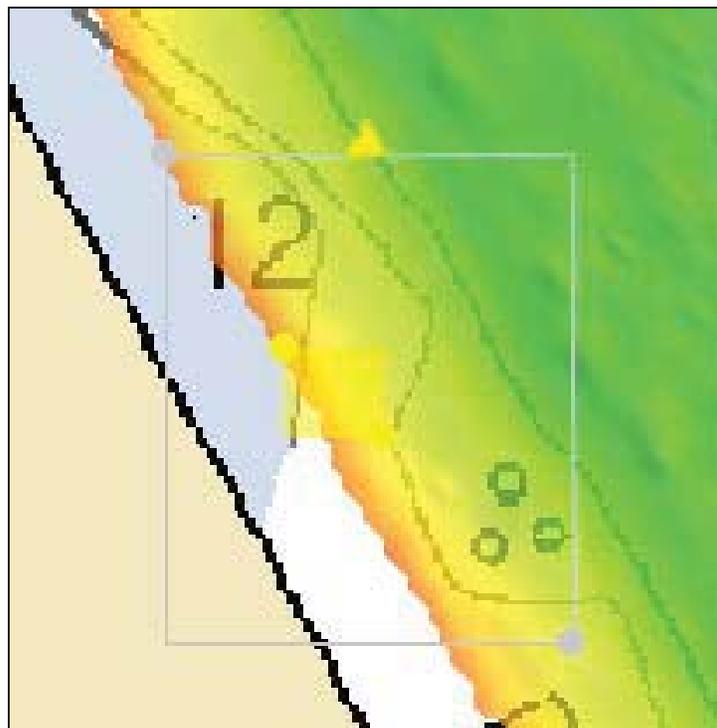


Figure 32

Three charted dolphins are mis-charted , in position (approximately center position of the three dols) 21-18-11.7 / 157-52-11.7 - the shoalest sounding on the group of five dolphins was designated using CARIS Sub-Set Editor, position: 21-18-12 / 157-52-12.<sup>32</sup> See figure 33, 34, & 37

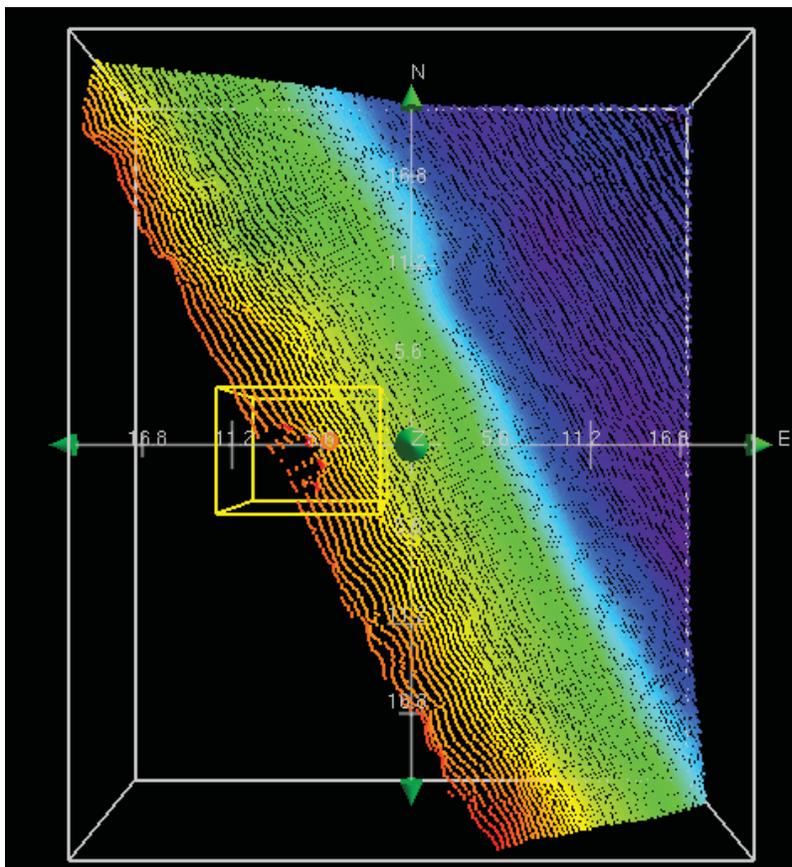
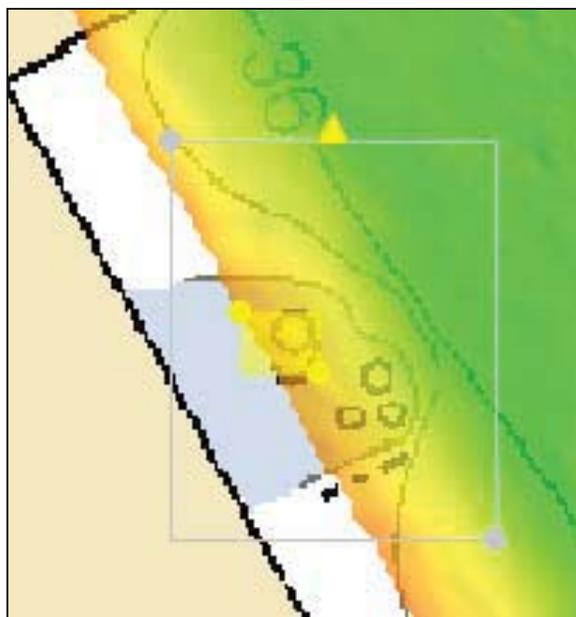


Figure 33



Three charted dolphins in position (approximately center position of the three dols) 21-18-10.7 / 157-52-11.1 are not visible in the data and should be removed from the chart. <sup>33</sup> See Figure 35, 36 & 37

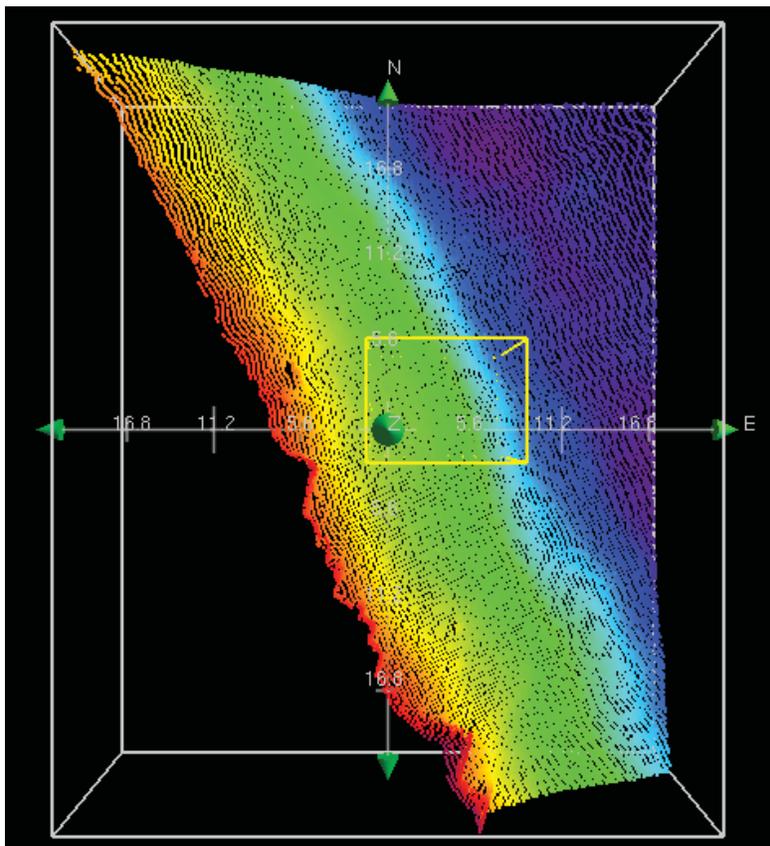


Figure 35

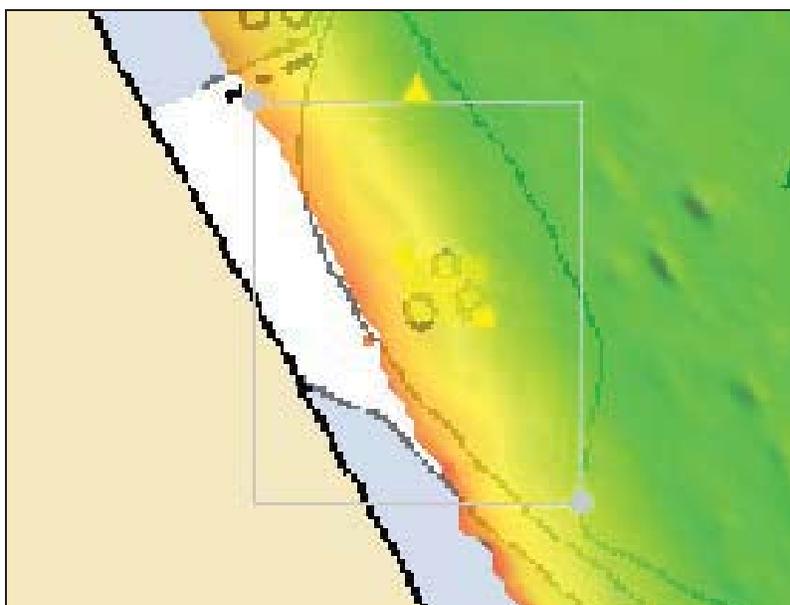


Figure 36

Figure 37 is a screen grab from CARIS displaying all four Dolphin groups described in figure's 29 – 36. Figure 37 is provided for reference purposes only.

