H11458

NOAA FORM 76-35A

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

# DESCRIPTIVE REPORT

*Type of Survey* **Navigable Area**

*Registry No.* **H11458**

## LOCALITY

*State* **WASHINGTON**

*General Locality* **Commencement Bay**

*Sub-locality* **Old Tacoma to Point Defiance**

**2008 - 2009**

CHIEF OF PARTY
**Kathryn Simmons**
**NOAA/NRT3**

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DATE

| NOAA FORM 77-28 (11-72) | U.S DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION | REGISTRY No |
|---|---|---|
| HYDROGRAPHIC TITLE SHEET | | **H11458** |
| **INSTRUCTIONS** - 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. **NRT3-10-01-08** |

**State:** Washington

**General Locality:** Commencement Bay

**Sub-Locality:** Old Tacoma to Point Defiance

**Scale:** 1:10000 **Date of Survey:** May 19, 2008 to April 3, 2009

**Instructions dated:** May 10, 2007 **Project No. :** OPR-N411-NRT3-07

**Vessel:** NOAA Survey Launch S1212

**Chief of party:** Kathryn Simmons

**Surveyed by:** Kathryn Simmons, Kurt Mueller, Philip Sparr

**Soundings by echo sounder, hand lead, pole,** SWMB Echosounder

**Graphic record scaled by:** NRT-3

**Graphic record checked by:** NRT-3 **Automated Plot:**

**Verification by:** ***Atlantic Hydrographic Branch***

**Soundings in fathoms feet meters at MLW MLLW MLLW**

**REMARKS:** *All times UTC.*

***Bold, Red, Italic notes were made during office processing.***

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537

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# Descriptive Report to Accompany H11458

Scale 1:10000

**2008**

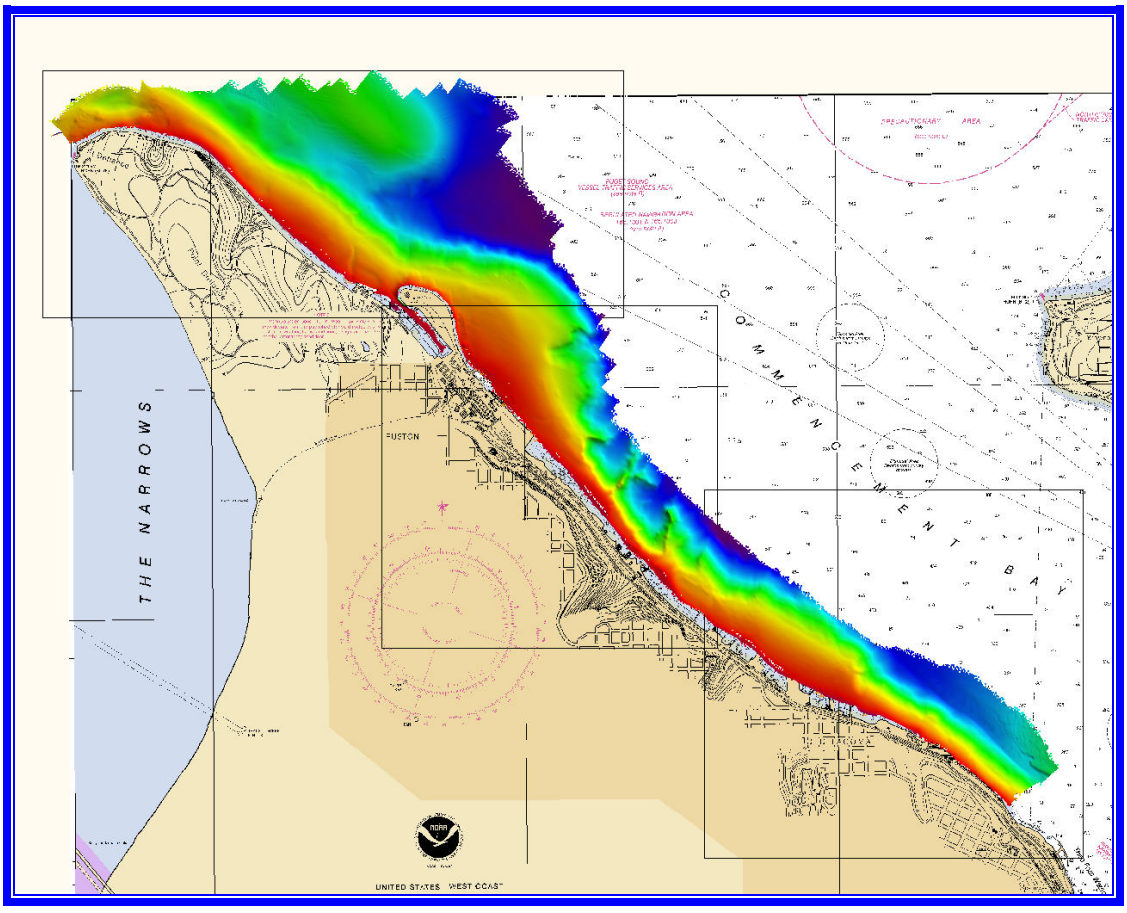
**Navigation Response Team 3**

**Team Leader: Kathryn Simmons**

## A. Area Surveyed

Significant changes to the shoreline in and around Tacoma have occurred in recent years and in 2004 the Marine Chart Division (MCD) identified Tacoma as a port in need of Electronic Nautical Chart (ENC) validation. In addition, Office of Coast Survey's National Survey Plan has identified Commencement Bay as a critical survey area because of major dredging and filling at various locations around the port area. This project was conducted to provide multibeam data in support of updating the National Ocean Service (NOS) nautical charts. ***Concur***

Three Field Sheets were created for this survey as shown below:




The total area of hydrography is approximately 1.9 square nautical miles.

H11458 is one of two surveys in Project OPR-N411-NRT3-07 and includes hydrographic data, side scan sonar data and detached positions. ***Concur.***

## B. DATA ACQUISITION AND PROCESSING *See also the Evaluation Report.*

Data acquisition was conducted from May 19, 2008, (DN 140) through April 3, 2009 (DN 093)

### B1. Equipment and Vessels

NRT3's survey vessel, NOAA Survey Launch S1212, is equipped with an Odom single beam transducer, a Klein side scan sonar system and a Simrad EM3000 SWMB echosounder and was used to acquire multibeam echosounder data, side scan sonar data and detached positions. ***Concur.***

Launch S1212, a 27-foot, SeaArk Commander (SAMA115510000), was acquired in January 2001. In August 2004 the hull was extended to 30 feet to accommodate the weight of the two 150-horsepower Yamaha four-stroke outboards which power the vessel. The launch is eight feet wide, displaces 4.8 tons, has a static draft of 0.4 meters and is equipped with a Dell Pentium IV PC for running the primary acquisition software. ***Concur.***

Prior to the start of the survey, the launch's POSMV was sent to Applanix for repair, and a temporary replacement was installed. A GAMS calibration and patch test were performed before the start of data acquisition. The replacement unit was used for the duration of the survey. Multiple components of the Klein SSS system were replaced during the survey due to failures. A failure of the SSS acquisition computer's internal battery on DN 140 caused the computer's clock to reset to January 1, 2000, and the lines acquired on that day could not be converted. A workaround was developed which involved creation of a separate HVF file with a fictitious date of August 18, 1999, (*S1212sss_100_time*). The files were successfully converted and all subsequent lines were acquired with the correct date, and converted using the current HVF file (S1212sss_100).

Across-track artifacts were observed in the SWMB base surfaces generated for DQA. These were apparently caused by intermittent and short (<1 second) data gaps in the sensor data from the POS MV. Attempts to correct the problem were not successful and the artifacts persisted through the survey.

See Data Acquisition and Processing Report (DAPR).*****

### B2. Quality Control

*Crossline Data*

The 2.54 nautical miles of crosslines acquired during the survey represent 4.7 percent of total mainscheme miles. Correlation was excellent. ***Concur.***

See also Data Acquisition and Processing Report. *****

### B3. Corrections to Echo Soundings

See Data Acquisition and Processing Report. *****

### B4. Data Processing

Three CARIS field sheets (H11458 -A, -B, and -C) were created to keep grids to a manageable size. Two BASE surfaces were created for each field sheet using the CUBE algorithm. Because of the large range of depths in this survey, one-meter base surfaces were generated to the greatest depth the data could support without excessive holidays, and two-meter base surfaces were generated for all deeper areas. ***Concur***

See also Data Acquisition and Processing Report. . *****

**** Data filed with original field records.***

## C. VERTICAL AND HORIZONTAL CONTROL *See also the Evaluation Report.*

### C1. Tides and Water Levels

See Data Acquisition and Processing Report. *

### C2. Horizontal Datum

The horizontal control datum for this project is North American Datum of 1983 (NAD83). *Concur.*

### C3. Position Control

See Data Acquisition and Processing Report. *

## D. RESULTS AND RECOMMENDATIONS *See also the Evaluation Report.*

### D1. Chart Comparison

Survey results were compared with the latest revisions of the affected raster and ENC charts.

| Chart No. | Scale | Date | Edition | Downloaded |
|---|---|---|---|---|
| 18453 | 1:15,000 | October 2003 | 25th | January 21, 2009 |
| 18474 | 1:40,000 | September 2007 | 8th | January 21, 2009 |

| ENC Cell | Edition | Update Application Date | Issue Date |
|---|---|---|---|
| US5WA18M | 7 | 7/31/2007 | 7/10/2008 |
| US5WA22M | 5 | 10/4/2007 | 11/10/2008 |

*Comparison of Soundings*

Survey data were compared with the charts using contour lines and sounding plots generated by CARIS Field Sheet Editor, Pydro and Mapinfo/Vertical Mapper. Some shoaling has occurred in near shore areas, most of which is concentrated in two sections along shore: the eastmost from latitude 47º17’52.814”N to latitude 47º18’08.644”N; the westmost from latitude 47º19’8.391”N to latitude 47º17’30.130”N. *Concur.*

A large rocky area extends seaward 100 to 150 meters from the high water line between latitude 47°17'50”N and latitude 47°18'20”N. A number of soundings designated in this area rise above adjacent or seaward soundings but, in the opinion of the hydrographer, did not warrant submission as Dangers to Navigation. The hydrographer recommends that a notation of “rky” be added to the chart in this vicinity. ***Concur with clarification. Additional Dangers to Navigation submitted by AHB.***

A least depth of 21 feet was found in the Point Defiance Ferry terminal, where a 25 ft sounding is charted. The shoaling is most likely sediment accumulation caused by prop wash during ferry operations. Because the Point Defiance Ferries, which draw considerably less than 21 feet, are the only vessels that would approach this area, the hydrographer does not consider this a danger to Navigation. ***Concur.***

****Data filed with original records.***

*Comparison of Non-Sounding Features*

A new shoreline compilation along with a CEF spreadsheet was provided by the Remote Sensing Division. The shoreline was verified; the CEF was annotated as requested and returned to RSD on January 21, 2009.* Evident discrepancies with the chart were annotated with field notes. New and revised high water features will be submitted separately in S57 format. ***Concur.***
****See also the Evaluation Report.***

*AWOIS Items*

One AWOIS item was located within the limits of this survey and investigated. See Features Report.
***Concur. See Appendix 2 for final charting recommendation.***

*Dangers to Navigation*

Two Dangers to Navigation were identified during the course of this survey and submitted to Marine Chart Division. See Appendix I. ***Concur. See Appendix 1 for final charting recommendations.***

**D2. Additional Results**

*Comparison with Prior Surveys*

Prior surveys were not addressed. ***Concur.***

*Aids to Navigation*

Floating aids within the navigable area were verified visually; no discrepancies were found. Most fixed aids were positioned using Trimble GeoXT Datalogger; a few were verified with detached positions. Updated positions have been submitted directly to MCD; a copy of that submission accompanies this survey. One major discrepancy was submitted to MCD on October 31, 2008 (LLN 17213 Point Defiance Ferry Dolphin Light). ***Concur.***

*Bridges, Cables, Pipelines*

Where feasible, charted bridges, cables, and pipelines were visually confirmed. A sewer discharge pipe was found 36 meters north of its charted position with the offshore end located at latitude 47°18’10.738”N, longitude 122°30’23.893”W, corresponding with the position of the charted 20-foot shoal. ***Concur – Add sewer in present survey location.***

*Miscellaneous*

The additional hydrography acquired on April 3 was collected in order to eliminate data gaps and to help resolve some shoreline isues. ***Concur.***

*Statistics*

| Description | Quantities |
|---|---|
| Total Linear Nautical Miles | 75.34 |
| Mainscheme Multibeam | 62.28 |
| Side Scan Sonar | 8.86 |
| Development | 1.66 |
| Crosslines | 2.54 |
| Square Nautical Miles Hydrography | 1.9 |
| Square Nautical Miles SSS | .78 |
| Velocity Casts | 16 |
| Bottom Samples | 0 |
| AWOIS Items | 1 |
| Tide Stations Installed | 0 |

Submitted for approval,

Philip Sparr
Physical Science Technician

## E. APPROVAL SHEET

Standard field surveying and processing procedures were followed in producing this survey in accordance with the Navigation Response Branch Operations Manual, the Field Procedures Manual and NOS Hydrographic Surveys Specifications and Deliverables.

The data were reviewed daily during acquisition and processing.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded to Atlantic Hydrographic Branch and should be attached to H11458 for final review and processing.

Approved and forwarded,

Kathryn Simmons
Team Leader

# H11458 Dton1

**Registry Number:** H11458

**State:** Washington

**Locality:** Commencement Bay

**Sub-locality:** Old Tacoma to Point Defiance

**Project Number:** OPR-N411-NRT3-07

**Survey Dates:** 06/25/2008 - 07/24/2008

Two uncharted shoals were found along the western shore of Commencement Bay near Longitude 122.465445 W.

## Charts Affected

| Number | Edition | Date | Scale (RNC) | RNC Correction(s)* |
|---|---|---|---|---|
| 18453 | 24th | 01/01/2003 | 1:15,000 (18453_1) | USCG LNM: 10/17/2006 (06/05/2007)<br>CHS NTM: None (04/27/2007)<br>NGA NTM: 02/26/2000 (06/09/2007) |
| 18474 | 8th | 10/01/2003 | 1:40,000 (18474_1) | [L]NTM: ? |
| 18445 | 31st | 04/01/2006 | 1:80,000 (18445_8)<br>1:40,000 (18445_7) | [L]NTM: ? |
| 18448 | 34th | 07/01/2006 | 1:80,000 (18448_1) | [L]NTM: ? |
| 18440 | 28th | 12/01/2005 | 1:150,000 (18440_1) | [L]NTM: ? |
| 18003 | 20th | 11/01/2006 | 1:736,560 (18003_1) | [L]NTM: ? |
| 18007 | 32nd | 07/01/2005 | 1:1,200,000 (18007_1) | [L]NTM: ? |
| 501 | 12th | 11/01/2002 | 1:3,500,000 (501_1) | [L]NTM: ? |
| 530 | 31st | 06/01/2005 | 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 |
|---|---|---|---|---|
| 1.1 | Shoal | 6.98 m | 47° 16' 41.1" N | 122° 28' 06.2" W |
| 1.2 | Shoal | 2.92 m | 47° 16' 35.2" N | 122° 27' 49.5" W |

# 1 - Danger To Navigation

## 1.1) Profile/Beam - 4085/123 from h11458 / s1212_simrad / 2008-177 / 004_1657

# DANGER TO NAVIGATION

## Survey Summary

**Survey Position:** 47° 16' 41.1" N, 122° 28' 06.2" W

**Least Depth:** 6.98 m (= 22.89 ft = 3.815 fm = 3 fm 4.89 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.608 m ; **TVU (TPEv)** ±0.724 m

**Timestamp:** 2008-177.17:10:21.439 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 004_1657

**Profile/Beam:** 4085/123

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Shoal, approx 8 ft high and 20 ft in diameter, with a least depth of 22.9 ft. Shoal is located along the 30 ft contour.

## Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/004_1657 | 4085/123 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101002100 | 0007 | 11.05 | 126.7 | Secondary (grouped) |

## Hydrographer Recommendations

Chart as shoal.

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

23ft (18453_1)

3 ¾fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

3fm 5ft (18445_7, 18474_1, 18445_8)

7.0m (501_1, 50_1)

## S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** INFORM - Large Mound
QUASOU - 1:depth known
STATUS - 1:permanent
TECSOU - 3:found by multi-beam
VALSOU - 6.976 m
WATLEV - 3:always under water/submerged

**Geo object 2:** Sounding (SOUNDG)

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area
INFORM - Mound
QUASOU - 1:depth known
STATUS - 1:permanent
TECSOU - 3:found by multi-beam

OFFICE NOTES

***Concur - Chart 23 ft depth.***

# 1.2) Profile/Beam - 490/94 from h11458 / s1212_simrad / 2008-206 / 001_1730

## DANGER TO NAVIGATION

## Survey Summary

**Survey Position:** 47° 16' 35.2" N, 122° 27' 49.5" W

**Least Depth:** 2.92 m (= 9.59 ft = 1.598 fm = 1 fm 3.59 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.401 m ; **TVU (TPEv)** ±0.187 m

**Timestamp:** 2008-206.17:31:40.131 (07/24/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-206 / 001_1730

**Profile/Beam:** 490/94

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Shoal, approx 10 ft high and 15 ft in diameter, with a least depth of 9.6 ft. The shoal is located very close to a 28 ft sounding.

## Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-206/001_1730 | 490/94 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101002100 | 0008 | 12.20 | 234.0 | Secondary |

## Hydrographer Recommendations

Chart as shoal. Delete charted 28 ft sounding

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

9ft (18453_1)

1 ½fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

1fm 3ft (18445_7, 18474_1, 18445_8)

2.9m (501_1, 50_1)

## S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** INFORM - Large Mound

QUASOU - 1:depth known

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 2.923 m

WATLEV - 3:always under water/submerged

**Geo object 2:** Sounding (SOUNDG)

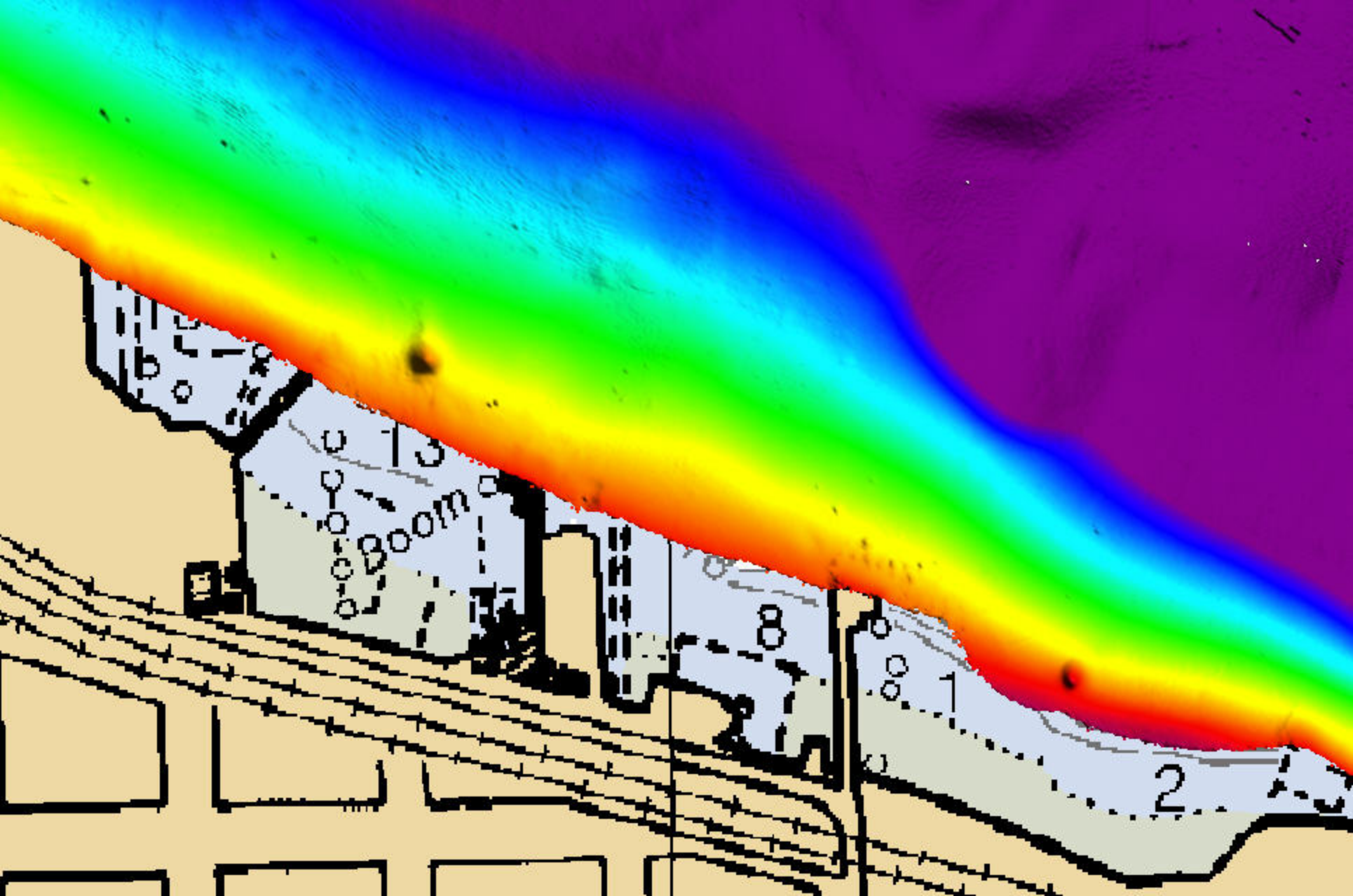
**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