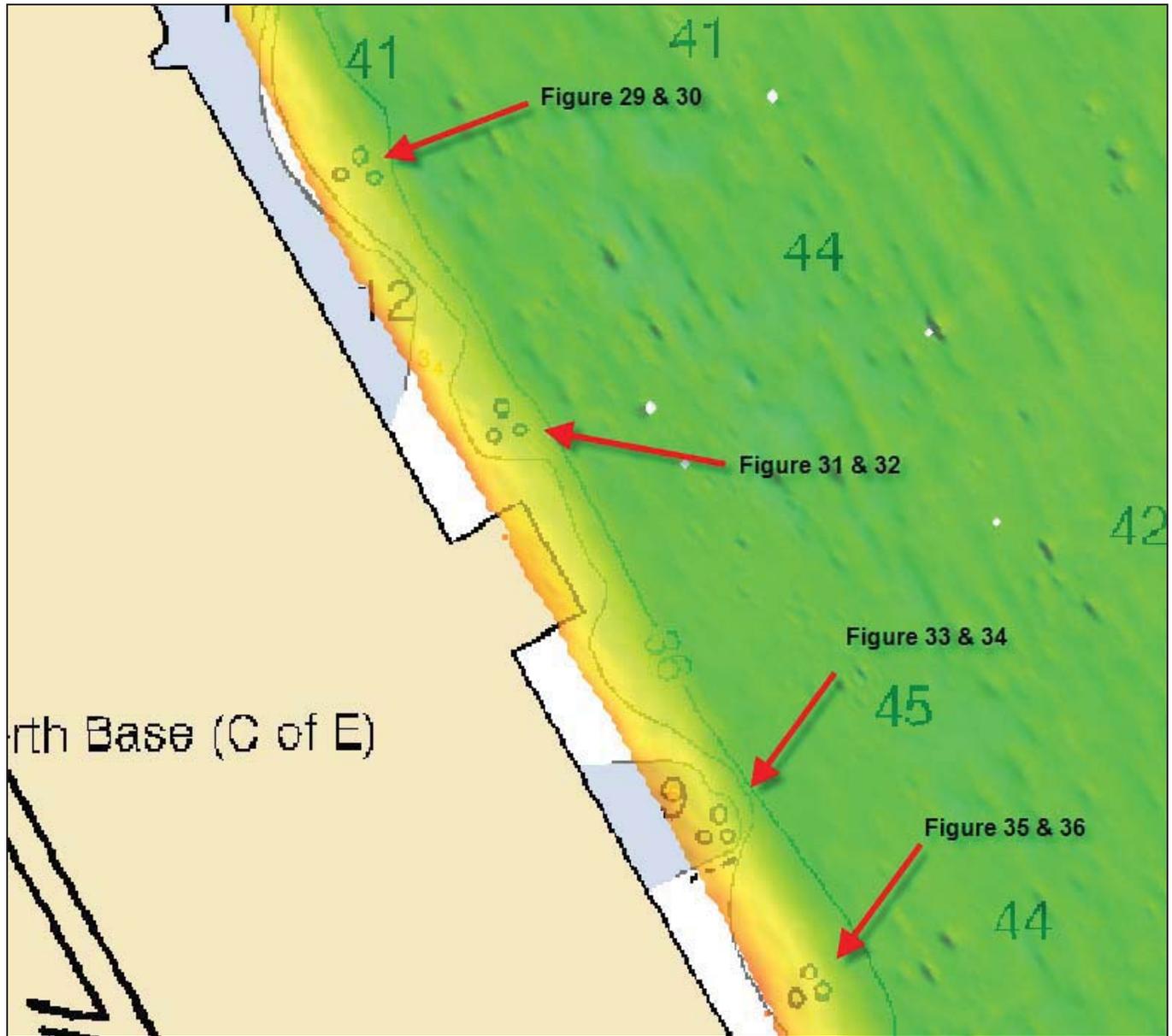


Figure 37

### Chart 19369

Chart 19369 is a 1:20,000 scale chart and contains a limited amount of soundings in the survey area. Due to the scale of the chart, a sounding comparison was impractical, but soundings generally agree within one to three feet of the surveyed depths.<sup>34</sup>

### Chart 19357

Chart 19357 is a 1:80,000 scale chart and does not contain sounding data in the survey area. Due to the scale of the chart, a sounding comparison was not possible. The ATON positioning, shoreline, and channel limits are all in agreement with the data from survey H12046.<sup>35</sup>

Refer to Appendix II. Survey Features Report for a Pydro generated report detailing the findings and recommendations for five non-dangerous, submerged, uncharted wrecks and one non-dangerous, visible uncharted wreck.<sup>36</sup>

### Chart Comparison Recommendations

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the *HSSDM*. **The surveyed soundings are adequate to supersede prior surveys in their common areas.**<sup>37</sup> Based on the application of verified water level data, final chart comparisons are not required by the Pacific Hydrographic Branch.

### Automated Wreck and Obstruction Information System (AWOIS) Investigations

Three AWOIS items were assigned to S-T342-Ahi-09, sheet H12046 for full investigation. Refer to Appendix 1 for details.<sup>38</sup>

### Dangers to Navigation

One DTON report was generated and submitted to PHB on 6/24/09 for this survey. Refer to Appendix VI. For the full DTON Report.<sup>39</sup>

## D.2 Additional Results

### Prior Survey Comparison

Survey H12046 was compared to the 2000 – 2002 U.S. Naval Hydrographic Office Lidar and Multibeam surveys W00100 & W00101. Sounding data from W00100 & W00101 overlapped with H12046 in the main entrance channels into Honolulu Harbor, HI. Depths from survey H12046 are in general agreement with these prior surveys within 1-3 feet. General trends in the bathymetry from W00100 & W00101 were in agreement with H12046.

### Shoreline Verification and Processing

Shoreline verification was not required or performed for survey H12046.<sup>40</sup>

**Aids to Navigation**

All aids to Navigation were positioned accurately and found to serve their intended purpose.<sup>41</sup>

**Bottom Samples**

Bottom samples were not required for survey H12046.<sup>42</sup>

**Submarine Cables and Pipelines**

There are two charted submerged cable and pipeline areas and one charted pipeline area within the survey limits. No noticeable discrepancies were observed.<sup>43</sup>

Descriptions begin from the eastern portion of the survey area and moving to the west:

1. Cable and Pipeline area between Sand Island and Berth No. 1 in the East Entrance Channel centered at: 21-17-57.84 N / 157-52-22.29W.
2. Pipeline area running between Berth No. 52 on Sand Island and Berth No. 33, centered at: 21-18-47.07 / 157-52-41.04.
3. Cable and Pipeline area between the Emergency Turning Basin and the Kapalama Basin in the West Entrance Channel centered at: 21-18-52.09 N / 157-53-16.72W

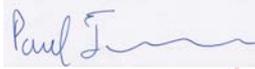
**E. APPROVAL**

As team leader, field operations for hydrographic survey H12046 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2008 edition), Field Procedures Manual (May 2008 edition), and all HSD Technical Directives issued through May 2009. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required . All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

| <u>Title</u>   | <u>Date Sent</u> | <u>Office</u> |
|--|------------------|---------------|
| AHI_HSRR_Memorandum                                  | April 25, 2009   | N/CS34        |
| S-T342-Ahi-09 Data Acquisition and Processing Report | May 6, 2009      | N/CS34        |

Approved and Forwarded:



Paul Turner  
I am the author of this document  
2009.06.24 15:44:19 -04'00'

---

Paul Turner, Physical Scientist, NOAA

In addition, the following individual was responsible for project support and assisting with data acquisition and processing of this survey:



Digitally signed by Kurt Brown  
Date: 2009.06.24 12:00:37 -07'00'

---

Kurt Brown  
Physical Scientist, NOAA

## Revisions Compiled During Office Processing and Certification

<sup>1</sup> Concur.

<sup>2</sup> Concur.

<sup>3</sup> Concur.

<sup>4</sup> Concur.

<sup>5</sup> Concur.

<sup>6</sup> Do not concur. H12046 junctions with survey H12047 from the same project. The surveys are in agreement along their common borders

<sup>7</sup> Concur.

<sup>8</sup> Concur.

<sup>9</sup> Concur.

<sup>10</sup> Concur.

<sup>11</sup> See attached Tide Note.

<sup>12</sup> Concur with hydrographer recommendations on the exceptions listed under chart comparison unless otherwise noted. Chart items per HCell.

<sup>13</sup> Concur but recommended that the tabulated depths for the channel be updated with the latest survey information which may be from the US Army Corps of Engineers. Shoaling is also occurring in the in the upper reaches of the Emergency Turning Basin near 21-18-49.20N 157-53-17.75W, 21-18-51-.03N 157-53-16.94W and 21-18-52.58N 157-53-20.74W. HCell Soundings were brought forward in the Emergency Turning Basin but recommend that the depths for the channel be updated with the most recent survey information which may be from the US Army Corps of Engineers.

<sup>14</sup> Concur. Pipeline is offset approximately 15m. Recommend recharging per HCell.

<sup>15</sup> Concur, chart per HCell.

<sup>16</sup> Concur, see attached AWOIS Report.

<sup>17</sup> Chart new extents of foul area and foul ground per HCell.

<sup>18</sup> Concur, chart per HCell.

<sup>19</sup> Concur, recommend removing Dol.

<sup>20</sup> Concur, recommend removing Dolphins.

<sup>21</sup> Concur, recommend removing Dol.

<sup>22</sup> Concur, chart new non dangerous wreck per HCell.

<sup>23</sup> Concur, chart per HCell.

<sup>24</sup> Concur, chart per HCell.

<sup>25</sup> Concur, chart per HCell.

<sup>26</sup> Concur, chart per HCell.

<sup>27</sup> Concur, chart wrecks per HCell.

<sup>28</sup> Do not concur. A least depth on 13 feet was found over charted obstruction. A shoaler obstruction with least depth of 8.996 feet is located approximately 20m SW of charted obstruction at 21-18-79N 157-53-61W. Recommend removing charted obstruction and charting new obstruction per HCell.

- 29 Concur, recommend removing.
- 30 Concur, recommend removing.
- 31 Concur, chart per HCell.
- 32 Concur, chart per HCell.
- 33 Concur, recommend removing.
- 34 Concur.
- 35 Concur.
- 36 See attached Features Report.
- 37 Concur.
- 38 See attached AWOIS Report.
- 39 See attached DTON Report.
- 40 Concur.
- 41 Concur, use latest ATONIS information
- 42 Concur.
- 43 Concur.