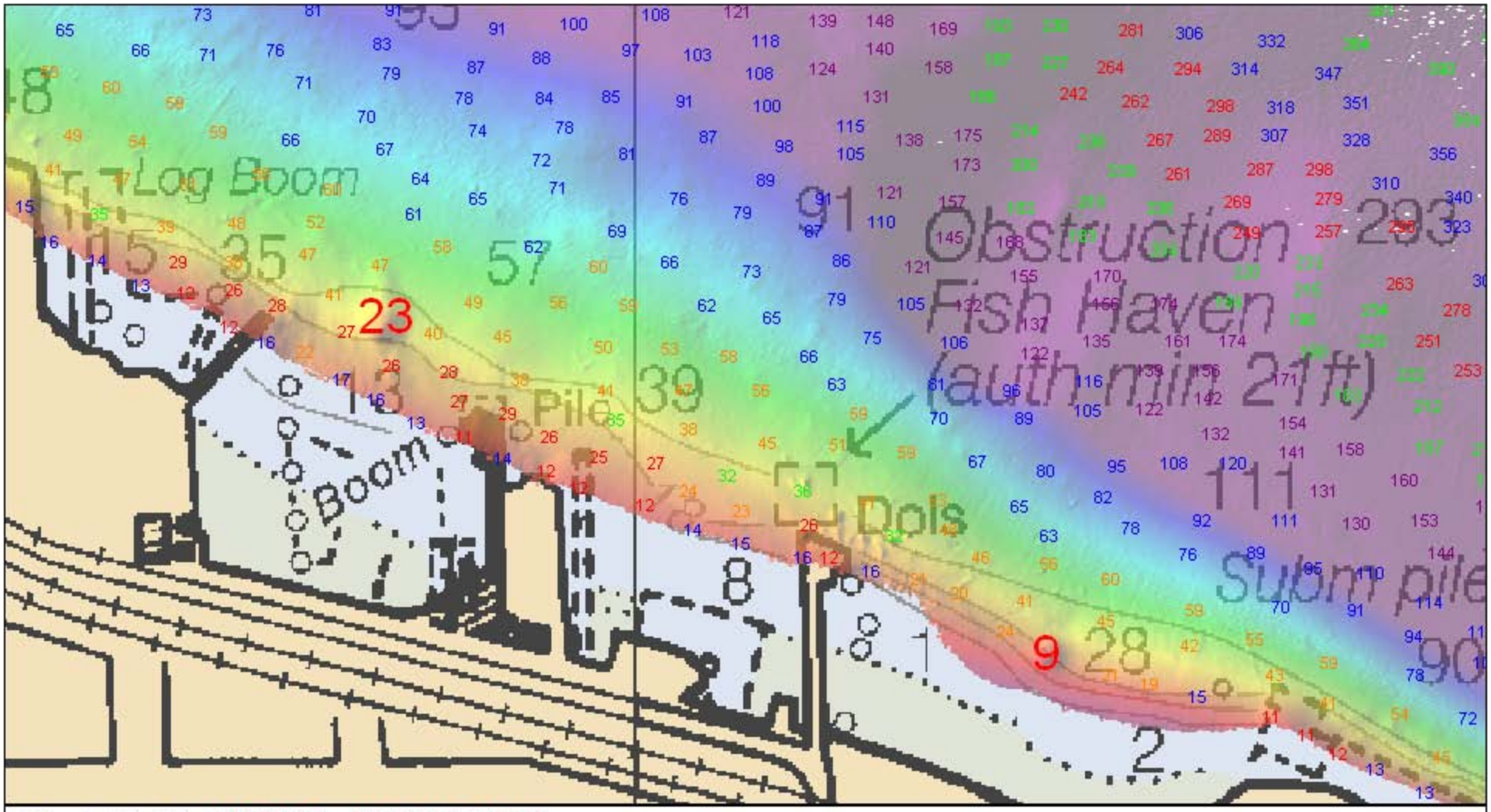
QUASOU - 1:depth known

TECSOU - 3:found by multi-beam

OFFICE NOTES

***Concur - Chart 9 ft depth.***


13
Boom
8
1
2




**Chartlet 1 of 1** *H11458 Dton Two Uncharted Shoals*

This chartlet has been corrected through
Notice to Mariners dated
NOT FOR NAVIGATION.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

| | |
|---|---|
| Project: | OPR-N411-NRT3-08 |
| Survey: | H11458 |
| State: | WA |
| Locality: | Commencement Bay |
| Sub-locality: | Old Tacoma to Point Defiance |
| Survey Scale: | 1:10,000 |

| | |
|---|---|
| Sounding Units: | Feet |
| Sounding Datum: | MLLW |
| Horizontal Datum: | NAD 83 |
| Chart Number: | 18453 |
| Chart Edition: | 24, Jan./03 |
| NOS Ref: | |

**NOAA NRT-3**
**Kathryn Simmons**
**Team Leader**

Survey Dates: May 19 to July 25, 2008

# H11458 Danger to Navigation Report #2

**Registry Number:** H11458

**State:** Washington

**Locality:** Commencement Bay

**Sub-locality:** Old Tacoma to Point Defiance

**Project Number:** OPR-N411-NRT3-07

**Survey Dates:** 05/19/2008 - 04/03/2009

Each of the submitted uncharted features qualify as a Danger to Navigation after discussion at the Atlantic Hydrographic Branch.

## Charts Affected

| Number | Edition | Date | Scale (RNC) | RNC Correction(s)* |
|---|---|---|---|---|
| 18453 | 25th | 10/01/2007 | 1:15,000 (18453_1) | USCG LNM: 02/19/2008 (01/13/2009)<br>CHS NTM: None (12/26/2008)<br>NGA NTM: 02/26/2000 (01/24/2009) |
| 18474 | 8th | 10/01/2003 | 1:40,000 (18474_1) | [L]NTM: ? |
| 18445 | 31st | 04/01/2006 | 1:80,000 (18445_8)<br>1:40,000 (18445_7) | [L]NTM: ? |
| 18448 | 34th | 07/01/2006 | 1:80,000 (18448_1) | [L]NTM: ? |
| 18440 | 28th | 12/01/2005 | 1:150,000 (18440_1) | [L]NTM: ? |
| 18003 | 20th | 11/01/2006 | 1:736,560 (18003_1) | [L]NTM: ? |
| 18007 | 32nd | 07/01/2005 | 1:1,200,000 (18007_1) | [L]NTM: ? |
| 501 | 12th | 11/01/2002 | 1:3,500,000 (501_1) | [L]NTM: ? |
| 530 | 31st | 06/01/2005 | 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. | Name | Feature Type | Survey Depth | Survey Latitude | Survey Longitude |
|---|---|---|---|---|---|
| 1.1 | 31 ft Sounding | Shoal | 9.66 m | 47° 17' 57.7" N | 122° 30' 04.0" W |
| 1.2 | 24 ft Rock | Rock | 7.36 m | 47° 18' 05.0" N | 122° 30' 14.2" W |
| 1.3 | 25 ft Sounding | Shoal | 7.78 m | 47° 17' 56.9" N | 122° 30' 06.1" W |
| 1.4 | 36 ft Obstruction | Obstruction | 11.11 m | 47° 18' 01.0" N | 122° 30' 06.3" W |

*Generated by Pydro v9.4 (r2680) on Mon Jun 01 19:10:48 2009 [UTC]*

# 1 - Danger To Navigation

## 1.1) 31 ft Sounding

# DANGER TO NAVIGATION

## Survey Summary

**Survey Position:** 47° 17' 57.7" N, 122° 30' 04.0" W

**Least Depth:** 9.66 m (= 31.71 ft = 5.285 fm = 5 fm 1.71 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.468 m ; **TVU (TPEv)** ±0.218 m

**Timestamp:** 2008-154.20:06:58.482 (06/02/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-154 / 032_1937

**Profile/Beam:** 9045/88

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Feature significantly shoaler than charted depth.

## Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-154/032_1937 | 9045/88 | 0.00 | 000.0 | Primary |
| h11458/s1212_simrad/2008-154/032_1937 | 9099/114 | 26.52 | 331.3 | Secondary (grouped) |

## Hydrographer Recommendations

Chart least depth sounding over feature.

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

31ft (18453_1)

5 ¼fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

5fm 1ft (18445_7, 18474_1, 18445_8)

9.7m (501_1, 50_1)

## S-57 Data

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

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 6:least depth known

SORDAT - 20090403

SORIND - US,US,nsurf,H11458

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

## Office Notes

***Concur with clarification --- Chart 31 ft depth.***

## Feature Images

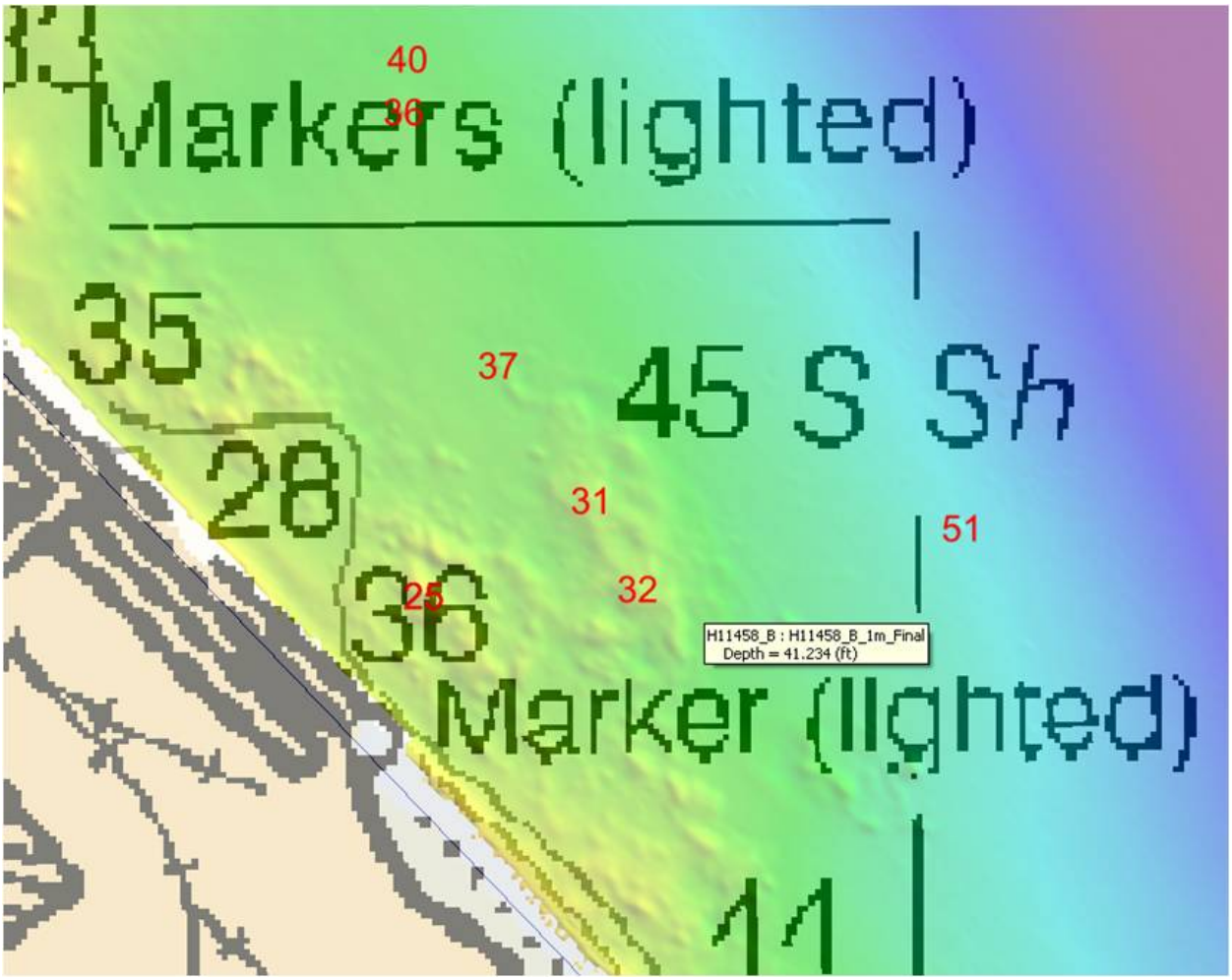



*Figure 1.1.1*

## 1.2) 24 ft Rock

# DANGER TO NAVIGATION

## Survey Summary

**Survey Position:** 47° 18' 05.0" N, 122° 30' 14.2" W

**Least Depth:** 7.36 m (= 24.14 ft = 4.023 fm = 4 fm 0.14 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.483 m ; **TVU (TPEv)** ±0.465 m

**Timestamp:** 2008-140.19:33:30.887 (05/19/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-140 / 010_1914

**Profile/Beam:** 6196/7

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Obstruction. This area is very rocky, with multiple obstructions. This is 24 ft sounding near a charted 43 sounding.

## Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-140/010_1914 | 6196/7 | 0.00 | 000.0 | Primary |
| h11458/s1212_simrad/2008-154/032_1937 | 8174/55 | 37.77 | 163.5 | Secondary (grouped) |
| h11458/s1212_simrad/2008-154/032_1937 | 8157/106 | 42.83 | 146.8 | Secondary (grouped) |
| h11458/s1212sss_100/2008-177/sonar_data080625202600 | 0002 | 51.17 | 158.2 | Secondary (grouped) |
| h11458/s1212_simrad/2008-140/010_1914 | 6057/58 | 63.05 | 131.9 | Secondary (grouped) |
| h11458/s1212_simrad/2008-178/004_1817 | 2072/122 | 63.08 | 130.4 | Secondary (grouped) |

## Hydrographer Recommendations

Delete 43 charted sounding. Chart 24 ft sounding at surveyed location.

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

24ft (18453_1)

4fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

4fm 0ft (18445_7, 18474_1, 18445_8)

7.4m (501_1, 50_1)

## S-57 Data

| | |
|---|---|
| **Geo object 1:** | Underwater rock / awash rock (UWTROC) |
| **Attributes:** | QUASOU - 6:least depth known |
| | SORDAT - 20090403 |
| | SORIND - US,US,nsurf,H11458 |
| | STATUS - 1:permanent |
| | TECSOU - 3:found by multi-beam |
| | VALSOU - 7.358 m |
| | WATLEV - 3:always under water/submerged |

## Office Notes

***Do not concur - Chart a rock with a depth of 24 feet in Latitude 47° 18' 04.96" N, Longitude 122° 30' 14.22" W. Add 24 Rk and danger curve.***

## Feature Images

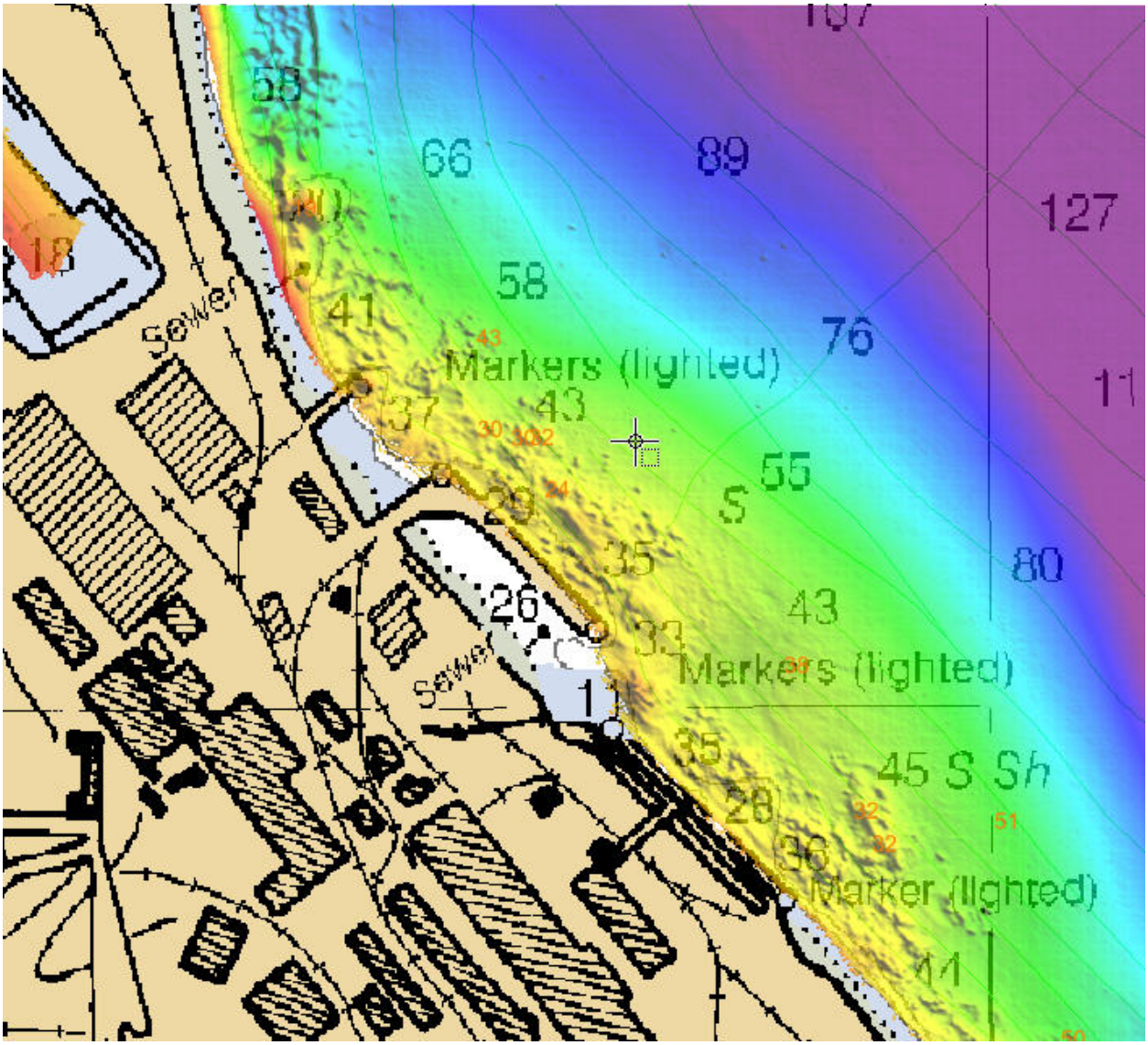



*Figure 1.2.1*

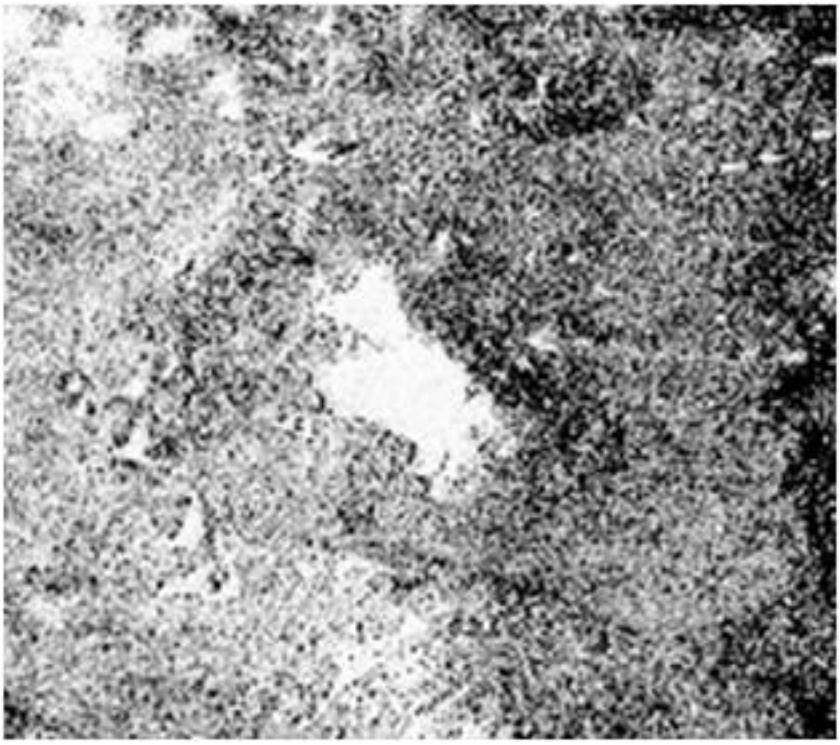


*Figure 1.2.2*

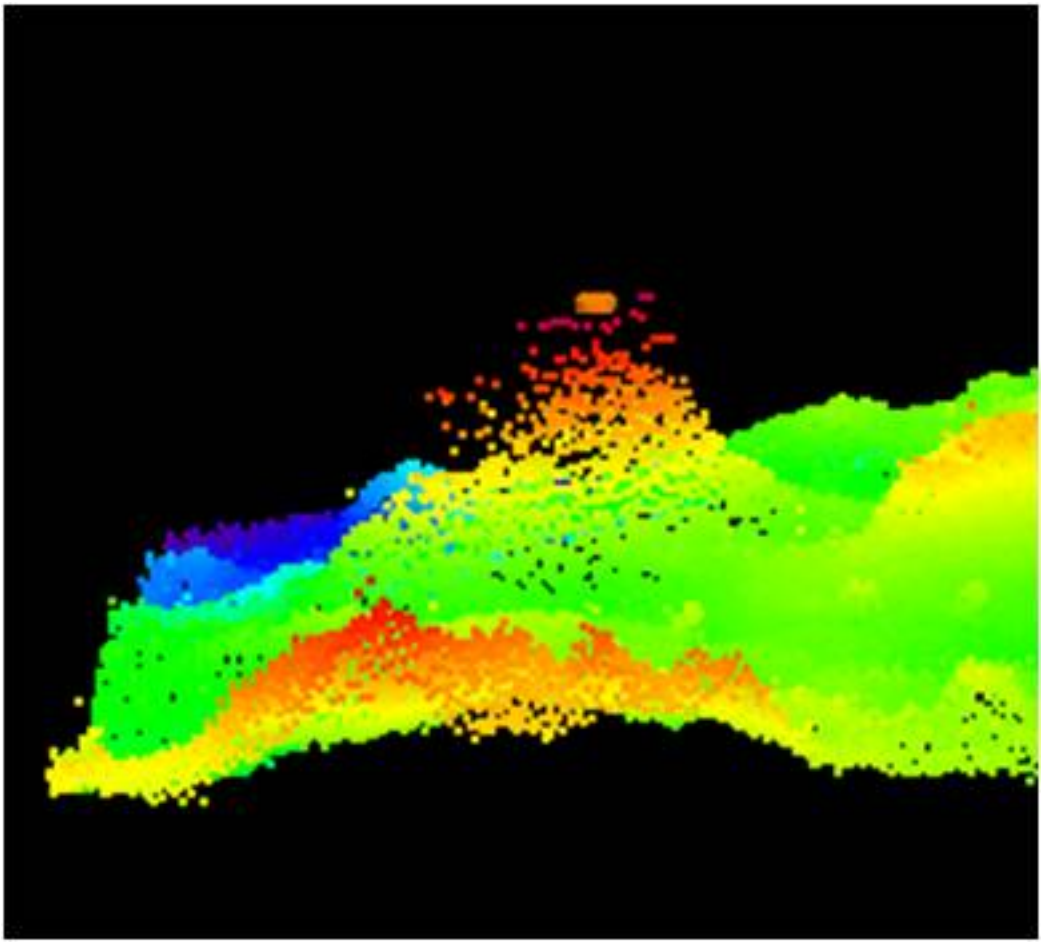


*Figure 1.2.3*

## 1.3) 25 ft Sounding

# DANGER TO NAVIGATION

## Survey Summary

**Survey Position:** 47° 17' 56.9" N, 122° 30' 06.1" W

**Least Depth:** 7.78 m (= 25.52 ft = 4.254 fm = 4 fm 1.52 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.477 m ; **TVU (TPEv)** ±0.295 m

**Timestamp:** 2008-178.18:20:06.846 (06/26/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-178 / 004_1817

**Profile/Beam:** 938/102

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

25.5 ft sounding on charted 36 ft sounding.

## Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-178/004_1817 | 938/102 | 0.00 | 000.0 | Primary |

## Hydrographer Recommendations

Chart current survey depths.

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

25ft (18453_1)

4 ¼fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

4fm 1ft (18445_7, 18474_1, 18445_8)

7.8m (501_1, 50_1)

## S-57 Data

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

**Attributes:** QUASOU - 6:least depth known

SORDAT - 20090404

SORIND - US,US,nsurf,H11458

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

## Office Notes

***Concur with clarification - Chart 25 ft depth.***

## Feature Images

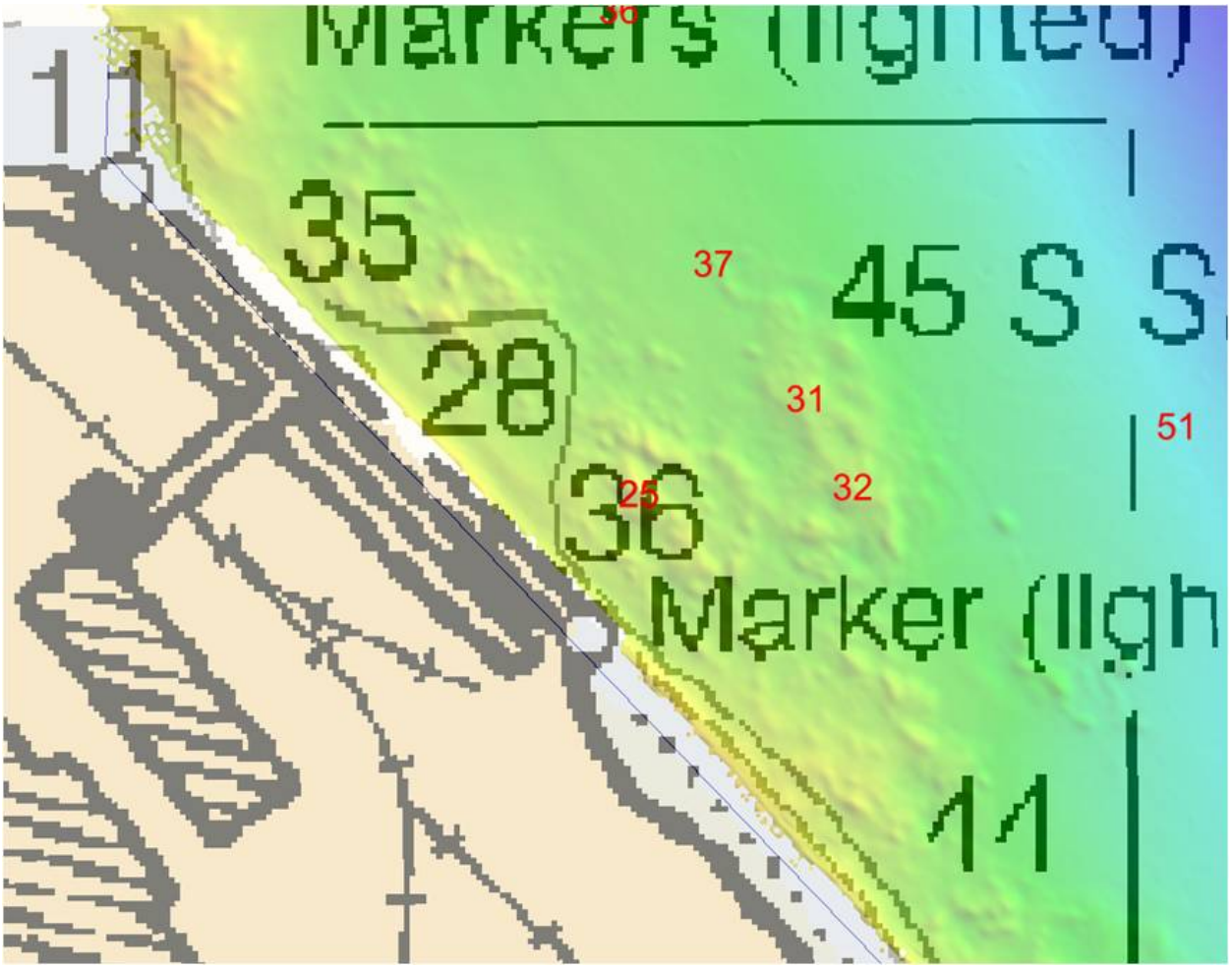



*Figure 1.3.1*

## 1.4) 36 ft Obstruction

# DANGER TO NAVIGATION

## Survey Summary

**Survey Position:** 47° 18' 01.0" N, 122° 30' 06.3" W

**Least Depth:** 11.11 m (= 36.46 ft = 6.076 fm = 6 fm 0.46 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.581 m ; **TVU (TPEv)** ±0.466 m

**Timestamp:** 2009-093.18:48:11.251 (04/03/2009)

**Survey Line:** h11458 / s1212_simrad / 2009-093 / 006_1847a

**Profile/Beam:** 371/109

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Designated because base surface did not honor shoal sounding.

## Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2009-093/006_1847a | 371/109 | 0.00 | 000.0 | Primary |
| h11458/s1212_simrad/2008-169/001_2007 | 975/86 | 0.37 | 036.6 | Secondary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101005100 | 0006 | 17.61 | 111.1 | Secondary |

## Hydrographer Recommendations

[None]

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

36ft (18453_1)

6fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

6fm 0ft (18445_7, 18474_1, 18445_8)

11.1m (501_1, 50_1)

## S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** QUASOU - 6:least depth known
SORDAT - 20090403
SORIND - US,US,nsurf,H11458
TECSOU - 3:found by multi-beam
VALSOU - 11.112 m
WATLEV - 3:always under water/submerged

## Office Notes

***Concur with clarification - Chart an obstruction with a depth of 36 feet in Latitude 47° 18' 01.0" N, Longitude 122° 30' 06.3" W. Add 36 Obstn and danger curve.***

## Feature Images

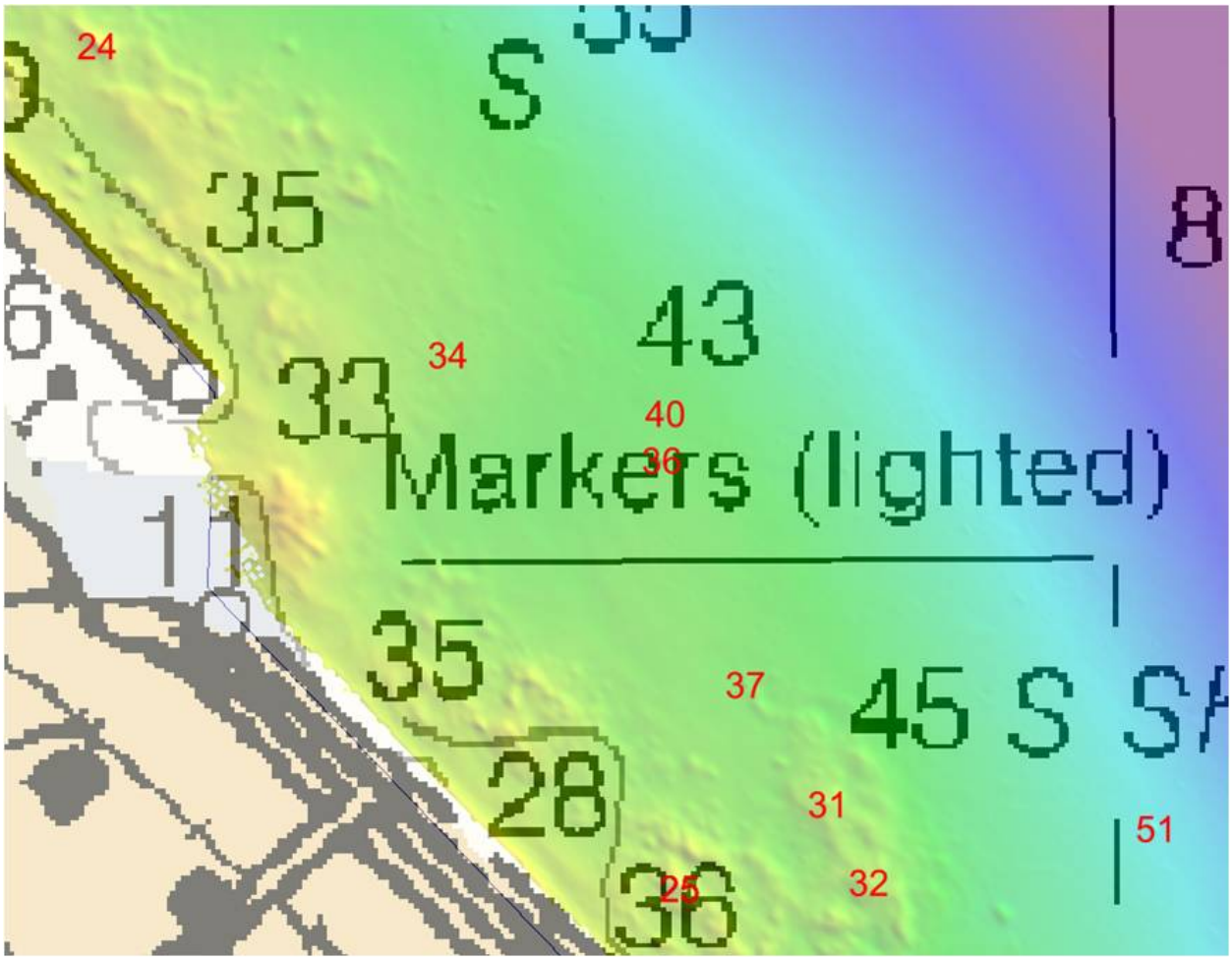



*Figure 1.4.1*

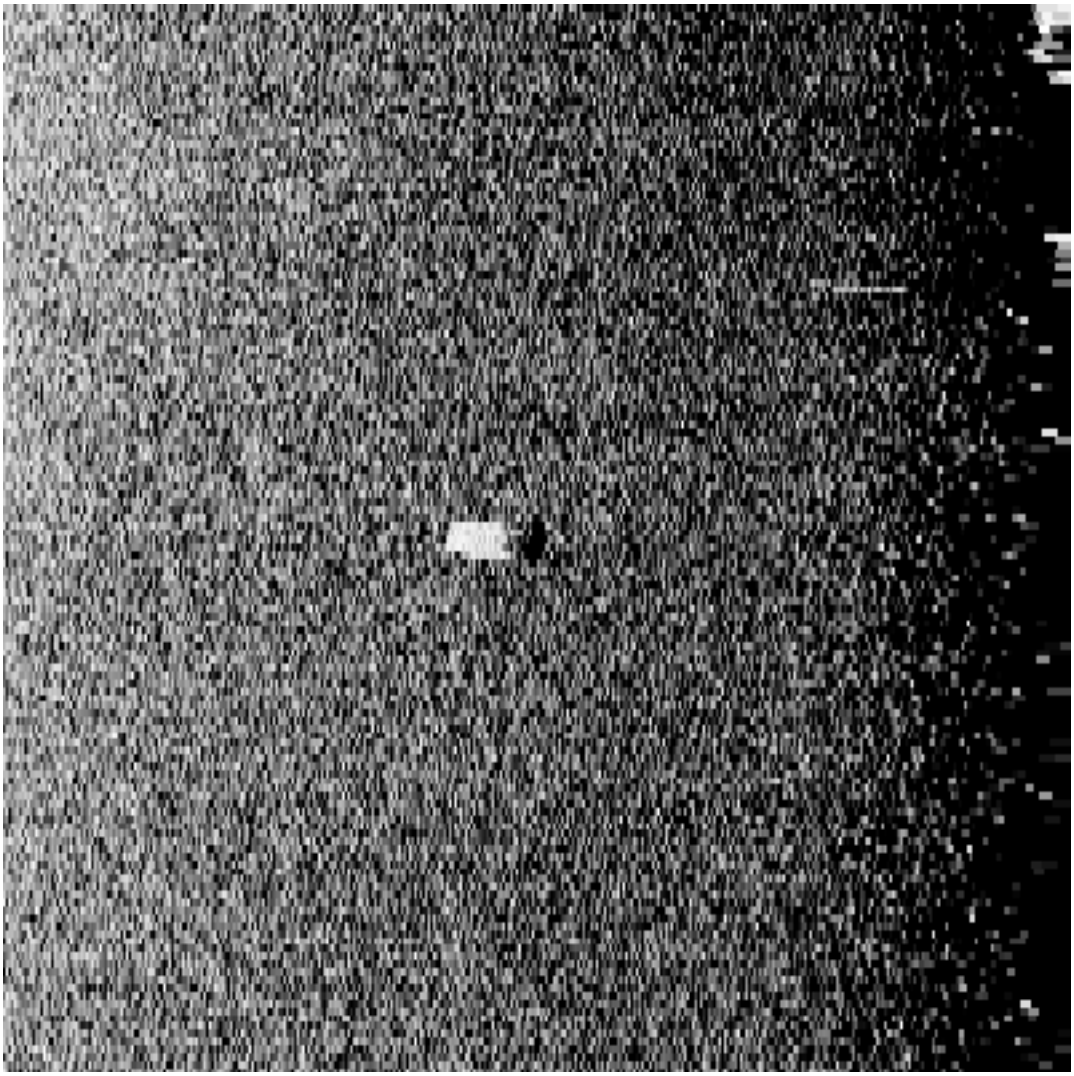


*Figure 1.4.2*

# AWOIS Report

**Registry Number:** H11458

**State:** Washington

**Locality:** Commencement Bay

**Sub-locality:** Old Tacoma to Point Defiance

**Project Number:** OPR-N411-NRT3-07

**Survey Date:** 07/24/2008

## Charts Affected

| Number | Edition | Date | Scale (RNC) | RNC Correction(s)* |
|---|---|---|---|---|
| 18453 | 25th | 10/01/2007 | 1:15,000 (18453_1) | USCG LNM: 02/19/2008 (01/13/2009)<br>CHS NTM: None (12/26/2008)<br>NGA NTM: 02/26/2000 (01/24/2009) |
| 18474 | 8th | 10/01/2003 | 1:40,000 (18474_1) | [L]NTM: ? |
| 18445 | 31st | 04/01/2006 | 1:80,000 (18445_8)<br>1:40,000 (18445_7) | [L]NTM: ? |
| 18448 | 34th | 07/01/2006 | 1:80,000 (18448_1) | [L]NTM: ? |
| 18440 | 28th | 12/01/2005 | 1:150,000 (18440_1) | [L]NTM: ? |
| 18003 | 20th | 11/01/2006 | 1:736,560 (18003_1) | [L]NTM: ? |
| 18007 | 32nd | 07/01/2005 | 1:1,200,000 (18007_1) | [L]NTM: ? |
| 501 | 12th | 11/01/2002 | 1:3,500,000 (501_1) | [L]NTM: ? |
| 530 | 31st | 06/01/2005 | 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. | Name | Feature Type | Survey Depth | Survey Latitude | Survey Longitude | AWOIS Item |
|---|---|---|---|---|---|---|
| 1.1 | AWOIS# 52306 | Obstruction | 5.64 m | 47° 18' 29.0" N | 122° 31' 06.7" W | 52306 |

# 1 - DR_AWOIS

## 1.1) AWOIS# 52306

### Primary Feature for AWOIS Item #52306

**Search Position:** 47° 18' 29.6" N, 122° 31' 06.9" W

**Historical Depth:** [None]

**Search Radius:** 30

**Search Technique:** S2, ES, DI, SD,VS

**Technique Notes:** [None]

**History Notes:**

HISTORY■ CL1401/82--USACE PUBLIC NOTICE 071-0YB-2-006466; ESTABLISHES A ìWATER INTAKE STRUCTURE WITH AN OFFSHORE INTAKE TOWER (THE AWOIS ìITEM). THIS INTAKE TOWER IS CHARTED AS A HIGH WATER FEATURE. ìTHIS FEATURE DOES NOT APPEAR ON DM-10044 (1994). THE CHART ìLETTER SHOWS THIS INTAKE TOWER TO BE A 5-FOOT DIAMETER CONCRETE ìPIPE RISING 7 FEET OFF THE BOTTOM AND HAVING A LEAST DEPTH OF ì33.3 FEET (MLLW). (ENTERED 6/96 BY MBH)■FE427/96--S-N903-PHP-96; INADEQUATE INVESTIGATION. ONLY ìCONDUCTED A VISUAL SEARCH FOR THE ITEM. (UPDATED 10/97 BY MBH)

### Survey Summary

**Survey Position:** 47° 18' 29.0" N, 122° 31' 06.7" W

**Least Depth:** 5.64 m (= 18.52 ft = 3.086 fm = 3 fm 0.52 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.427 m ; **TVU (TPEv)** ±0.173 m

**Timestamp:** 2008-206.18:01:37.980 (07/24/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-206 / 001_1800

**Profile/Beam:** 489/54

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Obstruction: AWOIS Item#52306

AWOIS item#52306, charted as obstruction, found with SSS. Obstruction is approx 20 meters from charted location. A least depth of 18.6 ft was obtained by MBES.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-206/001_1800 | 489/54 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100/2008-177/sonar_data080625200000 | 0002 | 7.45 | 274.9 | Secondary |

| | | | | |
|---|---|---|---|---|
| Tacoma Awois | AWOIS # 52306 | 20.68 | 168.2 | Secondary |

## Hydrographer Recommendations

Modify charted position of Obstruction to surveyed location. Update AWOIS database

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

18ft (18453_1)

3fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

3fm 0ft (18445_7, 18474_1, 18445_8)

5.6m (501_1, 50_1)

## S-57 Data

| | |
|---|---|
| **Geo object 1:** | Obstruction (OBSTRN) |
| **Attributes:** | CATOBS - 1:snag / stump |
| | QUASOU - 1:depth known |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | STATUS - 1:permanent |
| | TECSOU - 2:found by side scan sonar |
| | VALSOU - 5.644 m |
| | WATLEV - 3:always under water/submerged |
| **Geo object 2:** | Sounding (SOUNDG) |
| **Attributes:** | QUASOU - 1:depth known |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | TECSOU - 3:found by multi-beam |

## Office Notes

Concur with clarification - Delete charted obstruction.
Chart an obstruction with depth of 18 feet in Latitude 47°18' 28.99"N, Longitude 122° 31' 06.71" W.
Add 18 Obstn and danger curve.