# S-T342-Ahi-09

**Registry Number:** H12046  
**State:** Hawaii  
**Locality:** North Pacific Ocean  
**Sub-locality:** Honolulu, HI  
**Project Number:** S-T342-Ahi-09  
**Survey Date:** 04/25/2009

Significant shoaling occurring by Red Buoy "4" on the edge of the Honolulu Harbor Entrance Channel.

## Charts Affected

| Number | Edition | Date       | Scale (RNC)           | RNC Correction(s)*  |
|--------|---------|------------|-----------------------|---|
| 19367  | 39th    | 04/01/2008 | 1:5,000 (19367_1)     | USCG LNM: 05/13/2008 (01/20/2009)<br>NGA NTM: 12/13/2003 (01/31/2009) |
| 19369  | 6th     | 10/01/2006 | 1:20,000 (19369_1)    | [L]NTM: ?   |
| 19357  | 24th    | 06/01/2008 | 1:80,000 (19357_1)    | USCG LNM: 12/16/2008 (01/20/2009)<br>NGA NTM: 07/05/2008 (01/31/2009) |
| 19340  | 27th    | 03/01/2008 | 1:250,000 (19340_1)   | [L]NTM: ?   |
| 19004  | 38th    | 05/01/2006 | 1:600,000 (19004_1)   | [L]NTM: ?   |
| 19010  | 19th    | 10/01/2006 | 1:675,000 (19010_1)   | [L]NTM: ?   |
| 19013  | 18th    | 11/01/2006 | 1:675,000 (19013_1)   | [L]NTM: ?   |
| 19007  | 18th    | 12/01/2006 | 1:1,650,000 (19007_1) | [L]NTM: ?   |
| 540    | 19th    | 04/01/2008 | 1:3,121,170 (540_1)   | [L]NTM: ?   |
| 530    | 32nd    | 06/01/2007 | 1:4,860,700 (530_1)   | [L]NTM: ?   |
| 50     | 6th     | 06/01/2003 | 1:10,000,000 (50_1)   | [L]NTM: ?   |

\* Correction(s) - source: last correction applied (last correction reviewed--"cleared date")

## Features

| No. | Feature Type | Survey Depth | Survey Latitude | Survey Longitude | AWOIS Item |
|-----|--------------|--------------|-----------------|------------------|------------|
| 1.1 | Shoal        | 7.21 m       | 21° 17' 40.3" N | 157° 52' 15.5" W | ---        |

## **1 - Danger To Navigation**

## 1.1) Profile/Beam - 183/39 from h12046 / ahi\_f2505\_reson8101\_09 / 2009-115 / ahmbc09115\_d12

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 21° 17' 40.3" N, 157° 52' 15.5" W  
**Least Depth:** 7.21 m (= 23.64 ft = 3.940 fm = 3 fm 5.64 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 3.922$  m ; TVU (TPEv)  $\pm 0.224$  m  
**Timestamp:** 2009-115.20:06:13.584 (04/25/2009)  
**Survey Line:** h12046 / ahi\_f2505\_reson8101\_09 / 2009-115 / ahmbc09115\_d12  
**Profile/Beam:** 183/39  
**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

#### Remarks:

Significant shoaling occurring around Red Buoy # "4" in the Honolulu Harbor Entrance Channel. A 23 ft. sounding was designated inside the established channel limits with a control depth of 43 ft.

#### Feature Correlation

| Address   | Feature | Range | Azimuth | Status  |
|---|---------|-------|---------|---------|
| h12046/ahi_f2505_reson8101_09/2009-115/ahmbc09115_d12 | 183/39  | 0.00  | 000.0   | Primary |

#### Hydrographer Recommendations

Hydrographer recommends revising the chart to reflex the shaoing area with updated sounding data or dredge the area back to the established control depth of 43ft.

#### Cartographically-Rounded Depth (Affected Charts):

23ft (19367\_1)

4fm (19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1)

7.2m (50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)

# S-T342-Ahi-09

**Registry Number:** H12046  
**State:** Hawaii  
**Locality:** North Pacific Ocean  
**Sub-locality:** Honolulu, HI  
**Project Number:** S-T342-Ahi-09  
**Survey Date:**

AWOIS report for S-T342-Ahi-09, Sheet H12046, AWOIS items: 53747, 50468, and 50469.

## Charts Affected

| Number | Edition | Date       | Scale (RNC)           | RNC Correction(s)*  |
|--------|---------|------------|-----------------------|---|
| 19367  | 39th    | 04/01/2008 | 1:5,000 (19367_1)     | USCG LNM: 05/13/2008 (01/20/2009)<br>NGA NTM: 12/13/2003 (01/31/2009) |
| 19369  | 6th     | 10/01/2006 | 1:20,000 (19369_1)    | [L]NTM: ?   |
| 19357  | 24th    | 06/01/2008 | 1:80,000 (19357_1)    | USCG LNM: 12/16/2008 (01/20/2009)<br>NGA NTM: 07/05/2008 (01/31/2009) |
| 19340  | 27th    | 03/01/2008 | 1:250,000 (19340_1)   | [L]NTM: ?   |
| 19004  | 38th    | 05/01/2006 | 1:600,000 (19004_1)   | [L]NTM: ?   |
| 19010  | 19th    | 10/01/2006 | 1:675,000 (19010_1)   | [L]NTM: ?   |
| 19013  | 18th    | 11/01/2006 | 1:675,000 (19013_1)   | [L]NTM: ?   |
| 19007  | 18th    | 12/01/2006 | 1:1,650,000 (19007_1) | [L]NTM: ?   |
| 540    | 19th    | 04/01/2008 | 1:3,121,170 (540_1)   | [L]NTM: ?   |
| 530    | 32nd    | 06/01/2007 | 1:4,860,700 (530_1)   | [L]NTM: ?   |
| 50     | 6th     | 06/01/2003 | 1:10,000,000 (50_1)   | [L]NTM: ?   |

\* Correction(s) - source: last correction applied (last correction reviewed--"cleared date")

## Features

| Feature No. | Feature Type | Survey Depth | Survey Latitude | Survey Longitude | AWOIS Item |
|-------------|--------------|--------------|-----------------|------------------|------------|
| 1.1         | AWOIS        | [no data]    | [no data]       | [no data]        | ---        |
| 1.2         | AWOIS        | [no data]    | [no data]       | [no data]        | ---        |
| 1.3         | AWOIS        | [no data]    | [no data]       | [no data]        | ---        |

## **1 - AWOIS Database Items**

**1.1) AWOIS #50469 - UNKNOWN****No Primary Survey Feature for this AWOIS Item**

**Search Position:** 21° 18' 44.8" N, 157° 53' 23.1" W  
**Historical Depth:** 0.00 m  
**Search Radius:** 50  
**Search Technique:** SWMB  
**Technique Notes:** [None]

**History Notes:**

50469 ■ HISTORY ■ CL1494/77--(USCGAUX) WRECK OF A SAILBOAT, PARTIALLY SUBMERGED IN APPROXIMATE ■ LAT.21-18-56.2N, LONG.157-53-33.0W. ■ NM15/78--SEE CL1494/77 ■ SURVEY REQUIREMENTS ■ FULL--VERIFY OR DISPROVE. IF NOT VISBLE, develop with swmb, 50 ■ METER RADIUS, WILL BE NECESSARY FOR DISPROVAL OR DOCUMENTATION OF REMOVAL. ■ (2/9/09, PTT)

**Survey Summary**

**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

**Remarks:**

AWOIS number 50469 was not investigated due to shoaling and unsafe waters.

**Feature Correlation**

| Address                | Feature       | Range | Azimuth | Status  |
|------------------------|---------------|-------|---------|---------|
| AWOIS_ORAOP_Office2007 | AWOIS # 50469 | 0.00  | 000.0   | Primary |

**Hydrographer Recommendations**

Retain current charted position.

**S-57 Data**

[None]

## 1.2) AWOIS #50468 - UNKNOWN

### No Primary Survey Feature for this AWOIS Item

**Search Position:** 21° 18' 57.6" N, 157° 53' 07.9" W  
**Historical Depth:** 0.00 m  
**Search Radius:** 50  
**Search Technique:** SWMB  
**Technique Notes:** [None]

#### History Notes:

50468 ■ HISTORY ■ CL1494/77--(USCGAUX) WRECK REPORTED ON BEACH. VESSEL TYPE UNKNOWN  
 ■ APPROXIMATELY LOCATED IN LAT.21-19-09.0N, LONG.157-53-17.8W ■ NM15/78--SEE CL1494/77  
 ■ SURVEY REQUIREMENTS ■ FULL--VERIFY OR DISPROVE. IF NOT VISIBLE, develop with SWMB, 50  
 ■ METER RADIUS, IS NECESSARY FOR DISPROVAL OR DOCUMENTATION OF REMOVAL. ■ (2/9/09,  
 PTT)

### Survey Summary

**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1,  
 530\_1, 50\_1

#### Remarks:

Surveyed AWOIS item # 50468 with a RESON 8101 SWMB, item was detected in multibeam data and is correctly positioned. Unable to achieve 100% coverage, the search radius extends into shoaling and unsafe waters.

### Feature Correlation

| Address                | Feature       | Range | Azimuth | Status  |
|------------------------|---------------|-------|---------|---------|
| AWOIS_ORAOP_Office2007 | AWOIS # 50468 | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

Item detected in multibeam data in the current charted position. Hydrographer recommends retaining the charted wreck in current position.

### S-57 Data

[None]

### Feature Images

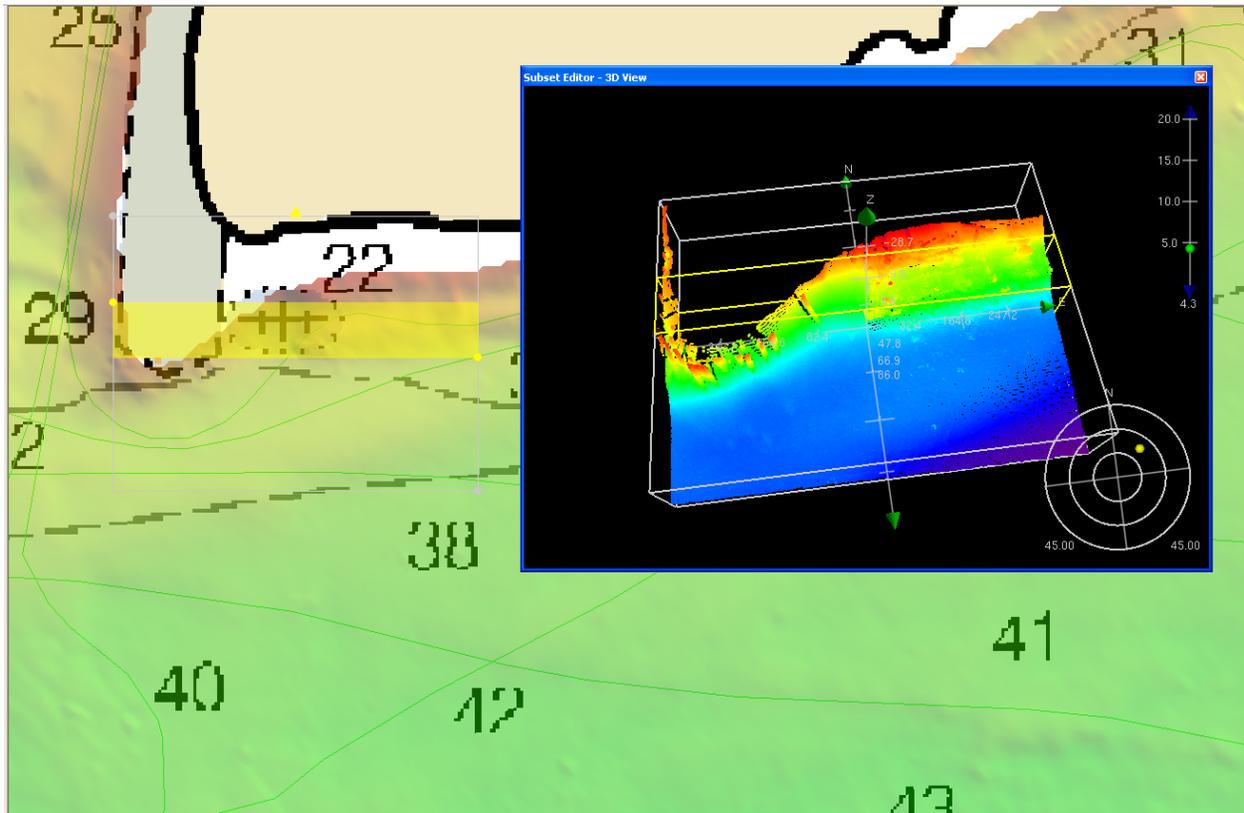


Figure 1.2.1

### 1.3) AWOIS #53747 - OBSTRUCTION

#### No Primary Survey Feature for this AWOIS Item

**Search Position:** 21° 17' 56.7" N, 157° 52' 12.0" W  
**Historical Depth:** [None]  
**Search Radius:** 50  
**Search Technique:** SWMB  
**Technique Notes:** [None]

#### History Notes:

S-T342-Ahi-09: Subm Obstn in the edge of Honolulu Channel, item may be part of the nearby charted Ruins. Identify and develop with swmb if possible. (PTT 2/13/09) Surveyed AWOIS item # 53747 with a RESON 8101 SWMB, item was not detected in multibeam data. Unable to achieve 100% coverage, the search radius extends into shoaling and unsafe waters. (6/4/09, PTT)

#### Survey Summary

**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

#### Remarks:

Surveyed AWOIS item # 53747 with a RESON 8101 SWMB, item was not detected in multibeam data.

#### Feature Correlation

| Address                | Feature       | Range | Azimuth | Status  |
|------------------------|---------------|-------|---------|---------|
| AWOIS_ORAOP_Office2007 | AWOIS # 53747 | 0.00  | 000.0   | Primary |

#### Hydrographer Recommendations

Item was not visible in the data in current charted position, hydrographer recommends removing charted Subm Obstn at: 21.29908300 , -157.86998900.

#### S-57 Data

[None]

### Feature Images

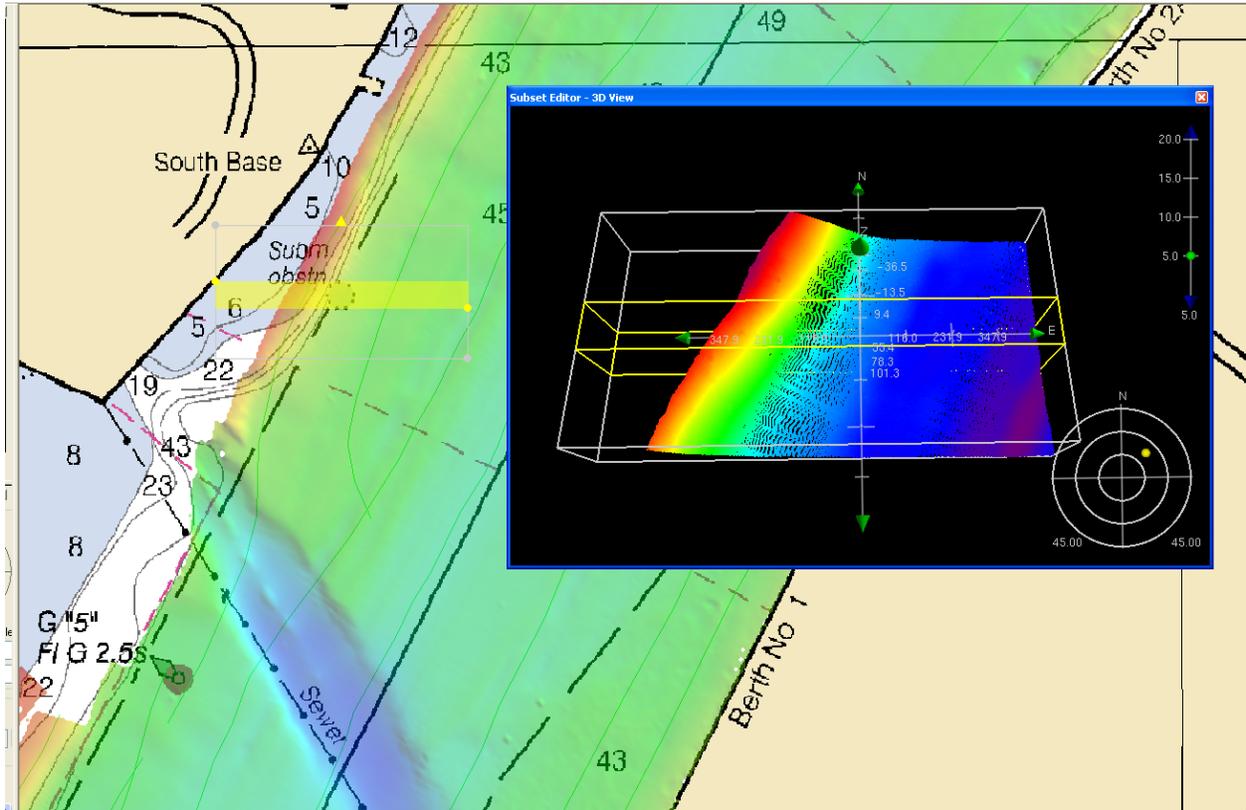


Figure 1.3.1

# S-T342-Ahi-09, Feature Report

**Registry Number:** H12046  
**State:** Hawaii  
**Locality:** North Pacific Ocean  
**Sub-locality:** Honolulu, HI  
**Project Number:** S-T342-Ahi-09  
**Survey Dates:** 04/19/2009 - 04/29/2009

Feature report for H12046 from S-T342-Ahi-09 for Six items: five non-dangerous, submerged wrecks; one non-dangerous visible wreck.

## Charts Affected

| Number | Edition | Date       | Scale (RNC)           | RNC Correction(s)*  |
|--------|---------|------------|-----------------------|---|
| 19367  | 39th    | 04/01/2008 | 1:5,000 (19367_1)     | USCG LNM: 05/13/2008 (01/20/2009)<br>NGA NTM: 12/13/2003 (01/31/2009) |
| 19369  | 6th     | 10/01/2006 | 1:20,000 (19369_1)    | [L]NTM: ?   |
| 19357  | 24th    | 06/01/2008 | 1:80,000 (19357_1)    | USCG LNM: 12/16/2008 (01/20/2009)<br>NGA NTM: 07/05/2008 (01/31/2009) |
| 19340  | 27th    | 03/01/2008 | 1:250,000 (19340_1)   | [L]NTM: ?   |
| 19004  | 38th    | 05/01/2006 | 1:600,000 (19004_1)   | [L]NTM: ?   |
| 19010  | 19th    | 10/01/2006 | 1:675,000 (19010_1)   | [L]NTM: ?   |
| 19013  | 18th    | 11/01/2006 | 1:675,000 (19013_1)   | [L]NTM: ?   |
| 19007  | 18th    | 12/01/2006 | 1:1,650,000 (19007_1) | [L]NTM: ?   |
| 540    | 19th    | 04/01/2008 | 1:3,121,170 (540_1)   | [L]NTM: ?   |
| 530    | 32nd    | 06/01/2007 | 1:4,860,700 (530_1)   | [L]NTM: ?   |
| 50     | 6th     | 06/01/2003 | 1:10,000,000 (50_1)   | [L]NTM: ?   |

\* Correction(s) - source: last correction applied (last correction reviewed--"cleared date")