# Feature Images

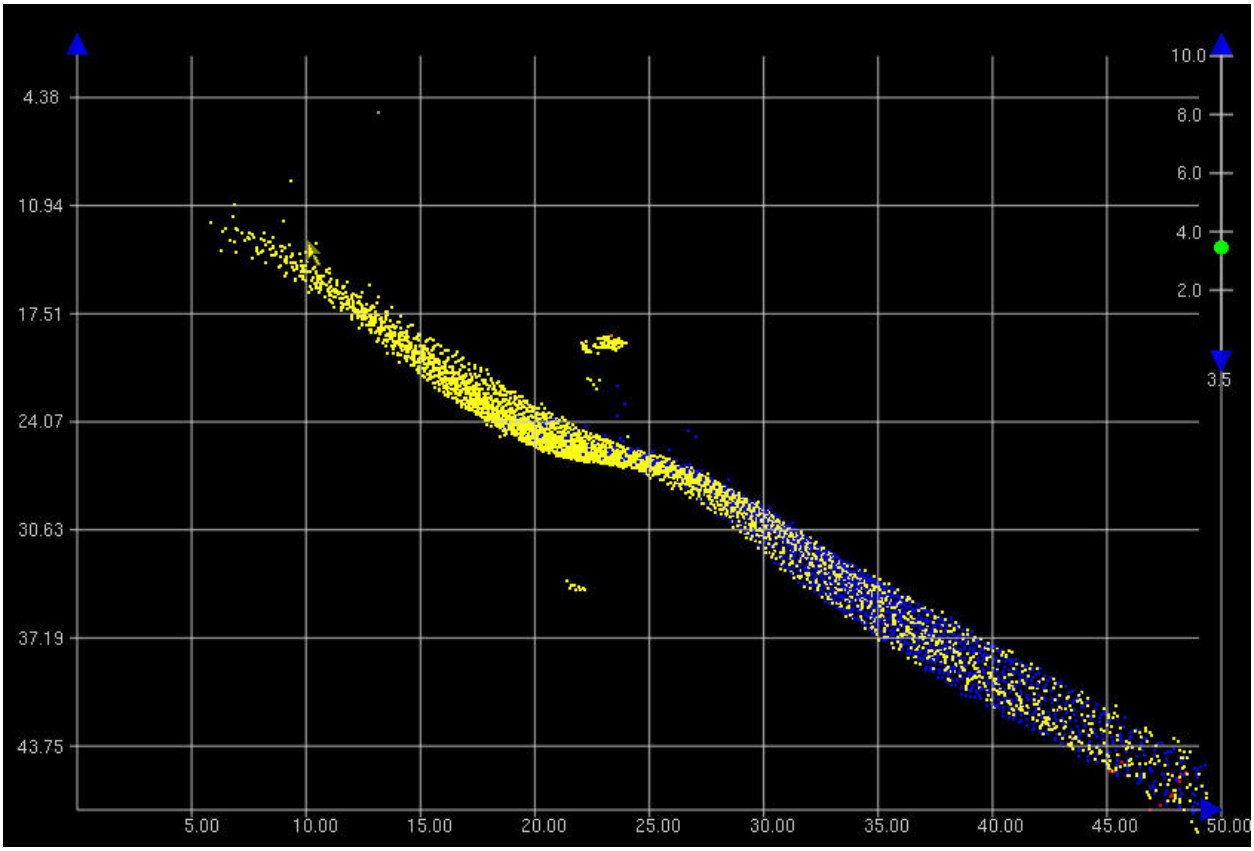



*Figure 1.1.1*

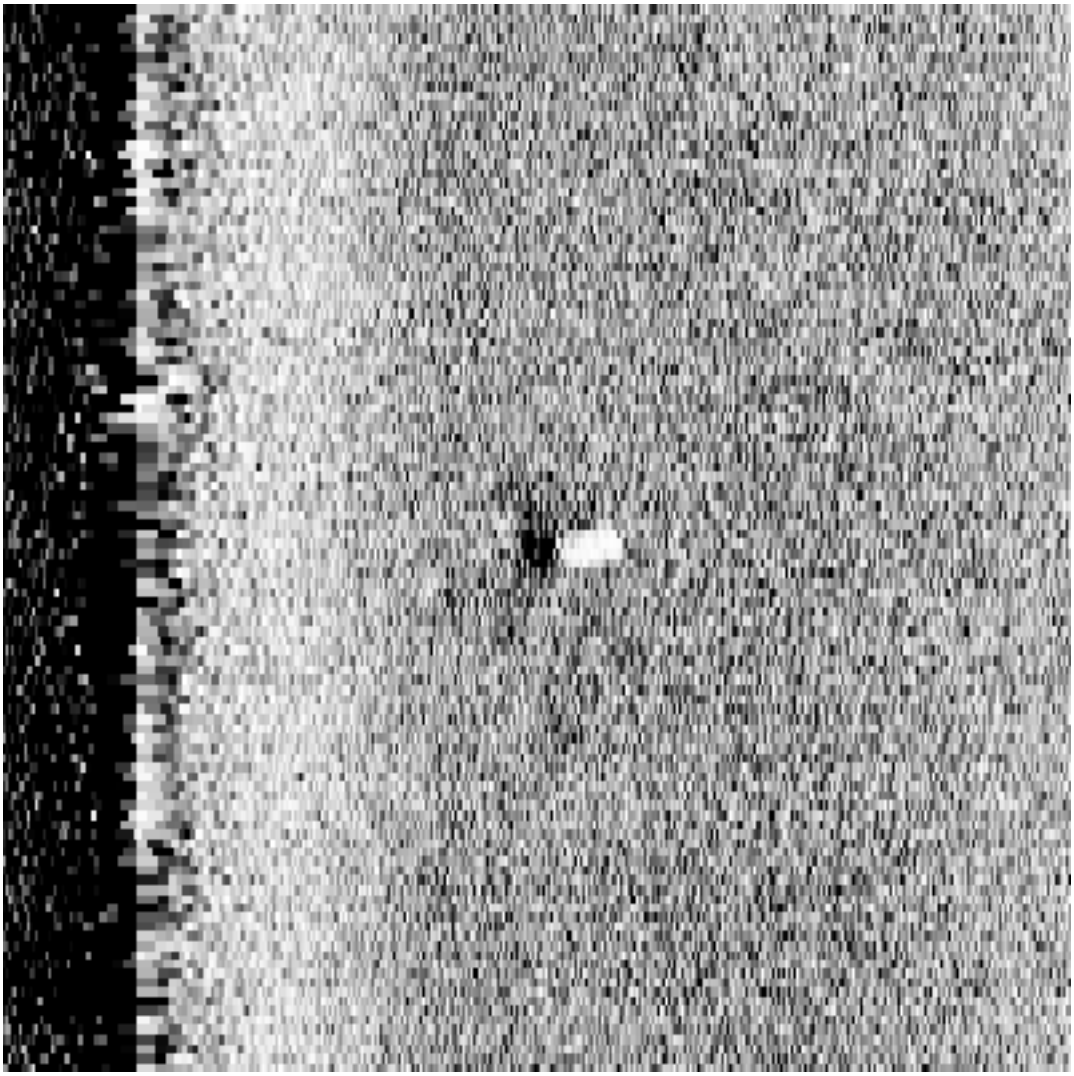


*Figure 1.1.2*

# Uncharted Items Report

**Registry Number:** H11458

**State:** Washington

**Locality:** Commencement Bay

**Sub-locality:** Old Tacoma to Point Defiance

**Project Number:** OPR-N411-NRT3-07

**Survey Dates:** 05/19/2008 - 04/03/2009

## Charts Affected

| Number | Edition | Date | Scale (RNC) | RNC Correction(s)* |
|---|---|---|---|---|
| 18453 | 25th | 10/01/2007 | 1:15,000 (18453_1) | USCG LNM: 02/19/2008 (01/13/2009)<br>CHS NTM: None (12/26/2008)<br>NGA NTM: 02/26/2000 (01/24/2009) |
| 18474 | 8th | 10/01/2003 | 1:40,000 (18474_1) | [L]NTM: ? |
| 18445 | 31st | 04/01/2006 | 1:80,000 (18445_8)<br>1:40,000 (18445_7) | [L]NTM: ? |
| 18448 | 34th | 07/01/2006 | 1:80,000 (18448_1) | [L]NTM: ? |
| 18440 | 28th | 12/01/2005 | 1:150,000 (18440_1) | [L]NTM: ? |
| 18003 | 20th | 11/01/2006 | 1:736,560 (18003_1) | [L]NTM: ? |
| 18007 | 32nd | 07/01/2005 | 1:1,200,000 (18007_1) | [L]NTM: ? |
| 501 | 12th | 11/01/2002 | 1:3,500,000 (501_1) | [L]NTM: ? |
| 530 | 31st | 06/01/2005 | 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. | Name | Feature Type | Survey Depth | Survey Latitude | Survey Longitude | AWOIS Item |
|---|---|---|---|---|---|---|
| 1.1 | 5088 | Shoal | [None] | 47° 18' 53.6" N | 122° 31' 46.4" W | --- |
| 1.2 | 5089B | Shoal | [None] | 47° 18' 10.7" N | 122° 30' 23.9" W | --- |
| 1.3 | 5089E | Shoal | [None] | 47° 17' 40.8" N | 122° 29' 46.3" W | --- |
| 1.4 | 87 ft Sounding | Obstruction | 26.68 m | 47° 18' 32.7" N | 122° 31' 04.0" W | --- |
| 1.5 | 90 ft Sounding | Obstruction | 27.64 m | 47° 18' 48.2" N | 122° 31' 27.4" W | --- |
| 1.6 | 51 ft Sounding | Obstruction | 15.53 m | 47° 17' 57.4" N | 122° 29' 59.4" W | --- |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1.7 | 34 ft Sounding | Shoal | 10.33 m | 47° 18' 02.0" N | 122° 30' 09.3" W | --- |
| 1.8 | 50 ft Sounding | Obstruction | 15.37 m | 47° 17' 52.5" N | 122° 29' 57.2" W | --- |
| 1.9 | 37 ft Sounding | Shoal | 11.41 m | 47° 17' 58.8" N | 122° 30' 05.1" W | --- |
| 1.10 | 32 ft Obstruction | Obstruction | 9.88 m | 47° 17' 47.6" N | 122° 29' 54.0" W | --- |
| 1.11 | 41 ft Obstruction | Obstruction | 12.59 m | 47° 17' 48.8" N | 122° 29' 55.3" W | --- |
| 1.12 | 28 ft Subm Piling | Obstruction | 8.49 m | 47° 16' 40.2" N | 122° 28' 04.6" W | --- |
| 1.13 | 48 ft Sounding | Obstruction | 14.77 m | 47° 16' 36.7" N | 122° 27' 49.5" W | --- |
| 1.14 | 60 ft Sounding | Shoal | 18.37 m | 47° 17' 02.1" N | 122° 28' 51.6" W | --- |
| 1.15 | 36 ft Sounding | Shoal | 11.16 m | 47° 17' 04.8" N | 122° 28' 59.1" W | --- |
| 1.16 | Subm piling | Obstruction | [None] | 47° 16' 37.5" N | 122° 27' 50.2" W | --- |
| 1.17 | 53 ft Sounding | Shoal | 16.23 m | 47° 16' 45.5" N | 122° 28' 14.7" W | --- |
| 1.18 | 59 ft Sounding | Obstruction | 17.97 m | 47° 16' 44.9" N | 122° 28' 11.5" W | --- |
| 1.19 | 46 ft Sounding | Obstruction | 14.07 m | 47° 17' 08.9" N | 122° 29' 02.7" W | --- |
| 1.20 | 30 ft Sounding | Shoal | 9.36 m | 47° 17' 05.3" N | 122° 29' 00.2" W | --- |
| 1.21 | 64 ft Sounding | Shoal | 19.48 m | 47° 16' 52.1" N | 122° 28' 28.0" W | --- |
| 1.22 | 15 ft Sounding | Shoal | 4.79 m | 47° 17' 38.8" N | 122° 29' 42.9" W | --- |
| 1.23 | 49 ft Sounding | Mooring buoy | 15.01 m | 47° 16' 55.2" N | 122° 28' 34.9" W | --- |
| 1.24 | 19 ft Sounding | Obstruction | 5.78 m | 47° 18' 11.4" N | 122° 30' 22.6" W | --- |
| 1.25 | 47 ft Sounding | Obstruction | 14.31 m | 47° 16' 42.1" N | 122° 28' 06.3" W | --- |
| 1.26 | Sewage Outfall | Pipe | 40.81 m | 47° 17' 14.5" N | 122° 29' 03.0" W | --- |
| 1.27 | 40 ft Sounding | Shoal | 12.35 m | 47° 17' 01.9" N | 122° 28' 53.5" W | --- |
| 1.28 | 10 ft Sounding | Shoal | 3.07 m | 47° 17' 38.7" N | 122° 29' 44.1" W | --- |
| 1.29 | 12 ft Sounding | Shoal | 3.65 m | 47° 17' 46.3" N | 122° 29' 55.6" W | --- |
| 1.30 | 40 ft Sounding | Shoal | 12.21 m | 47° 18' 01.4" N | 122° 30' 06.2" W | --- |
| 1.31 | 22 ft Sounding | Shoal | 6.82 m | 47° 18' 22.9" N | 122° 30' 48.6" W | --- |
| 1.32 | 83 ft Sounding | Shoal | 25.35 m | 47° 18' 53.5" N | 122° 31' 43.0" W | --- |

# 1 - DR_UnCharted

## 1.1) 5088

### Survey Summary

| | |
|---|---|
| **Survey Position:** | 47° 18' 53.6" N, 122° 31' 46.4" W |
| **Least Depth:** | [None] |
| **TPU (±1.96σ):** | **THU (TPEh)** [None] ; **TVU (TPEv)** [None] |
| **Timestamp:** | 2008-164.17:19:01.000 (06/12/2008) |
| **DP Dataset:** | h11458 / 1212dpnones / 2008-164 / detachedpositions 164 |
| **Profile/Beam:** | 1/1 |
| **Charts Affected:** | 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1 |

**Remarks:**

Row of four piles not seen visually, on SSS, or MBES.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/1212dpnones/2008-164/detachedpositions 164 | 1/1 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

Remove from Chart

### S-57 Data

[None]

### Office Notes

***Concur. Delete the 4 charted piles.***

## 1.2) 5089B

### Survey Summary

| | |
|---|---|
| **Survey Position:** | 47° 18' 10.7" N, 122° 30' 23.9" W |
| **Least Depth:** | [None] |
| **TPU (±1.96σ):** | **THU (TPEh)** [None] ; **TVU (TPEv)** [None] |
| **Timestamp:** | 2008-164.17:47:27.000 (06/12/2008) |
| **DP Dataset:** | h11458 / 1212dpnones / 2008-164 / detachedpositions 164 |
| **Profile/Beam:** | 4/1 |
| **Charts Affected:** | 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1 |

**Remarks:**

Sewer Pipe

Located 36 meters @ 310 deg from charted position.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/1212dpnones/2008-164/detachedpositions 164 | 4/1 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

Modify charted position.

### S-57 Data

| | |
|---|---|
| **Geo object 1:** | Pipeline, submarine/on land (PIPSOL) |
| **Attributes:** | CATPIP - 2:outfall pipe |
| | INFORM - Located 36 meters @ 310 deg from charted position. |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | STATUS - 1:permanent |

## Office Notes

***Concur with clarification. The location of the sewer pipe is not evident in the data and the assumption is made that the field unit located the pipe visually. Defer to MCD for final charting recommendation.***

# Feature Images

*Figure 1.2.1*

## 1.3) 5089E

### Survey Summary

**Survey Position:** 47° 17' 40.8" N, 122° 29' 46.3" W

**Least Depth:** [None]

**TPU (±1.96σ):** **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

**Timestamp:** 2008-164.18:07:53.000 (06/12/2008)

**DP Dataset:** h11458 / 1212dpnones / 2008-164 / detachedpositions 164

**Profile/Beam:** 7/1

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

No Visible pile. Pile ruins not seen SSS or in SWMB data.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/1212dpnones/2008-164/detachedpositions 164 | 7/1 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

Delete visible Pile. Retain charted ruins

### S-57 Data

**Geo object 1:** Pile (PILPNT)

**Attributes:** CATPLE - 3:post

INFORM - Pile not present.

SORDAT - 20080724

SORIND - US,US,survy,H11458

### Office Notes

***Concur with clarification - Not adequate investigation by field unit. Revise charted pile to Obstn (Subm pile).***

# Feature Images

*Figure 1.3.1*

## 1.4) 87 ft Sounding

### Survey Summary

**Survey Position:** 47° 18' 32.7" N, 122° 31' 04.0" W

**Least Depth:** 26.68 m (= 87.53 ft = 14.589 fm = 14 fm 3.53 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.920 m ; **TVU (TPEv)** ±0.235 m

**Timestamp:** 2008-154.20:29:18.725 (06/02/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-154 / 031_2018

**Profile/Beam:** 3224/70

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Man made feature observed on bottom, located 130 meters offshore of charted obstruction. Not significant, height less than 10% of water depth.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-154/031_2018 | 3224/70 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100/2008-177/sonar_data080625201600 | 0001 | 34.10 | 248.8 | Secondary (grouped) |
| h11458/s1212sss_100_time/2008-140/sonar_data000101005100 | 0003 | 45.97 | 128.3 | Secondary (grouped) |

### Hydrographer Recommendations

Recommend chart current survey depths.