## Features

| No. | Feature Type | Survey Depth | Survey Latitude | Survey Longitude | AWOIS Item |
|-----|--------------|--------------|-----------------|------------------|------------|
| 1.1 | Wreck        | 5.90 m       | 21° 18' 59.4" N | 157° 53' 02.7" W | ---        |
| 1.2 | Wreck        | 5.48 m       | 21° 18' 54.2" N | 157° 53' 35.3" W | ---        |
| 1.3 | Wreck        | 3.88 m       | 21° 18' 52.1" N | 157° 53' 35.2" W | ---        |
| 1.4 | Wreck        | 3.56 m       | 21° 18' 49.7" N | 157° 53' 37.1" W | ---        |

|     |       |        |                 |                  |     |
|-----|-------|--------|-----------------|------------------|-----|
| 1.5 | Wreck | 2.09 m | 21° 18' 52.8" N | 157° 53' 34.4" W | --- |
| 1.6 | Wreck | 5.05 m | 21° 18' 52.2" N | 157° 53' 37.2" W | --- |

## **1 - DR\_UnCharted**

## 1.1) Profile/Beam - 13772/90 from h12046 / ahi\_f2505\_reson8101\_09 / 2009-109 / ahmbc09109\_d07

### Survey Summary

**Survey Position:** 21° 18' 59.4" N, 157° 53' 02.7" W  
**Least Depth:** 5.90 m (= 19.36 ft = 3.227 fm = 3 fm 1.36 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 3.920$  m ; **TVU (TPEv)**  $\pm 0.222$  m  
**Timestamp:** 2009-109.00:45:08.940 (04/19/2009)  
**Survey Line:** h12046 / ahi\_f2505\_reson8101\_09 / 2009-109 / ahmbc09109\_d07  
**Profile/Beam:** 13772/90  
**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

#### Remarks:

An uncharted submerged wreck or obstruction was located along the shoreline between Berth No. 45 and Berth No 40C. A 19.4ft sounding was designated on the shoal point at 21-18-59.43n / 157-53-02.68w. The object resembles a small barge or platform and is located along the shoreline posing little threat to vessel traffic in the Kapalama Basin.

### Feature Correlation

| Address   | Feature  | Range | Azimuth | Status  |
|---|----------|-------|---------|---------|
| h12046/ahi_f2505_reson8101_09/2009-109/ahmbc09109_d07 | 13772/90 | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

Hydrographer recommends adding a non-dangerous wreck centered at: 21-18-59.43n / 157-53-02.68w.

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 QUASOU - 6:least depth known  
 SORDAT - 20090419  
 TECSOU - 3:found by multi-beam  
 VALSOU - 5.901 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

### Feature Images

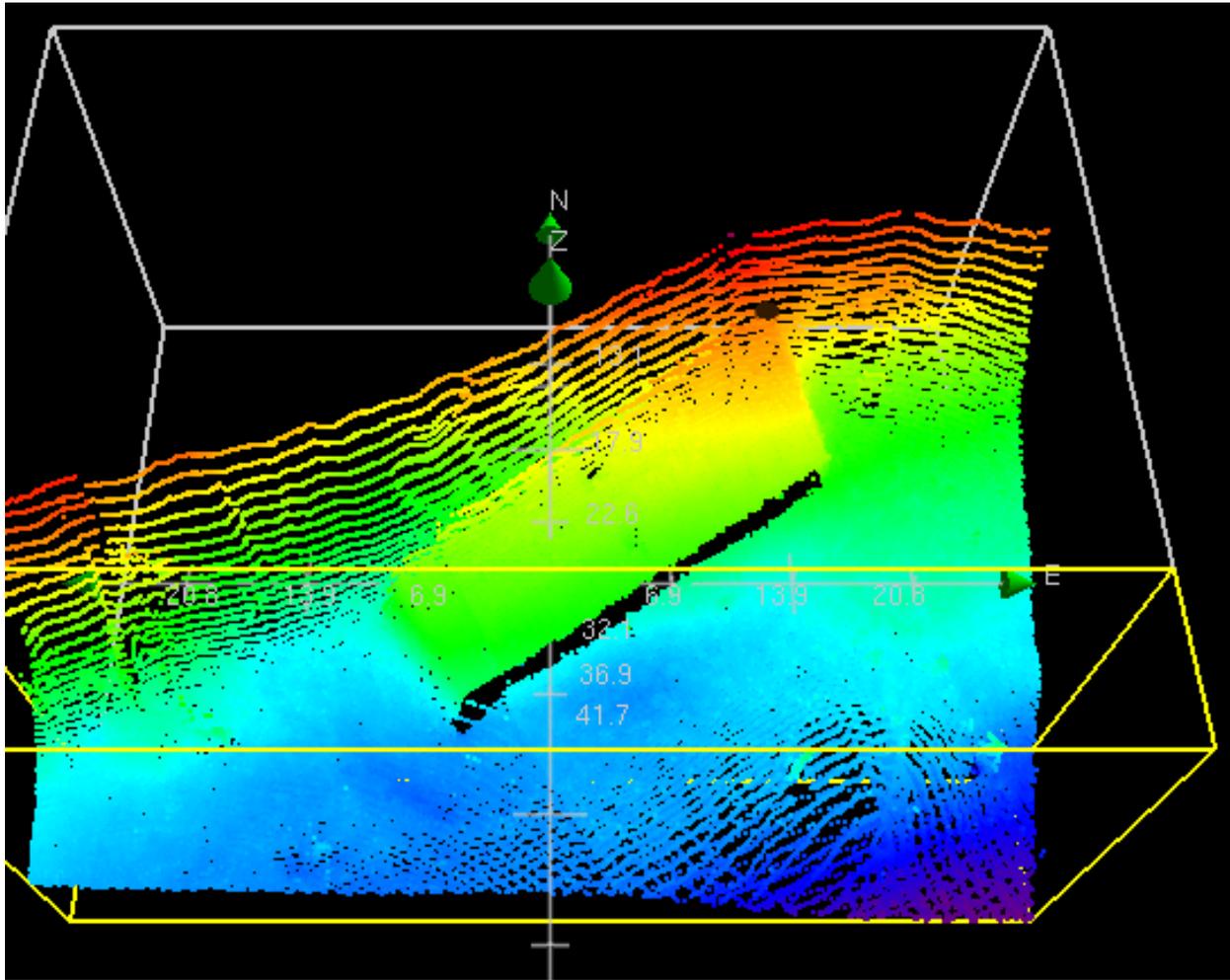


Figure 1.1.1

## 1.2) Profile/Beam - 4457/31 from h12046 / ahi\_f2505\_reson8101\_09 / 2009-113 / ahmbc09113\_d57

### Survey Summary

**Survey Position:** 21° 18' 54.2" N, 157° 53' 35.3" W  
**Least Depth:** 5.48 m (= 17.99 ft = 2.999 fm = 2 fm 5.99 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 3.920$  m ; **TVU (TPEv)**  $\pm 0.223$  m  
**Timestamp:** 2009-113.22:03:58.681 (04/23/2009)  
**Survey Line:** h12046 / ahi\_f2505\_reson8101\_09 / 2009-113 / ahmbc09113\_d57  
**Profile/Beam:** 4457/31  
**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

#### Remarks:

An uncharted submerged wreck was located within the anchorage area to the west of the Keehi Lagoon Barge Channel, this particular area is known by local mariners to have numerous uncharted wrecks.

This wreck is approximately 60t x 20 ft, Designated sounding depth of 17.9.

### Feature Correlation

| Address   | Feature | Range | Azimuth | Status  |
|---|---------|-------|---------|---------|
| h12046/ahi_f2505_reson8101_09/2009-113/ahmbc09113_d57 | 4457/31 | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

Hydrographer recommends charting a non dangerous, submerged wreck approximately: 21-18-54.1n / 157-53-35.2w

#### Cartographically-Rounded Depth (Affected Charts):

18ft (19367\_1)

3fm (19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1)

5.5m (50\_1)

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 CONVIS - 2:not visual conspicuous

QUASOU - 1:depth known

SORDAT - 20090423

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 5.484 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