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:**

CATOBS - 1:snag / stump

QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

TECSOU - 3:found by multi-beam

VALSOU - 26.680 m

WATLEV - 3:always under water/submerged

**Geo object 2:** Sounding (SOUNDG)

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

SORDAT - 20080724

SORIND - US,US,survy,H11458

TECSOU - 3:found by multi-beam

## Office Notes

***Concur. Chart sounding data.***

# Feature Images

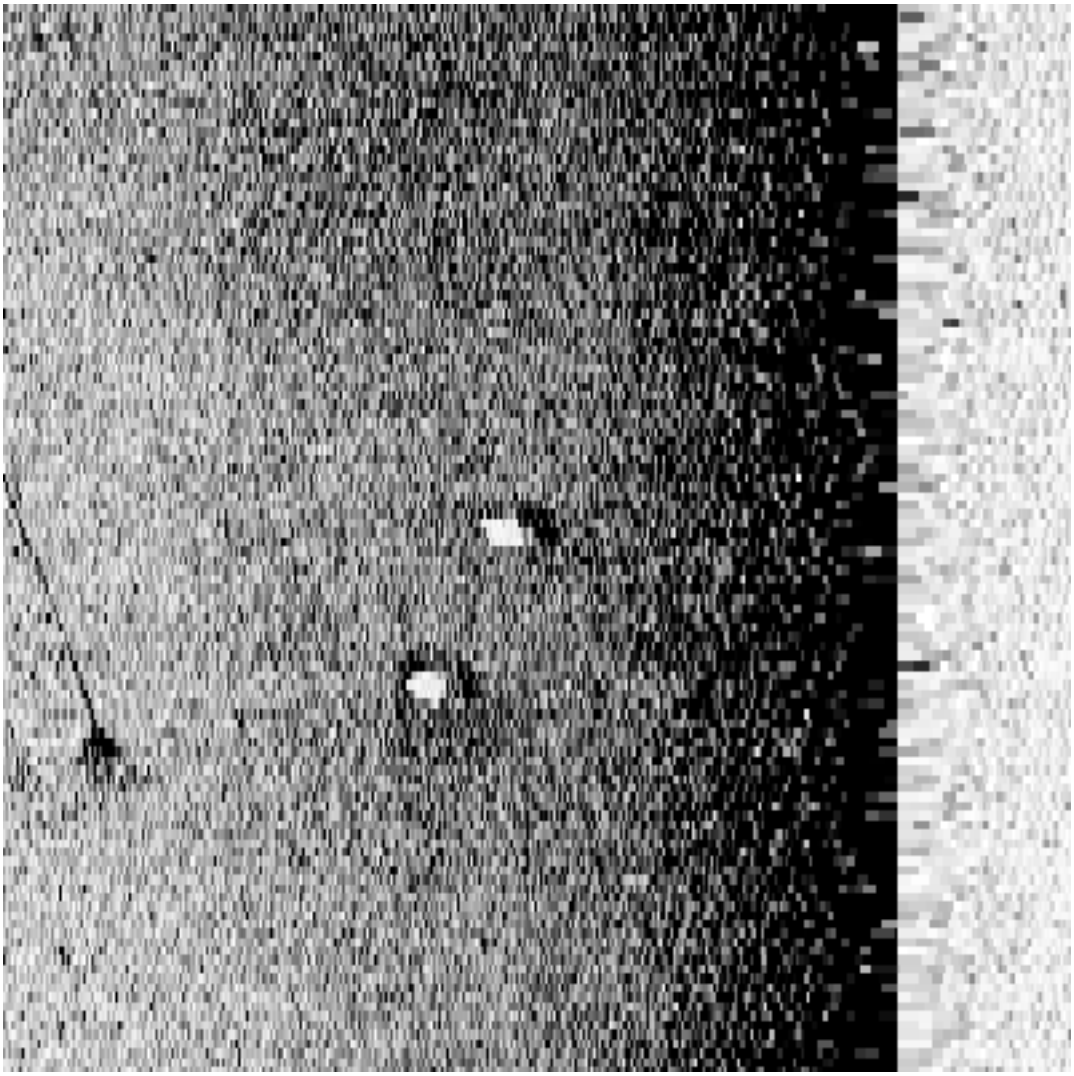


*Figure 1.4.1*

## 1.5) 90 ft Sounding

### Survey Summary

**Survey Position:** 47° 18' 48.2" N, 122° 31' 27.4" W

**Least Depth:** 27.64 m (= 90.67 ft = 15.111 fm = 15 fm 0.67 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±2.223 m ; **TVU (TPEv)** ±1.066 m

**Timestamp:** 2008-154.20:31:51.061 (06/02/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-154 / 031_2018

**Profile/Beam:** 3945/111

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Large feature, height is greater than 10% of water depth.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-154/031_2018 | 3945/111 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101005100 | 0004 | 32.19 | 120.5 | Secondary (grouped) |

### Hydrographer Recommendations

Chart as obstruction.

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

90ft (18453_1)

15fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

15fm (18445_7, 18474_1, 18445_8)

28m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** VALSOU - 27.635 m

**Geo object 2:** Sounding (SOUNDG)

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

## Office Notes

***Concur - Chart 90 ft depth.***

# Feature Images

*Figure 1.5.1*

## 1.6) 51 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 57.4" N, 122° 29' 59.4" W

**Least Depth:** 15.53 m (= 50.94 ft = 8.489 fm = 8 fm 2.94 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.598 m ; **TVU (TPEv)** ±0.263 m

**Timestamp:** 2008-154.20:21:35.641 (06/02/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-154 / 031_2018

**Profile/Beam:** 882/43

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Submerged rock, just under HSSD criteria for significant.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-154/031_2018 | 882/43 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101005100 | 0005 | 27.72 | 119.4 | Secondary (grouped) |

### Hydrographer Recommendations

Feature does not pose signifcant hazard. Recommend chart current survey depths.

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

51ft (18453_1)

8 ½fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

8fm 3ft (18445_7, 18474_1, 18445_8)

15.5m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

| | |
|---|---|
| | STATUS - 1:permanent |
| | TECSOU - 2:found by side scan sonar |
| | VALSOU - 15.525 m |
| | WATLEV - 3:always under water/submerged |
| **Geo object 2:** | Sounding (SOUNDG) |
| **Attributes:** | EXPSOU - 2:shoaler than range of depth of the surrounding depth area |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | TECSOU - 3:found by multi-beam |

## Office Notes

***Concur. Chart sounding data.***

# Feature Images

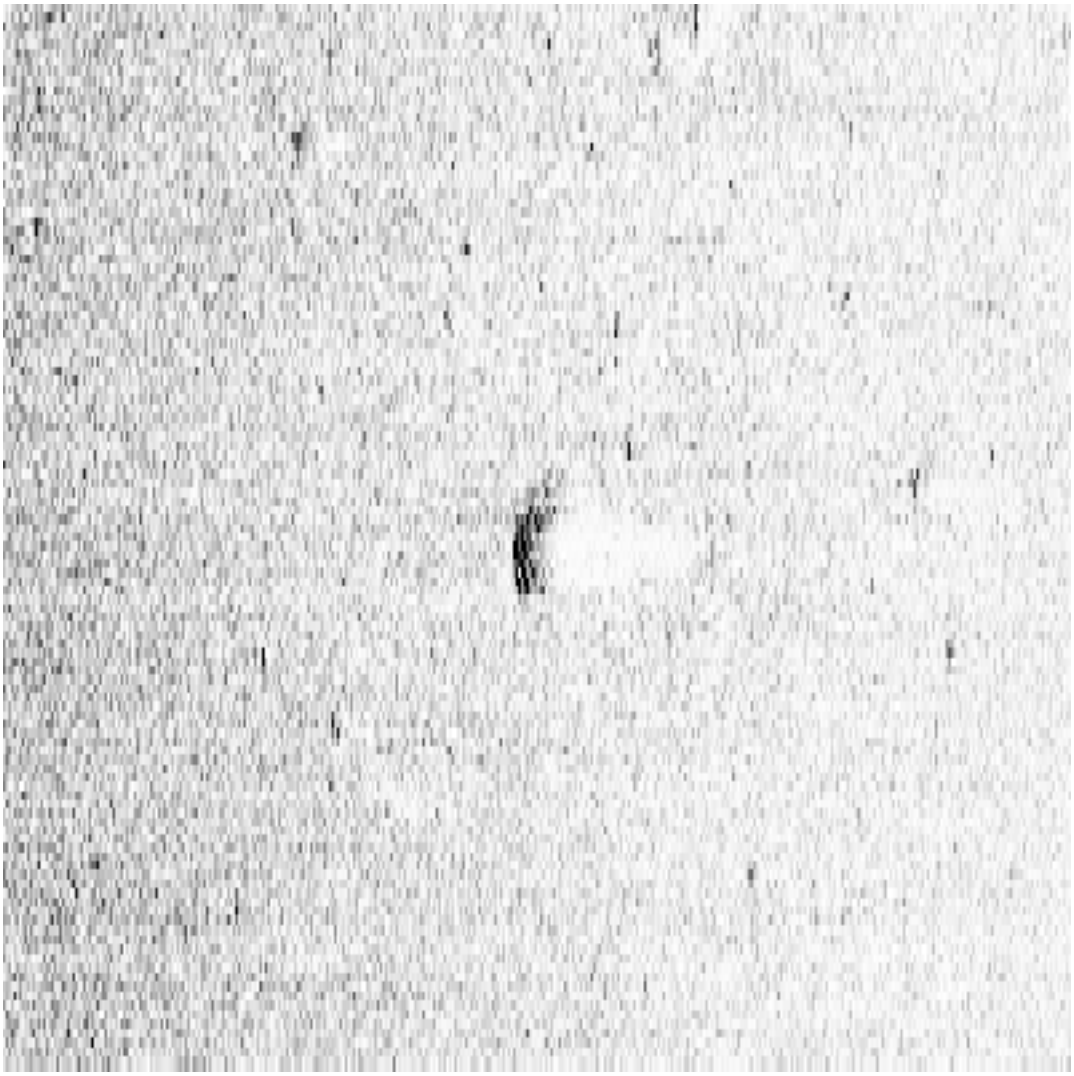


*Figure 1.6.1*

## 1.7) 34 ft Sounding

### Survey Summary

**Survey Position:** 47° 18' 02.0" N, 122° 30' 09.3" W

**Least Depth:** 10.33 m (= 33.89 ft = 5.648 fm = 5 fm 3.89 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.508 m ; **TVU (TPEv)** ±0.373 m

**Timestamp:** 2008-154.20:06:07.327 (06/02/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-154 / 032_1937

**Profile/Beam:** 8612/20

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Feature does not appear to be real. The shoal soundings are only present in one of two overlapping multibeam lines. Cannot find any significant SSS contacts at this location.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-154/032_1937 | 8612/20 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

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

### Office Notes

***Concur - Chart 34 ft depth.***

## 1.8) 50 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 52.5" N, 122° 29' 57.2" W

**Least Depth:** 15.37 m (= 50.42 ft = 8.403 fm = 8 fm 2.42 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.637 m ; **TVU (TPEv)** ±0.465 m

**Timestamp:** 2008-154.20:08:01.485 (06/02/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-154 / 032_1937

**Profile/Beam:** 9490/104

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Significantly shoaler than charted Depth.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-154/032_1937 | 9490/104 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

Delete charted sounding. Replace with new least depth sounding.

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

50ft (18453_1)

8 ¼fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

8fm 2ft (18445_7, 18474_1, 18445_8)

15.4m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** CATOBS - 1:snag / stump

QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 15.368 m

WATLEV - 3:always under water/submerged

**Geo object 2:** Sounding (SOUNDG)

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

TECSOU - 3:found by multi-beam

## Office Notes

***Concur. Chart sounding data.***

## Feature Images

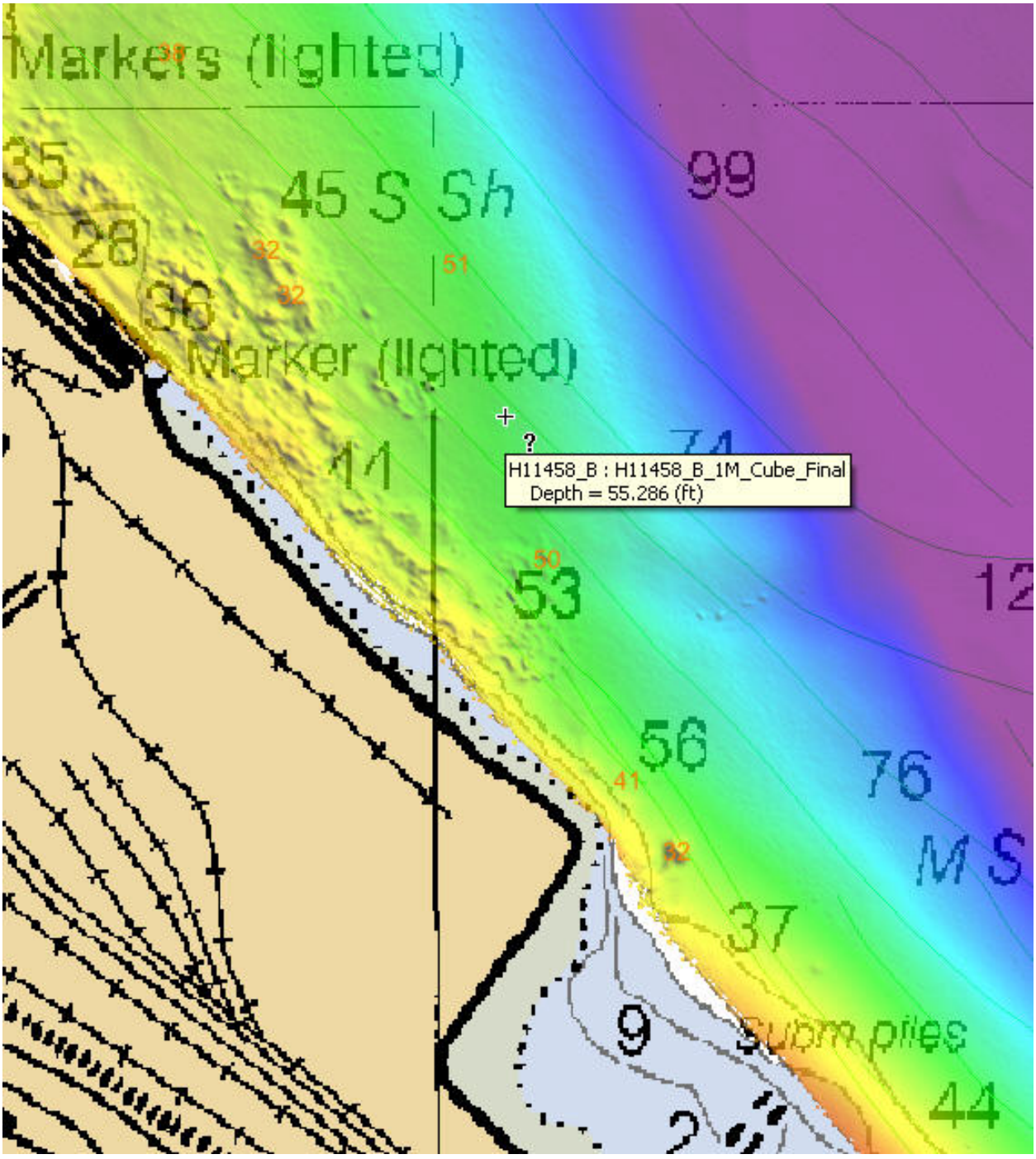



*Figure 1.8.1*

## 1.9) 37 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 58.8" N, 122° 30' 05.1" W

**Least Depth:** 11.41 m (= 37.44 ft = 6.240 fm = 6 fm 1.44 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.503 m ; **TVU (TPEv)** ±0.257 m

**Timestamp:** 2008-154.20:06:46.214 (06/02/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-154 / 032_1937

**Profile/Beam:** 8949/36

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Insignificant feature. Designated because base surface did not honor shoal sounding.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-154/032_1937 | 8949/36 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

[None]

### Office Notes

***Concur. Chart sounding data.***

## 1.10) 32 ft Obstruction

### Survey Summary

**Survey Position:** 47° 17' 47.6" N, 122° 29' 54.0" W

**Least Depth:** 9.88 m (= 32.40 ft = 5.400 fm = 5 fm 2.40 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.501 m ; **TVU (TPEv)** ±0.233 m

**Timestamp:** 2008-177.17:40:03.483 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 003_1736

**Profile/Beam:** 1312/41

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Obstruction.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/003_1736 | 1312/41 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101005100 | 0001 | 27.46 | 300.3 | Secondary (grouped) |

### Hydrographer Recommendations

Chart as obstruction.

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

32ft (18453_1)

5 ¼fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

5fm 2ft (18445_7, 18474_1, 18445_8)

9.9m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** CATOBS - 1:snag / stump

QUASOU - 1:depth known

SORDAT - 20080724

| | |
|---|---|
| | SORIND - US,US,survy,H11458 |
| | STATUS - 1:permanent |
| | TECSOU - 3:found by multi-beam |
| | VALSOU - 9.875 m |
| | WATLEV - 3:always under water/submerged |
| **Geo object 2:** | Sounding (SOUNDG) |
| **Attributes:** | EXPSOU - 2:shoaler than range of depth of the surrounding depth area |
| | QUASOU - 1:depth known |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | STATUS - 1:permanent |
| | TECSOU - 3:found by multi-beam |

## Office Notes

***Concur. Chart obstruction with a depth of 32 feet in Latitude 47°17'47.58"N, 122°29'54.05"W.***

***Add 32 Obstn and danger curve.***

## Feature Images

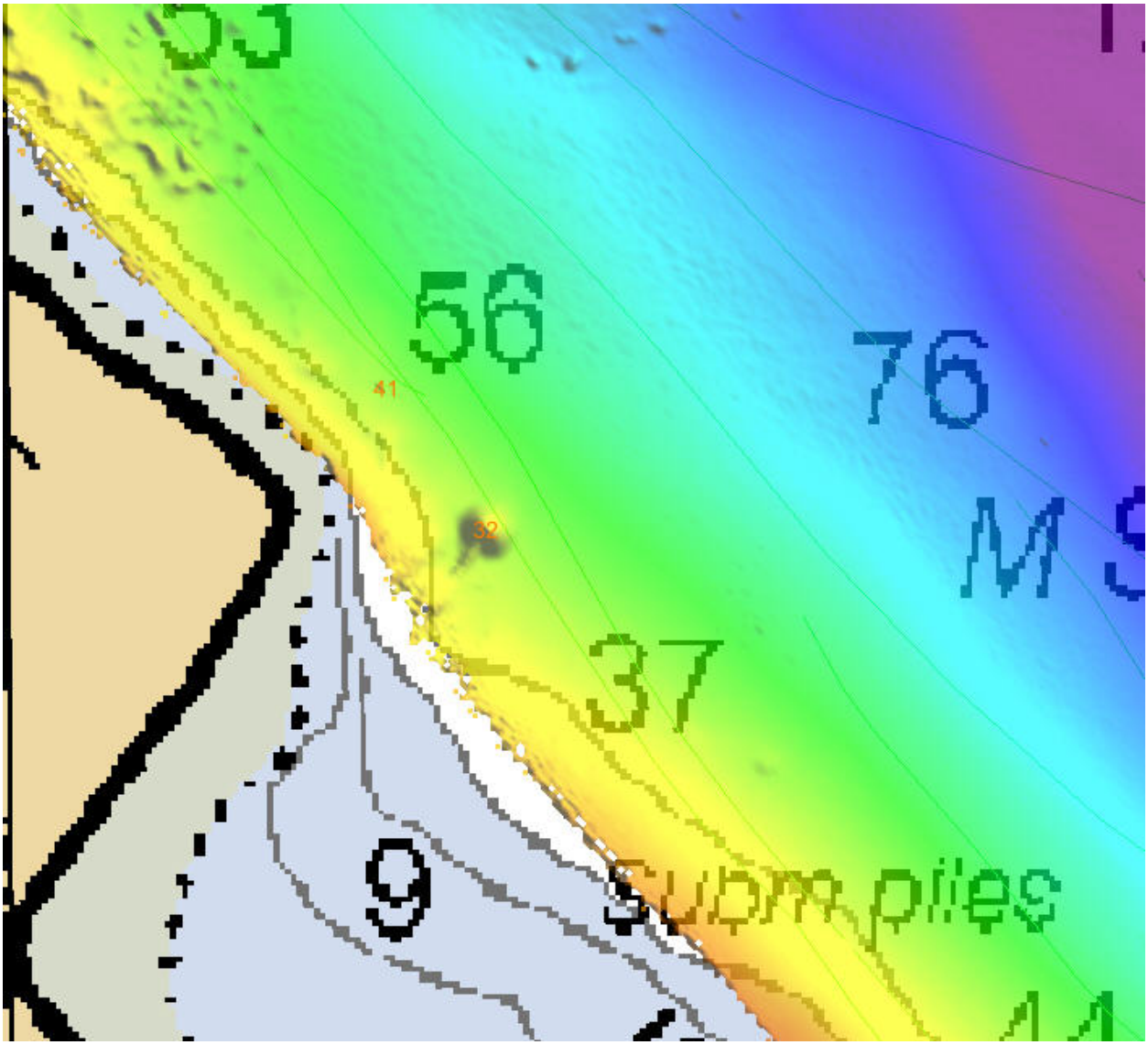



*Figure 1.10.1*

## 1.11) 41 ft Obstruction

### Survey Summary

**Survey Position:** 47° 17' 48.8" N, 122° 29' 55.3" W

**Least Depth:** 12.59 m (= 41.30 ft = 6.883 fm = 6 fm 5.30 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.560 m ; **TVU (TPEv)** ±0.261 m

**Timestamp:** 2008-177.17:40:33.584 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 003_1736

**Profile/Beam:** 1486/41

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Submerged rock or piling.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/003_1736 | 1486/41 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101005100 | 0002 | 28.01 | 303.0 | Secondary (grouped) |

### Hydrographer Recommendations

Chart as obstruction.

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

41ft (18453_1)

6 ¾fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

6fm 5ft (18445_7, 18474_1, 18445_8)

12.6m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

| | |
|---|---|
| | STATUS - 1:permanent |
| | TECSOU - 2:found by side scan sonar |
| | VALSOU - 12.587 m |
| | WATLEV - 3:always under water/submerged |
| **Geo object 2:** | Sounding (SOUNDG) |
| **Attributes:** | EXPSOU - 2:shoaler than range of depth of the surrounding depth area |
| | QUASOU - 1:depth known |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | STATUS - 1:permanent |
| | TECSOU - 3:found by multi-beam |

## Office Notes

***Do not concur - Determined insignificant during office processing. Do not chart.***

# Feature Images

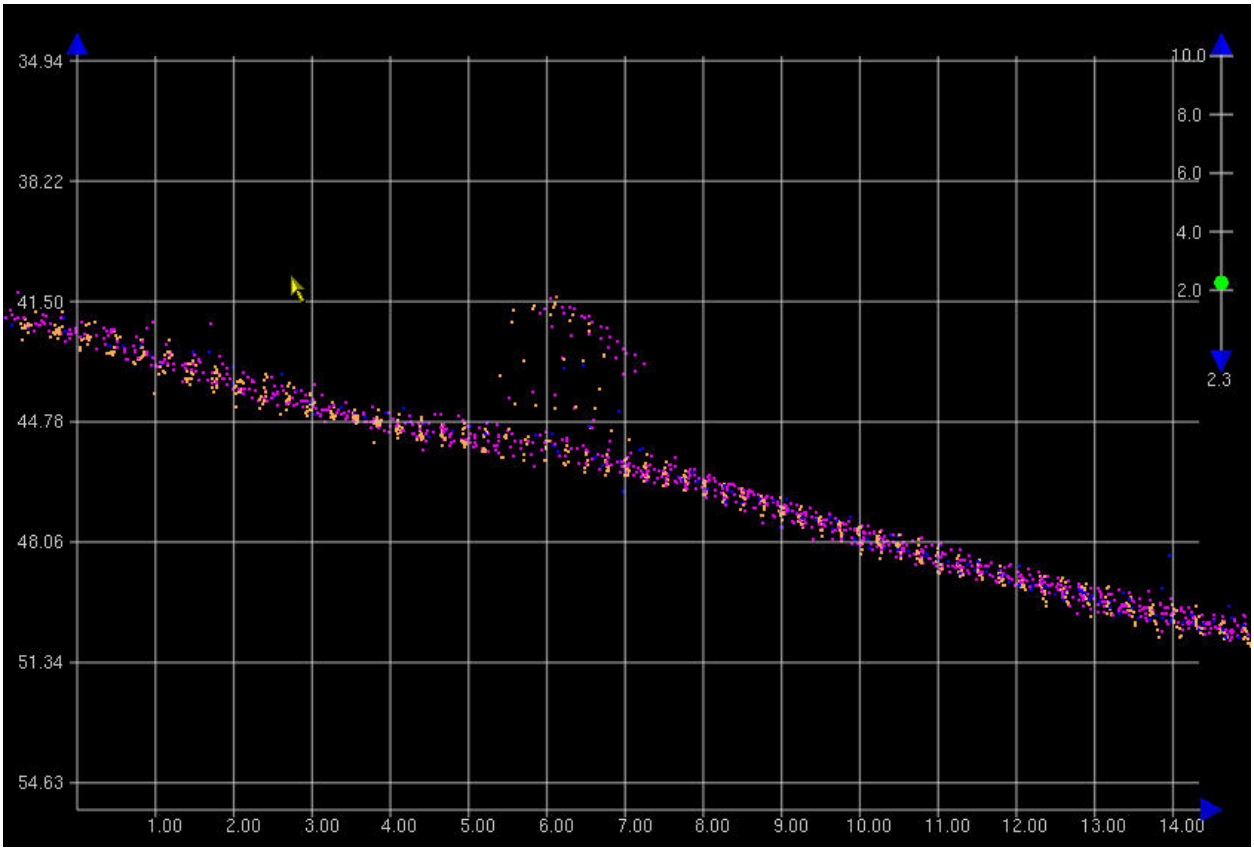



*Figure 1.11.1*

## 1.12) 28 ft Subm Piling

### Survey Summary

**Survey Position:** 47° 16' 40.2" N, 122° 28' 04.6" W

**Least Depth:** 8.49 m (= 27.85 ft = 4.642 fm = 4 fm 3.85 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.529 m ; **TVU (TPEv)** ±0.451 m

**Timestamp:** 2008-177.17:10:05.545 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 004_1657

**Profile/Beam:** 3974/113

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Submerged Pilings

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/004_1657 | 3974/113 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101002100 | 0010 | 9.04 | 156.5 | Secondary |

### Hydrographer Recommendations

Chart as submerged pilings.

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

28ft (18453_1)

4 ½fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

4fm 4ft (18445_7, 18474_1, 18445_8)

8.5m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** CATOBS - 1:snag / stump

SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

TECSOU - 2:found by side scan sonar

VALSOU - 8.490 m

WATLEV - 3:always under water/submerged

**Geo object 2:** Sounding (SOUNDG)

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

SORDAT - 20080724

SORIND - US,US,survy,H11458

TECSOU - 2:found by side scan sonar

## Office Notes

***Concur with clarification - Two (2) items seen in surface. Chart 28 Obstn subm piles.***

# Feature Images

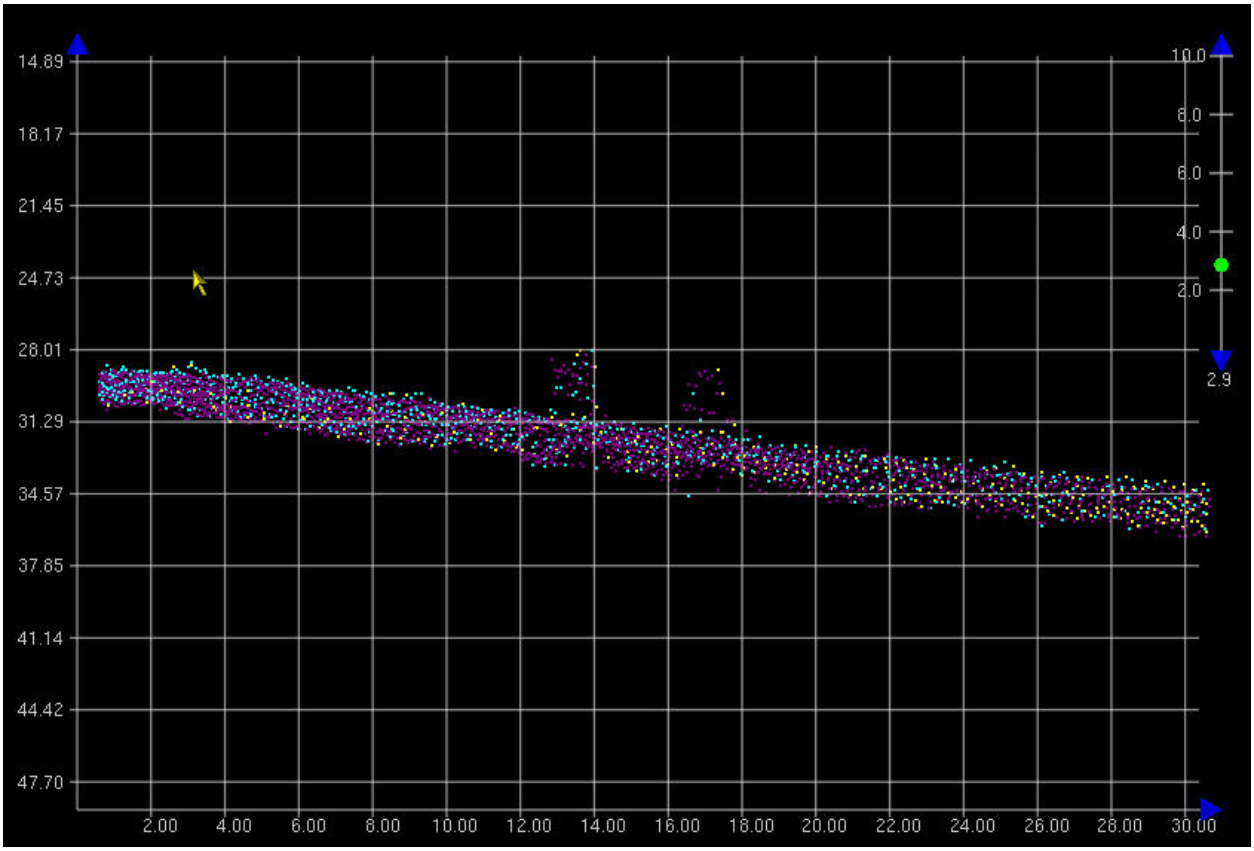



*Figure 1.12.1*

## 1.13) 48 ft Sounding

### Survey Summary

**Survey Position:** 47° 16' 36.7" N, 122° 27' 49.5" W

**Least Depth:** 14.77 m (= 48.45 ft = 8.075 fm = 8 fm 0.45 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.658 m ; **TVU (TPEv)** ±0.457 m

**Timestamp:** 2008-177.17:07:52.139 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 004_1657

**Profile/Beam:** 3100/102

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Submerged pilings or blocks. Located near floating dock. The line visible in the SSS imagery to the left of feature is a mooring chain connected to the floating dock.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/004_1657 | 3100/102 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

Feature is approx 3ft high and located on a slope. Equivalent depth from bottom profile is found a short distance shoreward. Recommend chart depths from current survey.

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

48ft (18453_1)

8fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

8fm 0ft (18445_7, 18474_1, 18445_8)

14.8m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** CATOBS - 1:snag / stump

QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

TECSOU - 2:found by side scan sonar

VALSOU - 14.767 m

WATLEV - 3:always under water/submerged

## Office Notes

***Concur. Chart sounding data.***

## 1.14) 60 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 02.1" N, 122° 28' 51.6" W

**Least Depth:** 18.37 m (= 60.27 ft = 10.045 fm = 10 fm 0.27 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.703 m ; **TVU (TPEv)** ±0.242 m

**Timestamp:** 2008-177.17:17:54.746 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 004_1657

**Profile/Beam:** 6813/51

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Insignificant feature. Designated because base surface did not honor shoal sounding.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/004_1657 | 6813/51 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

[None]

### Office Notes

***Concur. Chart 60 ft depth***.

## 1.15) 36 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 04.8" N, 122° 28' 59.1" W

**Least Depth:** 11.16 m (= 36.61 ft = 6.102 fm = 6 fm 0.61 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.539 m ; **TVU (TPEv)** ±0.301 m

**Timestamp:** 2008-177.17:19:04.392 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 004_1657

**Profile/Beam:** 7188/95

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Insignificant feature. Designated because base surface did not honor shoal sounding.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/004_1657 | 7188/95 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

[None]

### Office Notes

Concur. Chart sounding data.

## 1.16) Subm piling

### Survey Summary

**Survey Position:** 47° 16' 37.5" N, 122° 27' 50.2" W

**Least Depth:** [None]

**TPU (±1.96σ):** **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

**Timestamp:** 2008-295.05:12:36 (10/21/2008)

**Survey Line:** h11458 / s1212sss_100_time / 2008-140 / sonar_data000101002100

**Contact/Point:** 0009/1

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Submerged pilings or blocks. Located near floating dock. The line visible in the SSS imagery to the left of feature is a mooring chain connected to the floating dock.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212sss_100_time/2008-140/sonar_data000101002100 | 0009 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101002100 | 0001 | 2.33 | 133.1 | Secondary (grouped) |

### Hydrographer Recommendations

Feature is approx 3ft high and located on a slope. Equivalent depth from bottom profile is found a short distance shoreward. Recommend chart depths from current survey.

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

TECSOU - 2:found by side scan sonar

WATLEV - 3:always under water/submerged

# Office Notes

***Concur with clarifcation - Items disproved during office processing through side scan and multibeam review of data.***

***Chart sounding data in this area per present survey findings.***

## Feature Images

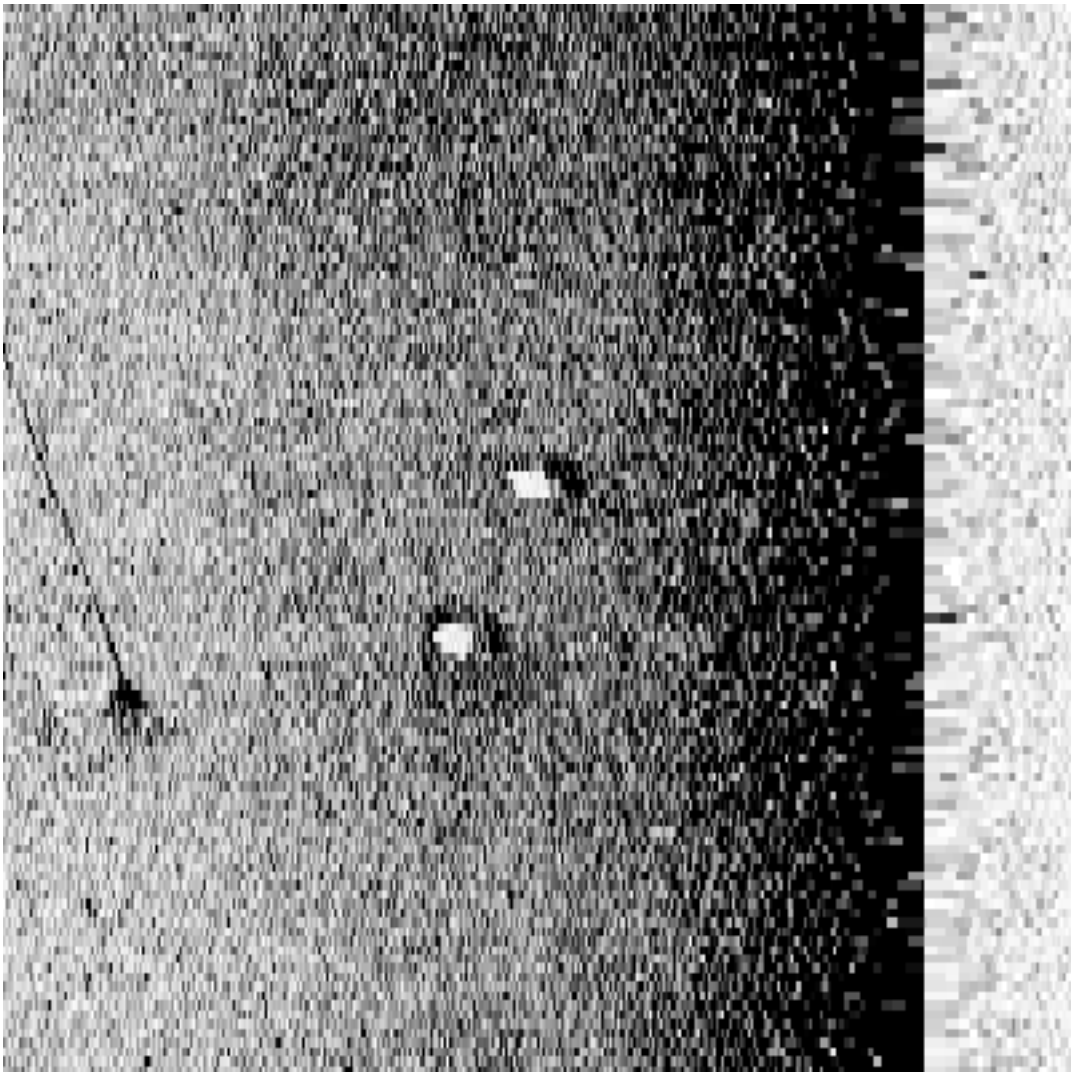


*Figure 1.16.1*

## 1.17) 53 ft Sounding

### Survey Summary

**Survey Position:** 47° 16' 45.5" N, 122° 28' 14.7" W

**Least Depth:** 16.23 m (= 53.24 ft = 8.873 fm = 8 fm 5.24 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.651 m ; **TVU (TPEv)** ±0.500 m

**Timestamp:** 2008-140.19:51:45.509 (05/19/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-140 / 002_1938

**Profile/Beam:** 4139/106

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Mooring bouy block.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-140/002_1938 | 4139/106 | 0.00 | 000.0 | Primary |
| h11458/1212dpnones/2008-164/detachedpositions 164 | 17/1 | 7.37 | 168.1 | Secondary |
| h11458/s1212sss_100/2008-177/sonar_data080625212200 | 0003 | 9.94 | 295.2 | Secondary |

### Hydrographer Recommendations

Chart as mooring buoy.

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

53ft (18453_1)

8 ¾fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

8fm 5ft (18445_7, 18474_1, 18445_8)

16.2m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Mooring/warping facility (MORFAC)

**Attributes:** BOYSHP - 3:spherical

CATMOR - 7:mooring buoy

COLOUR - 1:white

PICREP - mooringbouys1.jpg

SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

WATLEV - 7:floating

## Office Notes

***Concur. Chart mooring buoy.***

# Feature Images


*Figure 1.17.1*

## 1.18) 59 ft Sounding

### Survey Summary

**Survey Position:** 47° 16' 44.9" N, 122° 28' 11.5" W

**Least Depth:** 17.97 m (= 58.94 ft = 9.824 fm = 9 fm 4.94 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.642 m ; **TVU (TPEv)** ±0.304 m

**Timestamp:** 2008-140.19:52:05.496 (05/19/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-140 / 002_1938

**Profile/Beam:** 4251/40

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Submerged Piling or rock.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-140/002_1938 | 4251/40 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100/2008-177/sonar_data080625212200 | 0001 | 7.91 | 279.2 | Secondary |

### Hydrographer Recommendations

Chart as obstruction.