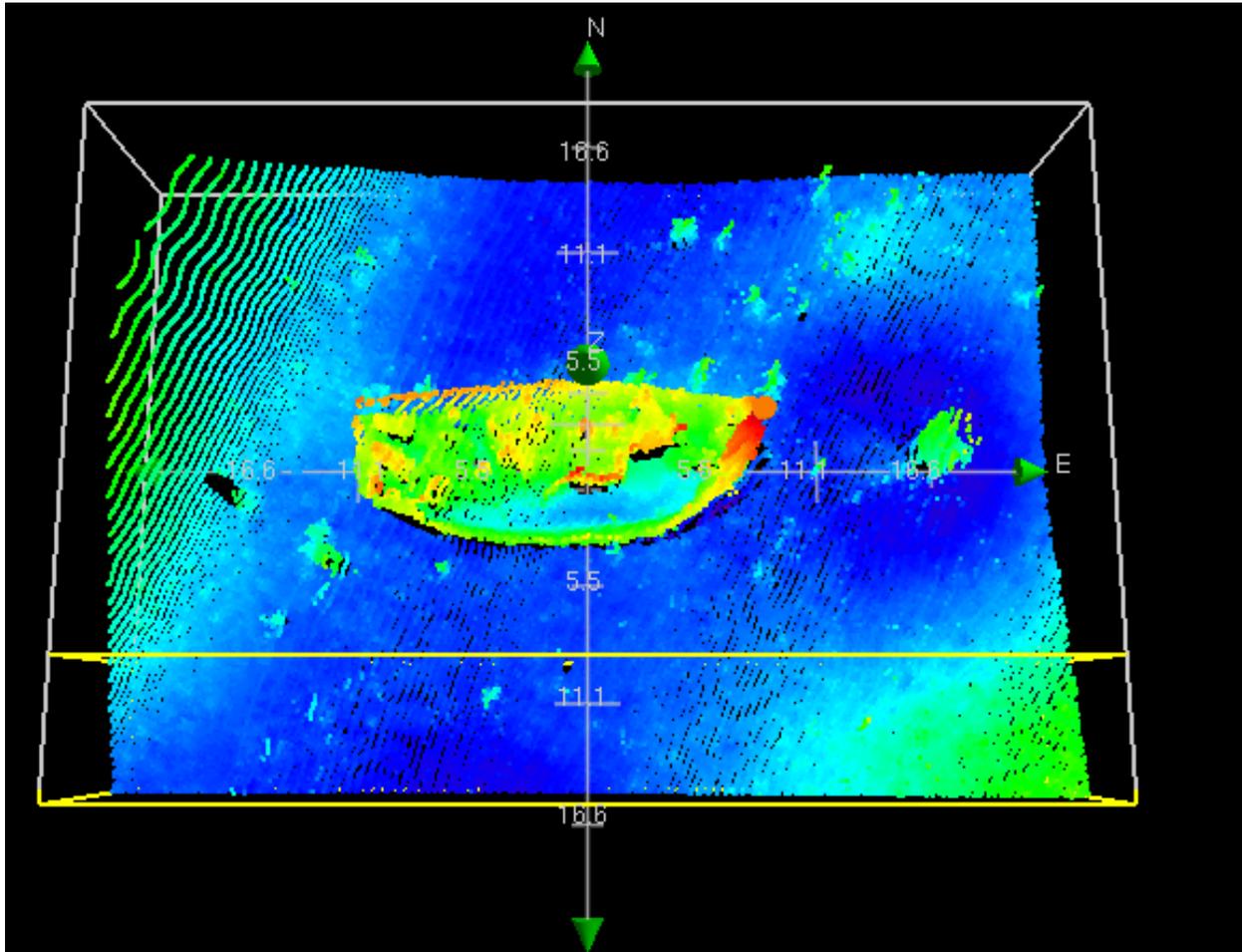


Figure 1.2.1

### 1.3) Profile/Beam - 2821/17 from h12046 / ahi\_f2505\_reson8101\_09 / 2009-113 / ahmbc09113\_d59

#### Survey Summary

**Survey Position:** 21° 18' 52.1" N, 157° 53' 35.2" W  
**Least Depth:** 3.88 m (= 12.73 ft = 2.122 fm = 2 fm 0.73 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 3.920$  m ; **TVU (TPEv)**  $\pm 0.222$  m  
**Timestamp:** 2009-113.22:11:23.867 (04/23/2009)  
**Survey Line:** h12046 / ahi\_f2505\_reson8101\_09 / 2009-113 / ahmbc09113\_d59  
**Profile/Beam:** 2821/17  
**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

#### Remarks:

An uncharted submerged wreck was located within the anchorage area to the west of the Keehi Lagoon Barge Channel, this particular area is known by local mariners to have numerous uncharted wrecks. This wreck is approximately 60t x 20 ft, Designated sounding depth of 12.7.

#### Feature Correlation

| Address   | Feature | Range | Azimuth | Status  |
|---|---------|-------|---------|---------|
| h12046/ahi_f2505_reson8101_09/2009-113/ahmbc09113_d59 | 2821/17 | 0.00  | 000.0   | Primary |

#### Hydrographer Recommendations

Hydrographer recommends charting a submerged, non-dangerous wreck at: 21-18-52.1n / 157-53-35.2w

#### Cartographically-Rounded Depth (Affected Charts):

12ft (19367\_1)

2fm (19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1)

3.9m (50\_1)

#### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 CONVIS - 2:not visual conspicuous  
 HEIGHT - 3.88 m

QUASOU - 1:depth known

SORDAT - 20090423

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 3.880 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

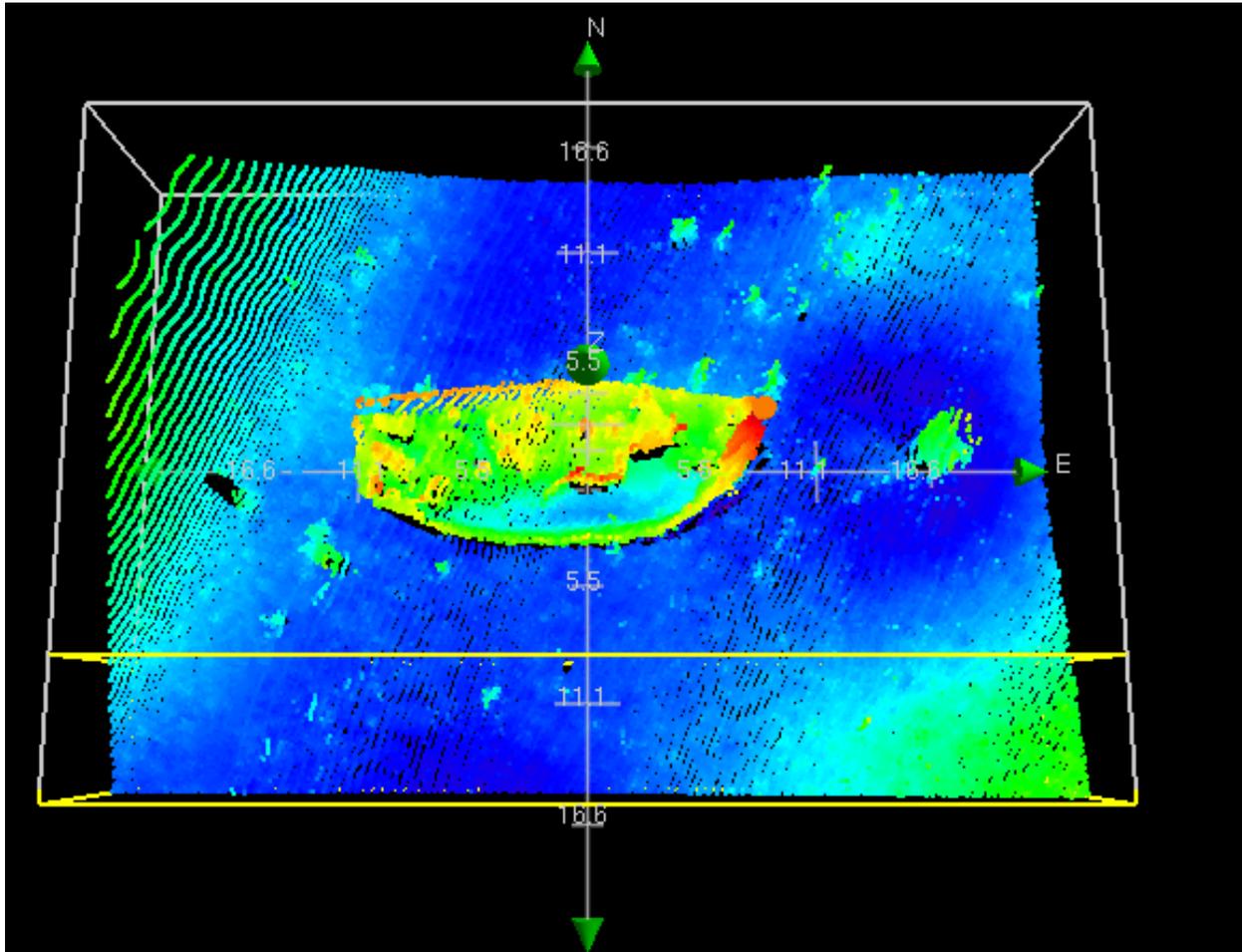


Figure 1.3.1

## 1.4) Profile/Beam - 1020/64 from h12046 / ahi\_f2505\_reson8101\_09 / 2009-119 / ahmbc09119\_d13

### Survey Summary

**Survey Position:** 21° 18' 49.7" N, 157° 53' 37.1" W  
**Least Depth:** 3.56 m (= 11.66 ft = 1.944 fm = 1 fm 5.66 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 3.920$  m ; **TVU (TPEv)**  $\pm 0.224$  m  
**Timestamp:** 2009-119.00:38:42.071 (04/29/2009)  
**Survey Line:** h12046 / ahi\_f2505\_reson8101\_09 / 2009-119 / ahmbc09119\_d13  
**Profile/Beam:** 1020/64  
**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

#### Remarks:

An uncharted submerged wreck was located within the anchorage area to the west of the Keehi Lagoon Barge Channel, Wreckage appears to be degrading into the bottom.

Approximately 60 ft x 20 ft, Designated sounding depth of 11.6 ft, 21-18-49.7n / 157-53-37.1w

### Feature Correlation

| Address   | Feature | Range | Azimuth | Status  |
|---|---------|-------|---------|---------|
| h12046/ahi_f2505_reson8101_09/2009-119/ahmbc09119_d13 | 1020/64 | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

Hydrographer recommends charting a non-dangerous, submerged wreck centered approximately: 21-18-49.7n / 157-53-37.1w.

#### Cartographically-Rounded Depth (Affected Charts):

11ft (19367\_1)

2fm (19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1)

3.6m (50\_1)

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 3:distributed remains of wreck  
 CONVIS - 2:not visual conspicuous

QUASOU - 6:least depth known

SORDAT - 20090429

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 3.555 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

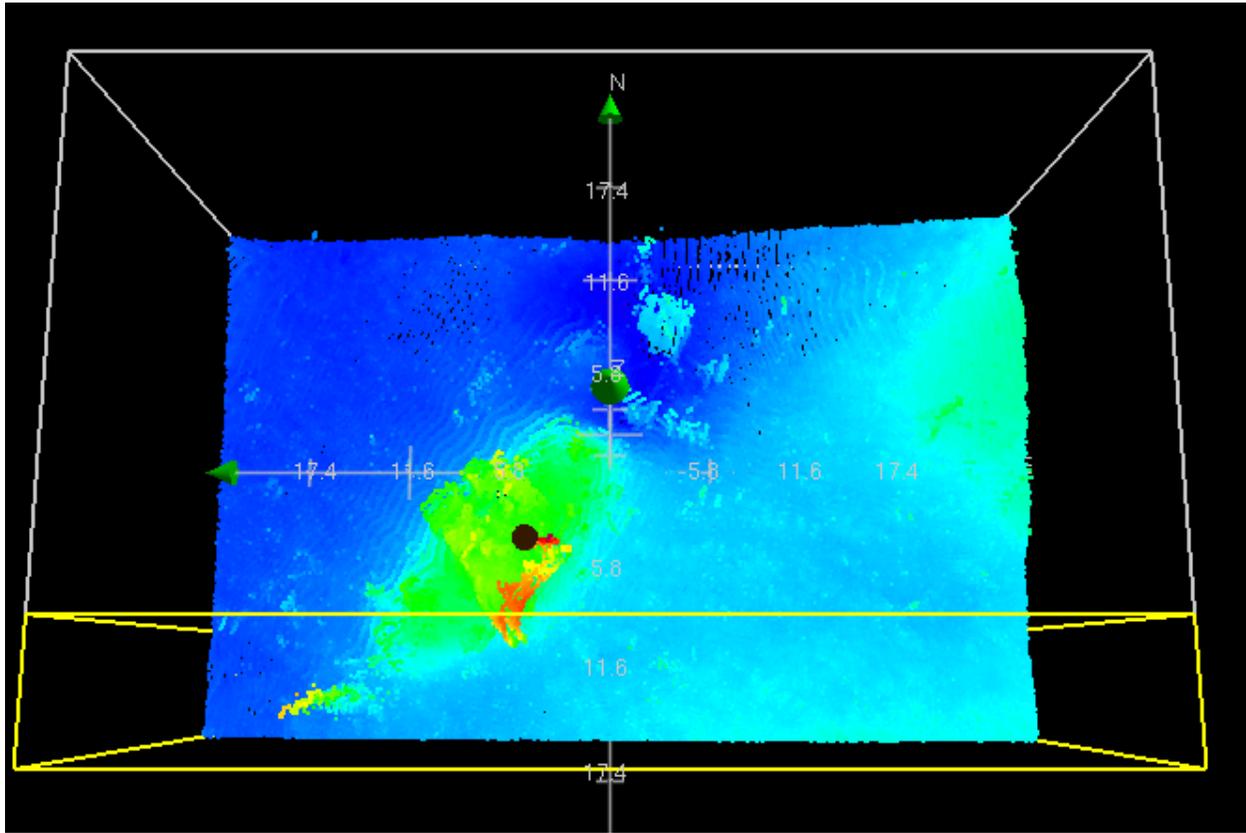


Figure 1.4.1

## 1.5) Profile/Beam - 340/2 from h12046 / ahi\_f2505\_reson8101\_09 / 2009-119 / ahmbc09119\_d23

### Survey Summary

**Survey Position:** 21° 18' 52.8" N, 157° 53' 34.4" W  
**Least Depth:** 2.09 m (= 6.86 ft = 1.144 fm = 1 fm 0.86 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 3.921$  m ; TVU (TPEv)  $\pm 0.220$  m  
**Timestamp:** 2009-119.00:54:17.798 (04/29/2009)  
**Survey Line:** h12046 / ahi\_f2505\_reson8101\_09 / 2009-119 / ahmbc09119\_d23  
**Profile/Beam:** 340/2  
**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

#### Remarks:

An uncharted visible wreck was located within the anchorage area to the west of the Keehi Lagoon Barge Channel, the position of the wreck was obtained by several passes with the RESON 8101 multibeam, the hull is visible in the multibeam imagery and a sounding near the bow was designated for positioning. Two masts are visible at all stages of the tide cycle.

This wreck is approximately 40t x 16 ft, centered approximately: 21-18-52.7 n / 157-53-34.3w.

### Feature Correlation

| Address   | Feature | Range | Azimuth | Status  |
|---|---------|-------|---------|---------|
| h12046/ahi_f2505_reson8101_09/2009-119/ahmbc09119_d23 | 340/2   | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

Hydrographer recommends charting a visible wreck centered at: 21-18-52.7 n / 157-53-34.3w.

#### Cartographically-Rounded Depth (Affected Charts):

7ft (19367\_1)

1fm (19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1)

2.1m (50\_1)

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 4:wreck showing mast/masts

CONVIS - 1:visual conspicuous

QUASOU - 1:depth known

SORDAT - 20090429

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 2.092 m

VERDAT - 12:Mean lower low water

WATLEV - 1:partly submerged at high water

### Feature Images

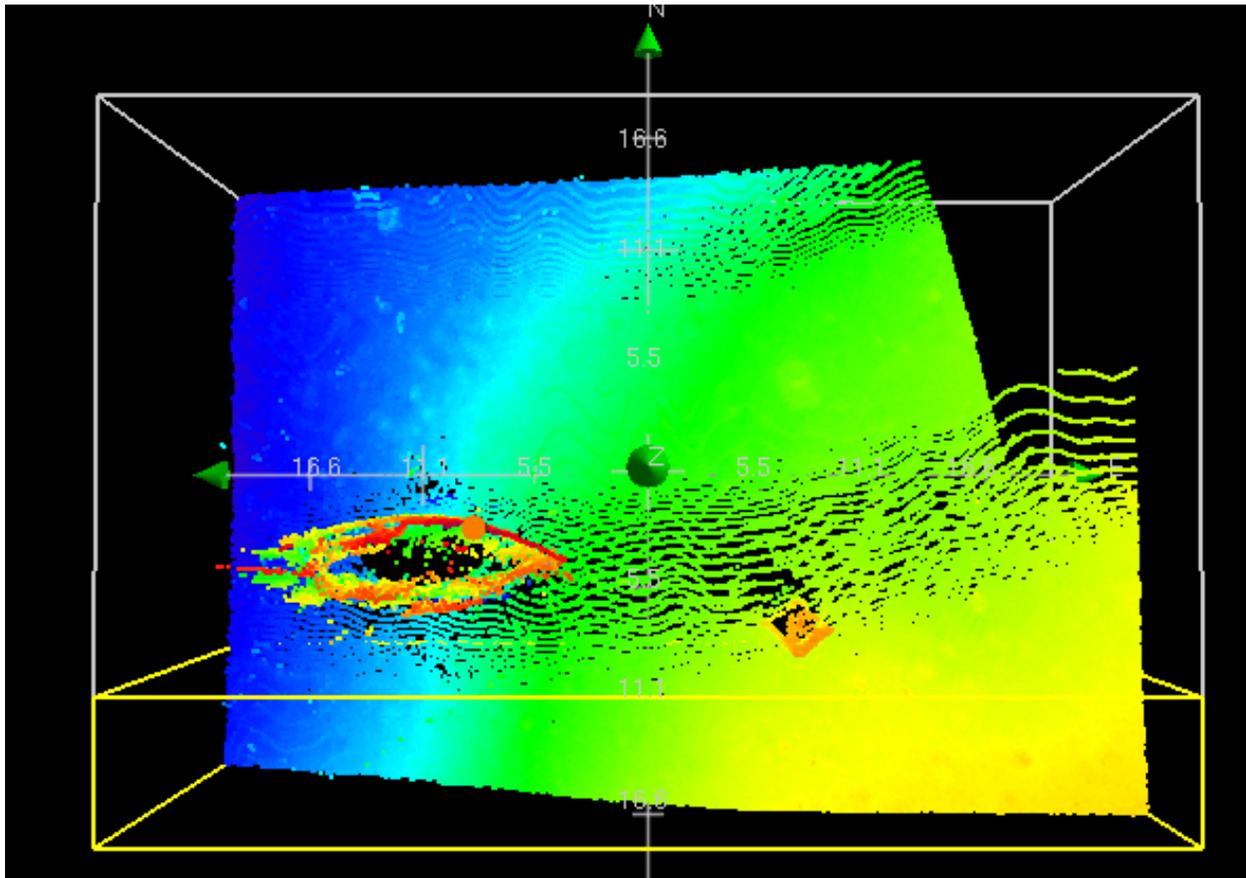


Figure 1.5.1



*Figure 1.5.2*

## 1.6) Profile/Beam - 334/91 from h12046 / ahi\_f2505\_reson8101\_09 / 2009-119 / ahmbc09119\_d24

### Survey Summary

**Survey Position:** 21° 18' 52.2" N, 157° 53' 37.2" W  
**Least Depth:** 5.05 m (= 16.56 ft = 2.759 fm = 2 fm 4.56 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 3.920$  m ; **TVU (TPEv)**  $\pm 0.222$  m  
**Timestamp:** 2009-119.00:55:10.394 (04/29/2009)  
**Survey Line:** h12046 / ahi\_f2505\_reson8101\_09 / 2009-119 / ahmbc09119\_d24  
**Profile/Beam:** 334/91  
**Charts Affected:** 19367\_1, 19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1, 50\_1

#### Remarks:

An uncharted submerged wreck was located within the anchorage area to the west of the Keehi Lagoon Barge Channel, this particular area is known by local mariners to have numerous uncharted wrecks. This wreck is approximately 45 ft x 20 ft, Designated sounding depth of 16.5 ft.