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

59ft (18453_1)

9 ¾fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

9fm 5ft (18445_7, 18474_1, 18445_8)

18.0m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** CATOBS - 1:snag / stump

QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

TECSOU - 2:found by side scan sonar

VALSOU - 17.966 m

WATLEV - 3:always under water/submerged

**Geo object 2:** Sounding (SOUNDG)

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

## Office Notes

***Do not concur. Determined insignificant. Chart sounding data.***

# Feature Images

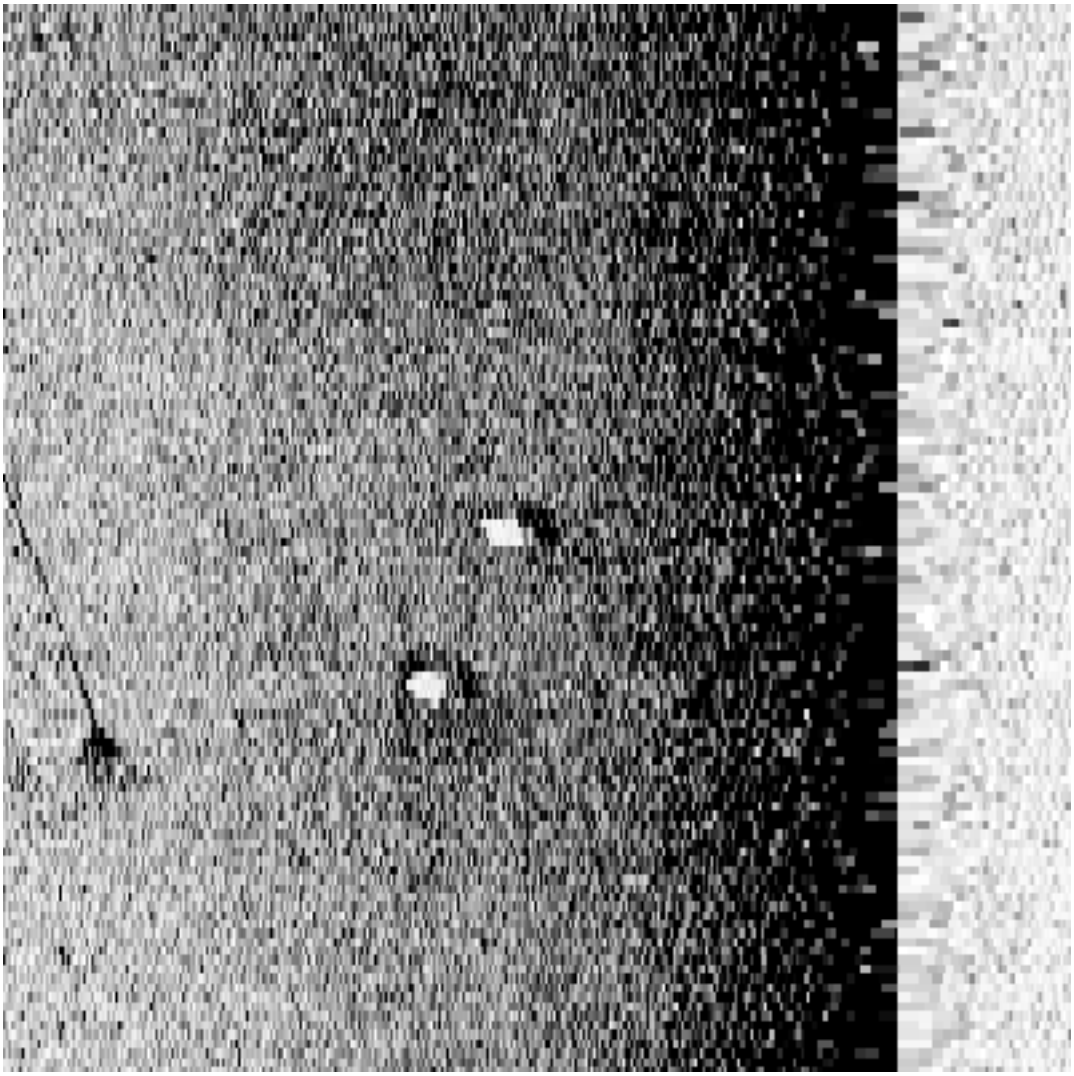


*Figure 1.18.1*

## 1.19) 46 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 08.9" N, 122° 29' 02.7" W

**Least Depth:** 14.07 m (= 46.15 ft = 7.692 fm = 7 fm 4.15 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.658 m ; **TVU (TPEv)** ±0.523 m

**Timestamp:** 2008-177.18:10:57.151 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 003_1810

**Profile/Beam:** 242/107

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Submerged piling or rock.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/003_1810 | 242/107 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101002100 | 0006 | 17.39 | 151.6 | Secondary |

### Hydrographer Recommendations

Chart as obstruction.

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

46ft (18453_1)

7 ¾fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

7fm 4ft (18445_7, 18474_1, 18445_8)

14.1m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** CATOBS - 1:snag / stump

SORDAT - 20080724

SORIND - US,US,survy,H11458

| | |
|---|---|
| | STATUS - 1:permanent |
| | TECSOU - 2:found by side scan sonar |
| | VALSOU - 14.067 m |
| | WATLEV - 3:always under water/submerged |
| **Geo object 2:** | Sounding (SOUNDG) |
| **Attributes:** | EXPSOU - 2:shoaler than range of depth of the surrounding depth area |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | TECSOU - 3:found by multi-beam |

## Office Notes

***Do not concur. Determined insignificant. Chart sounding data.***

## Feature Images

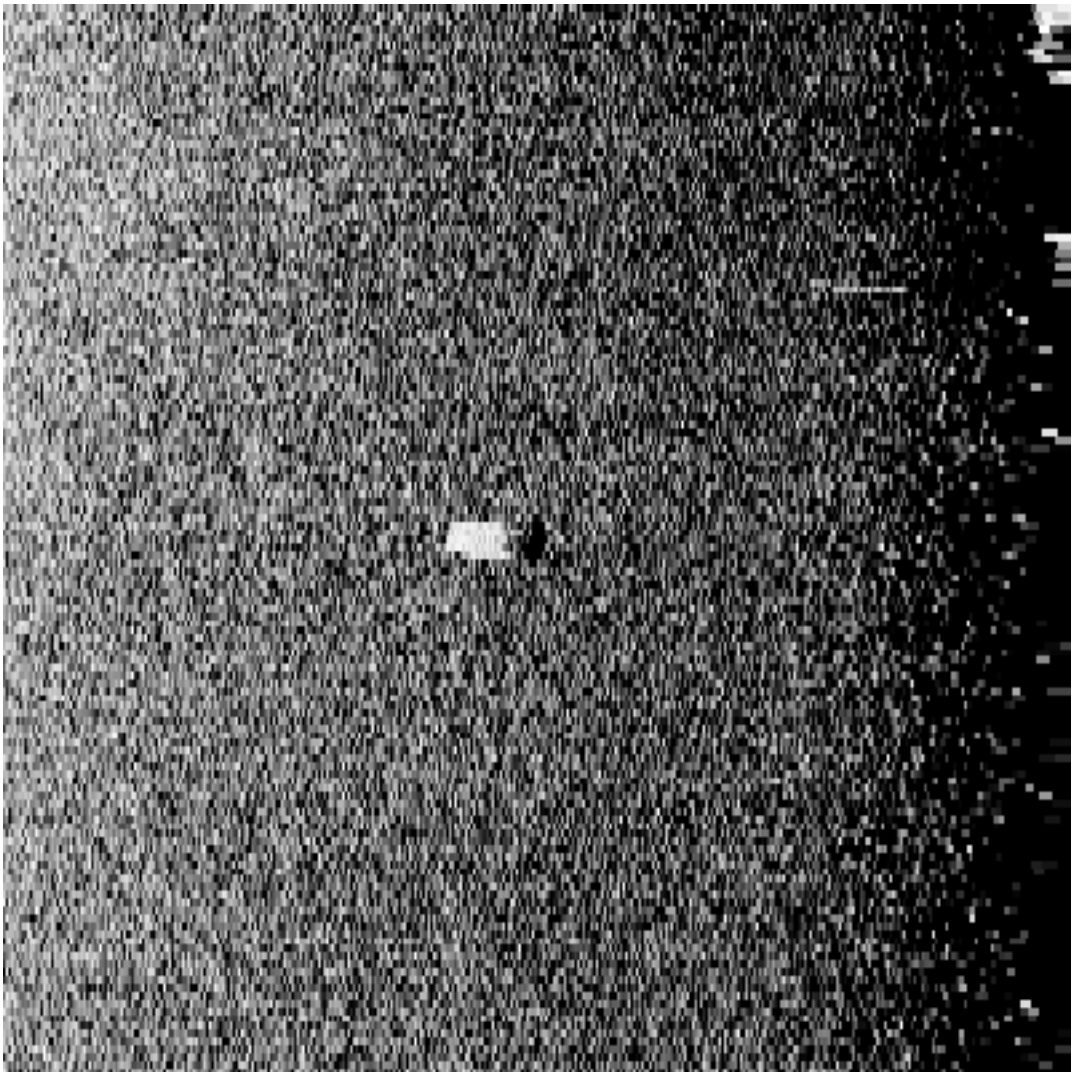


*Figure 1.19.1*

## 1.20) 30 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 05.3" N, 122° 29' 00.2" W

**Least Depth:** 9.36 m (= 30.71 ft = 5.118 fm = 5 fm 0.71 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.519 m ; **TVU (TPEv)** ±0.378 m

**Timestamp:** 2008-177.18:10:11.448 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 003_1810

**Profile/Beam:** 6/21

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Insignificant feature. Designated because base surface did not honor shoal sounding.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/003_1810 | 6/21 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

[None]

### Office Notes

***Concur. Chart sounding data.***

## 1.21) 64 ft Sounding

### Survey Summary

**Survey Position:** 47° 16' 52.1" N, 122° 28' 28.0" W

**Least Depth:** 19.48 m (= 63.92 ft = 10.654 fm = 10 fm 3.92 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.762 m ; **TVU (TPEv)** ±0.425 m

**Timestamp:** 2008-177.18:02:29.794 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 004_1748

**Profile/Beam:** 4236/34

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Block for mooring bouy.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/004_1748 | 4236/34 | 0.00 | 000.0 | Primary |
| h11458/1212dpnones/2008-164/detachedpositions 164 | 15/1 | 3.53 | 156.6 | Secondary |
| h11458/s1212sss_100_time/2008-140/sonar_data000101002100 | 0003 | 16.98 | 133.2 | Secondary |

### Hydrographer Recommendations

Chart as mooring buoy

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

64ft (18453_1)

10 ½fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

10fm 4ft (18445_7, 18474_1, 18445_8)

19.5m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Mooring/warping facility (MORFAC)

**Attributes:** BOYSHP - 3:spherical

CATMOR - 7:mooring buoy

| | |
|---|---|
| | COLOUR - 1:white |
| | PICREP - mooringbouys2.jpg |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | STATUS - 1:permanent |
| | WATLEV - 7:floating |
| **Geo object 2:** | Sounding (SOUNDG) |
| **Attributes:** | EXPSOU - 2:shoaler than range of depth of the surrounding depth area |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | TECSOU - 3:found by multi-beam |

## Office Notes

***Concur with clarification. Chart mooring buoy.***

# Feature Images


*Figure 1.21.1*

## 1.22) 15 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 38.80" N, 122° 29' 42.94" W

**Least Depth:** 4.79 m (= 15.71 ft = 2.618 fm = 2 fm 3.71 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.514 m ; **TVU (TPEv)** ±0.564 m

**Timestamp:** 2008-177.17:49:09.171 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 004_1748

**Profile/Beam:** 99/123

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Designated because base surface did not honor shoal sounding. Located near submerged piles and charted ruins.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/004_1748 | 99/123 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

[None]

### Office Notes

***Concur with clarification - During office processing the item was determined to be subm pile. It is reccomended that an obstruction (subm pile) with a depth of 15 feet be charted in present survey location. Add 15 Obstn (subm pile).***

## 1.23) 49 ft Sounding

### Survey Summary

**Survey Position:** 47° 16' 55.2" N, 122° 28' 34.9" W

**Least Depth:** 15.01 m (= 49.25 ft = 8.209 fm = 8 fm 1.25 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.611 m ; **TVU (TPEv)** ±0.221 m

**Timestamp:** 2008-177.18:01:26.316 (06/25/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-177 / 004_1748

**Profile/Beam:** 3930/77

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Shoal sounding on bouy block.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-177/004_1748 | 3930/77 | 0.00 | 000.0 | Primary |
| h11458/1212dpnones/2008-164/detachedpositions 164 | 14/1 | 4.36 | 311.4 | Secondary |

### Hydrographer Recommendations

Chart mooring bouy

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

49ft (18453_1)

8 ¼fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

8fm 1ft (18445_7, 18474_1, 18445_8)

15.0m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Mooring/warping facility (MORFAC)

**Attributes:** BOYSHP - 3:spherical

CATMOR - 7:mooring buoy

COLOUR - 1:white

SORDAT - 20080724

SORIND - US,US,survy,H11458

## Office Notes

***Concur - Chart mooring buoy.***

## 1.24) 19 ft Sounding

### Survey Summary

**Survey Position:** 47° 18' 11.4" N, 122° 30' 22.6" W

**Least Depth:** 5.78 m (= 18.96 ft = 3.161 fm = 3 fm 0.96 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.429 m ; **TVU (TPEv)** ±0.176 m

**Timestamp:** 2008-206.17:44:33.716 (07/24/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-206 / 002_1744

**Profile/Beam:** 138/52

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Large Obstruction. Approximately 30 ft in diameter and 10 ft high.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-206/002_1744 | 138/52 | 0.00 | 000.0 | Primary |
| h11458/s1212_simrad/2008-178/004_1817 | 2864/124 | 2.82 | 071.0 | Secondary |
| h11458/s1212sss_100/2008-177/sonar_data080625202600 | 0003 | 25.91 | 309.8 | Secondary (grouped) |

### Hydrographer Recommendations

Replace charted 20ft sounding with new least depth sounding.

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

19ft (18453_1)

3fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

3fm 1ft (18445_7, 18474_1, 18445_8)

5.8m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 5.780 m

WATLEV - 3:always under water/submerged

**Geo object 2:** Sounding (SOUNDG)

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 1:depth known

SORDAT - 20080724

SORIND - US,US,survy,H11458

TECSOU - 3:found by multi-beam

## Office Notes

***Concur - Chart 19 ft depth.***

## Feature Images

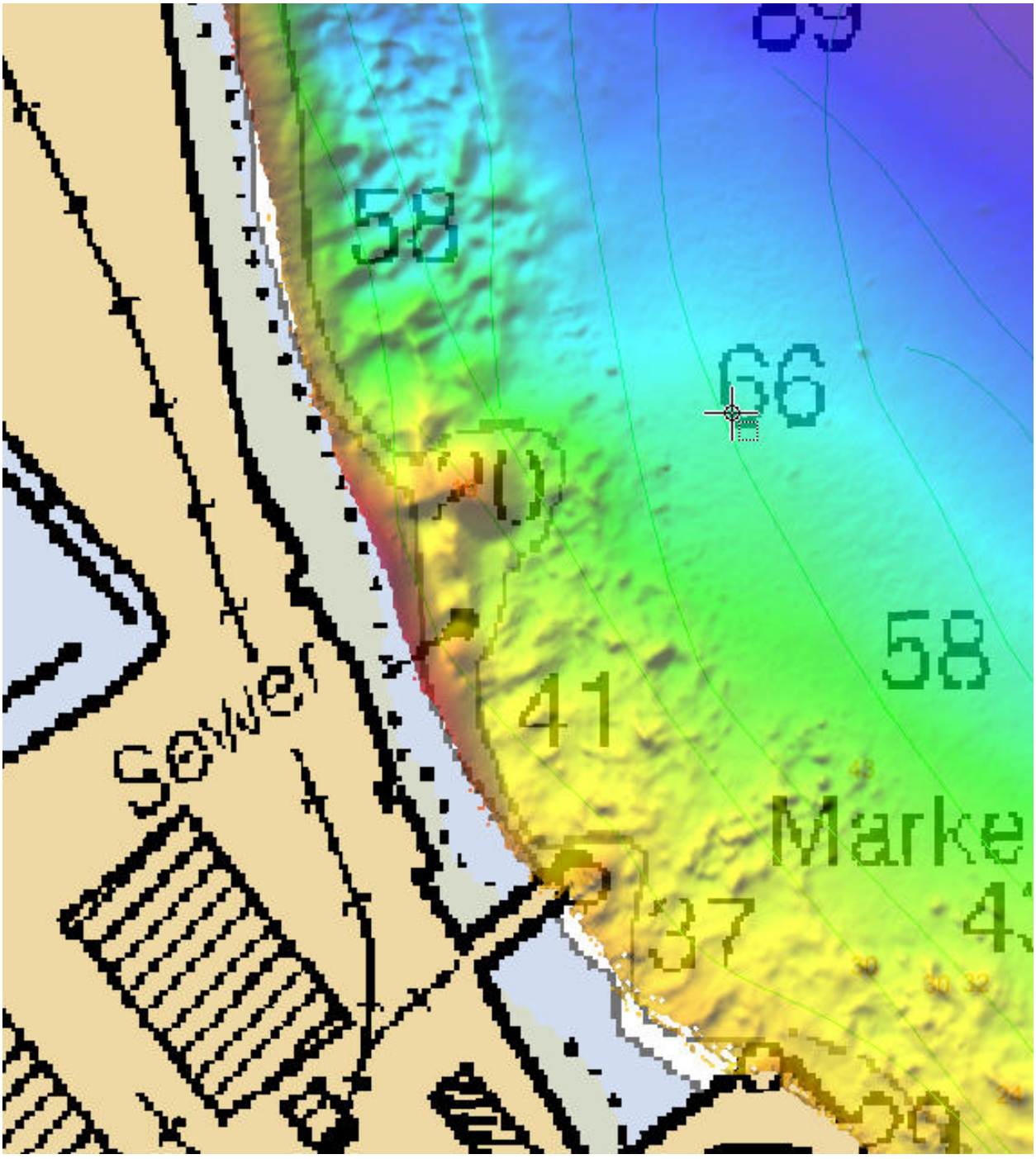



*Figure 1.24.1*

## 1.25) 47 ft Sounding

### Survey Summary

**Survey Position:** 47° 16' 42.1" N, 122° 28' 06.3" W

**Least Depth:** 14.31 m (= 46.96 ft = 7.827 fm = 7 fm 4.96 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.715 m ; **TVU (TPEv)** ±0.671 m

**Timestamp:** 2008-178.17:59:52.604 (06/26/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-178 / 003_1758

**Profile/Beam:** 562/15

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Submerged rock or piling.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-178/003_1758 | 562/15 | 0.00 | 000.0 | Primary |
| h11458/s1212sss_100/2008-177/sonar_data080625212200 | 0002 | 13.48 | 302.8 | Secondary |

### Hydrographer Recommendations

Chart as obstruction.

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

47ft (18453_1)

7 ¾fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

7fm 5ft (18445_7, 18474_1, 18445_8)

14.3m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** CATOBS - 1:snag / stump

SORDAT - 20080724

SORIND - US,US,survy,H11458

| | |
|---|---|
| | TECSOU - 2:found by side scan sonar |
| | VALSOU - 14.314 m |
| | WATLEV - 3:always under water/submerged |
| **Geo object 2:** | Sounding (SOUNDG) |
| **Attributes:** | EXPSOU - 2:shoaler than range of depth of the surrounding depth area |
| | SORDAT - 20080724 |
| | SORIND - US,US,survy,H11458 |
| | TECSOU - 2:found by side scan sonar |

## Office Notes

***Do not concur. Determined insignificant during office processing. Chart sounding data.***

## Feature Images

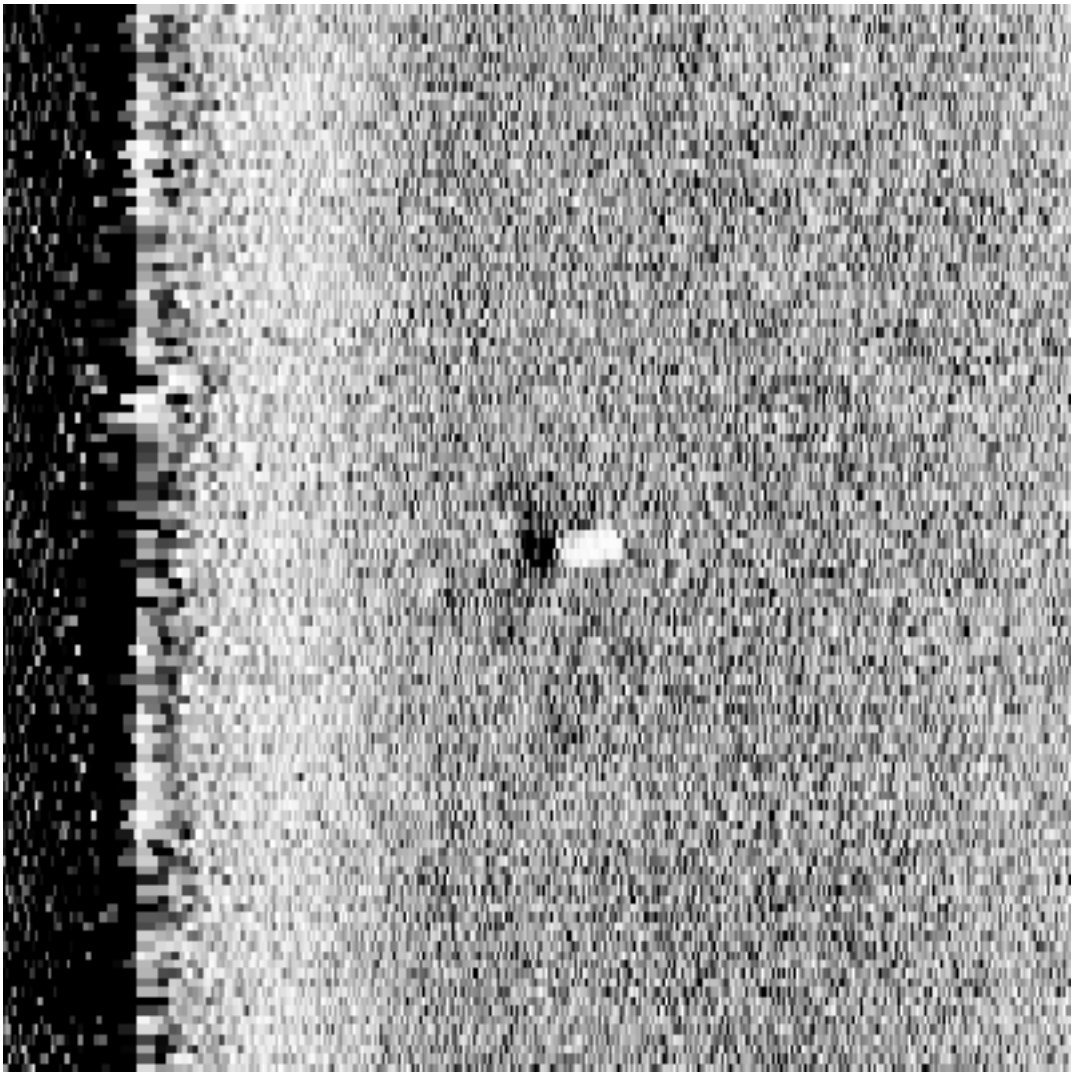


*Figure 1.25.1*

## 1.26) Sewage Outfall

### Survey Summary

**Survey Position:** 47° 17' 14.5" N, 122° 29' 03.0" W

**Least Depth:** 40.81 m (= 133.87 ft = 22.312 fm = 22 fm 1.87 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±2.474 m ; **TVU (TPEv)** ±0.774 m

**Timestamp:** 2008-142.19:03:31.450 (05/21/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-142 / 005_1848

**Profile/Beam:** 4011/33

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Offshore end of sewage outfall. Azimuth 225.8 deg.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-142/005_1848 | 4011/33 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

Chart outfall.