### Feature Correlation

| Address   | Feature | Range | Azimuth | Status  |
|---|---------|-------|---------|---------|
| h12046/ahi_f2505_reson8101_09/2009-119/ahmbc09119_d24 | 334/91  | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

Hydrographer recommends charting a submerged, non-dangerous wreck at: 21-18-52.1n / 157-53-37.2w

#### Cartographically-Rounded Depth (Affected Charts):

16ft (19367\_1)

2 ¾fm (19369\_1, 19357\_1, 19340\_1, 19004\_1, 19010\_1, 19013\_1, 19007\_1, 540\_1, 530\_1)

5.0m (50\_1)

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 QUASOU - 1:depth known  
 SORDAT - 20090429

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 5.046 m

WATLEV - 3:always under water/submerged

### Feature Images

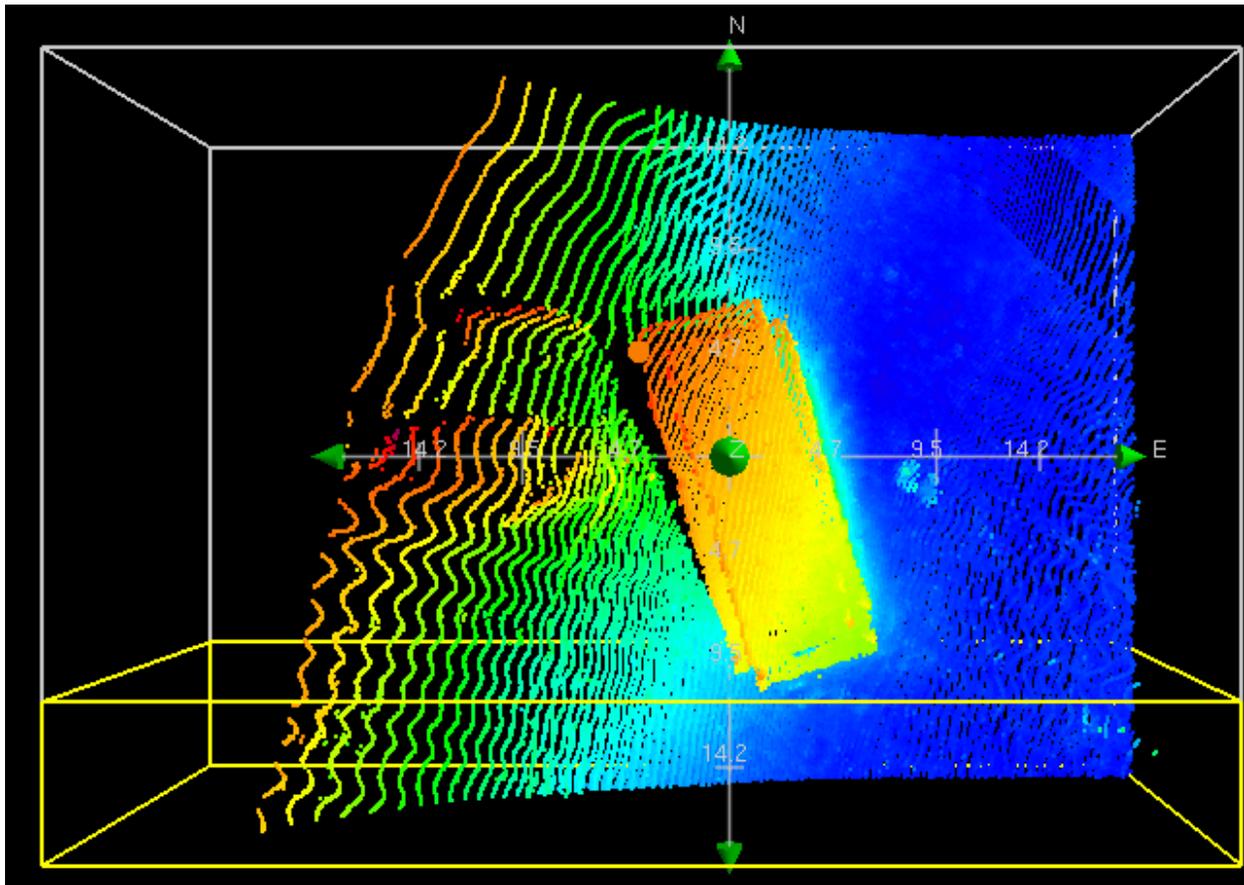


Figure 1.6.1



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
National Ocean Service  
Silver Spring, Maryland 20910

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** June 10, 2009

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** S-T342-AHI-2009  
**HYDROGRAPHIC SHEET:** H12046

**LOCALITY:** North Pacific Ocean, Honolulu, HI  
**TIME PERIOD:** April 18 - May 02, 2009

**TIDE STATION USED:** 161-2340 Honolulu, Hawaii  
Lat. 21° 18.4'N Long. 157° 52.0' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 0.439 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project S-T342-AHI-2009, H12046, during the time period between April 18 - May 02, 2009.

Please use the zoning file "T342AHI2009CORP" submitted with the project instructions for S-T342-AHI-2009. Zones H1211A and H1211 are the applicable zones for H12046.

**Refer to attachments for zoning information.**

**Note 1:** Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

**Peter J. Stone**

Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=Oceanographic Division,  
ou=NOAA/NOS/CO-OPS,  
email=peter.stone@noaa.gov, c=US  
Date: 2009.06.12 08:03:59 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION





**H12046 HCell Report**  
Annie Raymond, Physical Scientist  
Pacific Hydrographic Branch

**1. Specifications, Standards and Guidance Used in HCell Compilation**

HCell compilation of survey H12046 used:

Office of Coast Survey HCell Specifications: Version: 4.0, 2 June, 2010.  
HCell Reference Guide: Version 2.0, 2 June, 2010.

**2. Compilation Scale**

Depths and features for HCell H12046 were compiled to the largest scale raster charts shown below:

| Chart | Scale   | Edition | Edition Date | NTM Date   |
|-------|---------|---------|--------------|------------|
| 19367 | 1:5,000 | 39th    | 04/01/2008   | 01/29/2011 |

The following ENC's were also used during compilation:

| Chart    | Scale   |
|----------|---------|
| US5HA55M | 1:5,000 |

**3. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from the 1- meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:2,000 survey scale using a Radius Table file with values shown in the table, below.

| Shoal Limit (m) | Deep Limit (m) | Radius (mm) |
|-----------------|----------------|-------------|
| -4.7            | 10             | 3           |
| 10              | 20             | 4           |
| 20              | 50             | 4.5         |
| 50              | 200            | 5           |

In CARIS BASE Editor soundings were manually selected from the high density sounding layers (SS) and imported into a new layer (CS) created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology.

#### 4. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H12046\_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The metric and feet equivalent contour values are shown in the table below.

| Chart Contour Intervals in Feet from Chart 19367 | Metric Equivalent to Chart Feet, Arithmetically Rounded | Metric Equivalent of Chart Feet, with NOAA Rounding Applied | Feet with NOAA Rounding Applied | Feet with NOAA Rounding Removed for Display on H12046_SS.000 |
|--|---|---|---------------------------------|--|
| 6  | 1.8288  | 2.0574  | 6.75                            | 6  |
| 12   | 3.6576  | 3.8862  | 12.75                           | 12   |
| 18   | 5.4864  | 5.715   | 18.75                           | 18   |
| 24   | 7.3152  | 7.5438  | 24.75                           | 24   |
| 30   | 9.144   | 9.3726  | 30.75                           | 30   |
| 36   | 10.9728   | 11.2014   | 36.75                           | 36   |

With the exception of the zero contours included in the H12046\_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography, as all other features in the H12046\_CS file and soundings in the H12046\_SS have been. This may result in conflicts between the H12046\_SS file contours and HCell features at or near the survey limits. Conflicts with M\_QUAL, COALNE and SBDARE objects, and with DEPCNT objects representing MLLW, should be expected. HCell features should be honored over H12046\_SS.000 file contours in all cases where conflicts are found.

#### 5. Meta Areas

The following Meta object areas are included in HCell H12046:

M\_QUAL

The Meta area objects were constructed on the basis of the limits of the hydrography.

#### 6. Features

Features addressed by the field units are delivered to PHB where they are deconflicted against the hydrography and the largest scale chart. These features, as well as features to be retained from the chart and features digitized from the Base Surface, are included in the HCell. The geometry of these features may be modified to emulate chart scale per the HCell Reference Guide on compiling features to the chart scale HCell.

#### 7. Spatial Framework

##### 7.1 Coordinate System

All spatial map and base cell file deliverables are in an LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and MLLW (1983-2001 NTDE) sounding datums.

## 7.2 Horizontal and Vertical Units

DUNI, HUNI and PUNI are used to define units for depth, height and horizontal position in the chart units HCell, as shown below.

Chart Unit Base Cell Units:

|                          |        |
|--------------------------|--------|
| Depth Units (DUNI):      | Feet   |
| Height Units (HUNI):     | Feet   |
| Positional Units (PUNI): | Meters |

During creation of the HCell in CARIS BASE Editor and CARIS S-57 Composer, all soundings and features are maintained in metric units with as high precision as possible. Depth units for soundings measured with sonar maintain millimeter precision. Depths on rocks above MLLW and heights on islets above MHW are typically measured with range finder, so precision is less. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

|                    |  |
|--------------------|--|
| Sounding Units:    | Meters rounded to the nearest millimeter |
| Spot Height Units: | Meters rounded to the nearest decimeter  |

See the HCell Reference Guide for details of conversion from metric to charting units, and application of NOAA rounding.

## 8. Data Processing Notes

There were no significant deviations from the standards and protocols given in the HCell Specification and HCell Reference Guide.

## 9. QA/QC and ENC Validation Checks

H12046 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they are MCD approved as inherent to and acceptable for HCells.

## 10. Products

### 10.1 HSD, MCD and CGTP Deliverables

|               |  |
|---------------|--|
| H12046_CS.000 | Base Cell File, Chart Units, Soundings and features compiled to 1:40,000   |
| H12046_SS.000 | Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000   |
| H12046_DR.pdf | Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items |

H12046\_outline.gml  
H12046\_outline.xsd

Survey outline  
Survey outline

## 10.2 Software

|  |  |
|--|--|
| CARIS HIPS Ver. 6.1                                  | Inspection of Combined BASE Surfaces   |
| CARIS BASE Editor Ver. 3.0 HF10                      | Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly. |
| CARIS S-57 Composer Ver. 2.2 HF3                     | Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.   |
| CARIS GIS 4.4a                                       | Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.   |
| CARIS HOM Ver. 3.3                                   | Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.  |
| HydroService AS, dKart Inspector Ver. 5.1, SP 1      | Validation of the base cell file.  |
| Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3 | Independent inspection of final HCells using a COTS viewer.  |

## 11. Contacts

Inquiries regarding this HCell content or construction should be directed to:

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Seattle, WA  
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APPROVAL SHEET  
H12046

Initial Approvals:

The survey evaluation and verification has been conducted according to branch processing procedures and the HCell compiled per the latest OCS HCell Specifications.

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or disproof of charted data within the survey limits. The survey records and digital data comply with OCS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

I have reviewed the HCell, accompanying data, and reports. This survey and accompanying digital data meet or exceed OCS requirements and standards for products in support of nautical charting except where noted in the Descriptive Report.