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

134ft (18453_1)

22fm (18448_1, 18440_1, 18003_1, 18007_1, 530_1)

22fm (18445_7, 18474_1, 18445_8)

41m (501_1, 50_1)

### S-57 Data

**Geo object 1:** Pipeline, submarine/on land (PIPSOL)

**Attributes:** CATPIP - 2:outfall pipe

SORDAT - 20080724

SORIND - US,US,survy,H11458

STATUS - 1:permanent

# Office Notes

***Concur with clarification. - Defer charting recommendation to MCD.***

## Feature Images

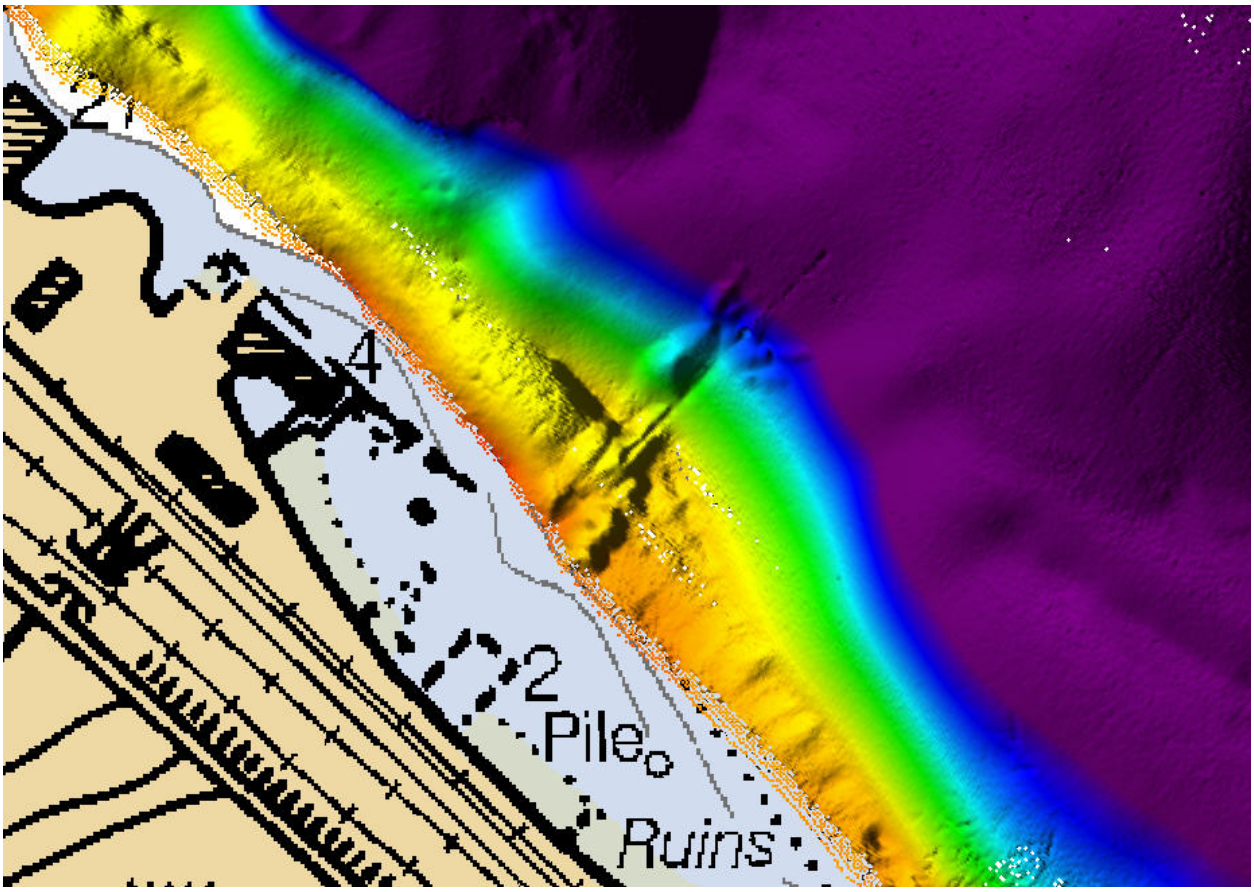



*Figure 1.26.1*

## 1.27) 40 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 01.9" N, 122° 28' 53.5" W

**Least Depth:** 12.35 m (= 40.51 ft = 6.752 fm = 6 fm 4.51 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.555 m ; **TVU (TPEv)** ±0.257 m

**Timestamp:** 2009-093.19:30:00.796 (04/03/2009)

**Survey Line:** h11458 / s1212_simrad / 2009-093 / 001_1926

**Profile/Beam:** 1344/41

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Designated because base surface did not honor shoal sounding. Located in charted Ruins.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2009-093/001_1926 | 1344/41 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

[None]

### Office Notes

***Concur. Chart sounding data.***

# 1.28) 10 ft Sounding

## Survey Summary

| | |
|---|---|
| **Survey Position:** | 47° 17' 38.74" N, 122° 29' 44.08" W |
| **Least Depth:** | 3.07 m (= 10.07 ft = 1.678 fm = 1 fm 4.07 ft) |
| **TPU (±1.96σ):** | **THU (TPEh)** ±1.453 m ; **TVU (TPEv)** ±0.430 m |
| **Timestamp:** | 2009-093.19:00:20.188 (04/03/2009) |
| **Survey Line:** | h11458 / s1212_simrad / 2009-093 / 003_1858 |
| **Profile/Beam:** | 1135/124 |
| **Charts Affected:** | 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1 |

**Remarks:**

Designated because base surface did not honor shoal sounding. Located adjacent to charted Ruins.

## Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2009-093/003_1858 | 1135/124 | 0.00 | 000.0 | Primary |

## Hydrographer Recommendations

[None]

## S-57 Data

[None]

## Office Notes

***Concur with clarification - During office processing item was deteremiend to be subm pile. It is recommended that an obstruction (subm pile) with a depth of 10 feet be charted in present survey location. Add 10 Obstn (subm pile) .***

## 1.29) 12 ft Sounding

### Survey Summary

**Survey Position:** 47° 17' 46.3" N, 122° 29' 55.6" W

**Least Depth:** 3.65 m (= 11.98 ft = 1.997 fm = 1 fm 5.98 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.497 m ; **TVU (TPEv)** ±0.551 m

**Timestamp:** 2009-093.19:04:06.212 (04/03/2009)

**Survey Line:** h11458 / s1212_simrad / 2009-093 / 003_1858

**Profile/Beam:** 3597/3

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Designated because base surface did not honor shoal sounding.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2009-093/003_1858 | 3597/3 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

[None]

### Office Notes

***Concur. Chart sounding data.***

## 1.30) 40 ft Sounding

### Survey Summary

**Survey Position:** 47° 18' 01.4" N, 122° 30' 06.2" W

**Least Depth:** 12.21 m (= 40.07 ft = 6.678 fm = 6 fm 4.07 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.546 m ; **TVU (TPEv)** ±0.202 m

**Timestamp:** 2009-093.18:48:06.630 (04/03/2009)

**Survey Line:** h11458 / s1212_simrad / 2009-093 / 006_1847a

**Profile/Beam:** 344/76

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Insignificant feature. Designated because base surface did not honor shoal sounding.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2009-093/006_1847a | 344/76 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

[None]

### S-57 Data

[None]

### Office Notes

***Concur - Chart sounding data.***

## 1.31) 22 ft Sounding

### Survey Summary

**Survey Position:** 47° 18' 22.9" N, 122° 30' 48.6" W

**Least Depth:** 6.82 m (= 22.39 ft = 3.731 fm = 3 fm 4.39 ft)

**TPU (±1.96σ):** **THU (TPEh)** ±1.472 m ; **TVU (TPEv)** ±0.337 m

**Timestamp:** 2008-178.18:34:37.519 (06/26/2008)

**Survey Line:** h11458 / s1212_simrad / 2008-178 / 005_1833

**Profile/Beam:** 392/109

**Charts Affected:** 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

**Remarks:**

Designated sounding.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-178/005_1833 | 392/109 | 0.00 | 000.0 | Primary |

### Hydrographer Recommendations

Chart current survey depth.

### S-57 Data

[None]

### Office Notes

***Concur. Chart sounding data.***

## 1.32) 83 ft Obstn

### Survey Summary

| | |
|---|---|
| **Survey Position:** | 47° 18' 53.5" N, 122° 31' 43.0" W |
| **Least Depth:** | 25.35 m (= 83.17 ft = 13.862 fm = 13 fm 5.17 ft) |
| **TPU (±1.96σ):** | **THU (TPEh)** ±1.935 m ; **TVU (TPEv)** ±0.636 m |
| **Timestamp:** | 2008-169.19:27:43.204 (06/17/2008) |
| **Survey Line:** | h11458 / s1212_simrad / 2008-169 / 006_1922 |
| **Profile/Beam:** | 1316/101 |
| **Charts Affected:** | 18453_1, 18445_7, 18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1 |

**Remarks:**

Obstruction.

### Feature Correlation

| Address | Feature | Range | Azimuth | Status |
|---|---|---|---|---|
| h11458/s1212_simrad/2008-169/006_1922 | 1316/101 | 0.00 | 000.0 | Primary |
| h11458/s1212_simrad/2008-140/010_1914 | 2398/89 | 0.09 | 000.0 | Secondary |
| h11458/s1212sss_100/2008-177/sonar_data080625200000 | 0001 | 7.02 | 194.0 | Secondary |

### Hydrographer Recommendations

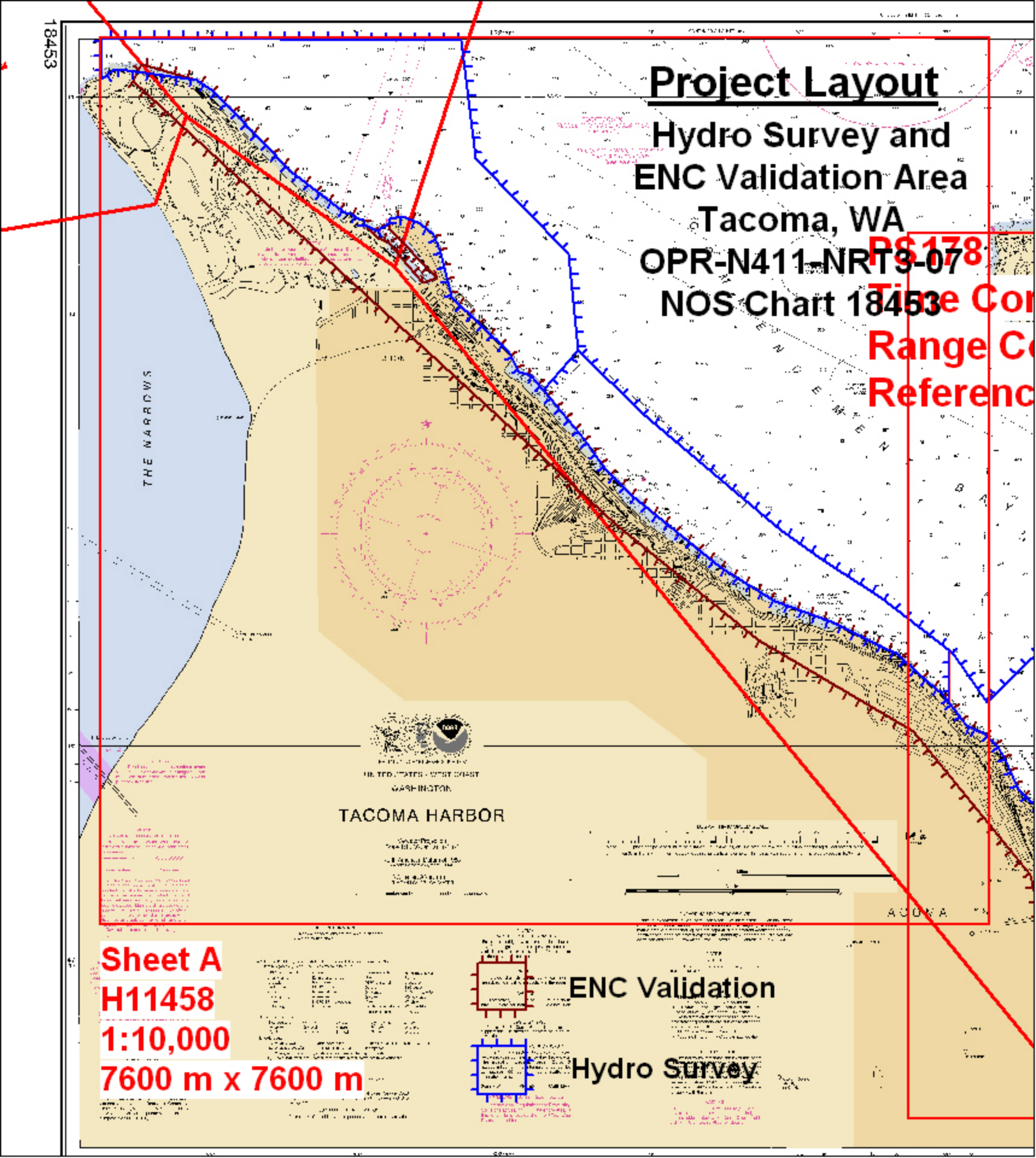
Chart obstruction.

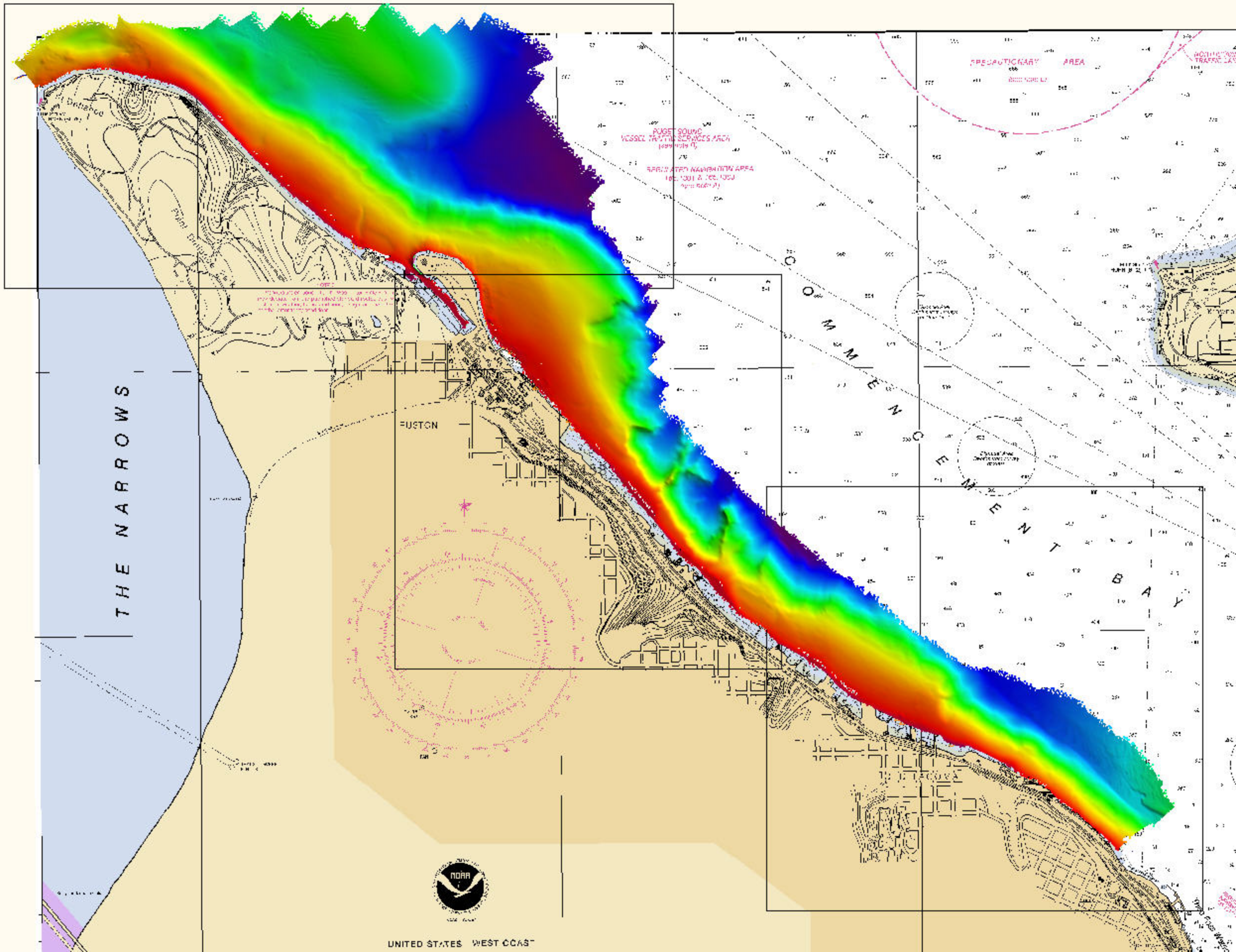
### S-57 Data

[None]

### Office Notes

***Do not concur - Determined insignificant during office processing. Do not chart.***


18453
Project Layout
Hydro Survey and
ENC Validation Area
Tacoma, WA
OPR-N411-NRT3-07
NOS Chart 18453
PS178
Tide Co
Range C
Referenc
THE NARROWS
TACOMA HARBOR
Sheet A
H11458
1:10,000
7600 m x 7600 m
ENC Validation
Hydro Survey


THE NARROWS
EUSTON
COMMENCEMENT BAY
UNITED STATES WEST COAST

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

# TIDE NOTE FOR HYDROGRAPHIC SURVEY

**DATE :** October 21, 2008

**HYDROGRAPHIC BRANCH:** Pacific
**HYDROGRAPHIC PROJECT:** OPR-N411-NRT3-2007
**HYDROGRAPHIC SHEET:** H11458

**LOCALITY:** Old Tacoma to Point Defiance, Commencement bay, WA
**TIME PERIOD:** May 19 - July 24, 2008

**TIDE STATION USED:** 944-6484 Tacoma, WA
Lat. 47° 16.0'N Long. 122° 24.7' W
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 3.336 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project OPR-N411-NRT3-2007, H11458, during the time period between May 19 - July 24, 2008.

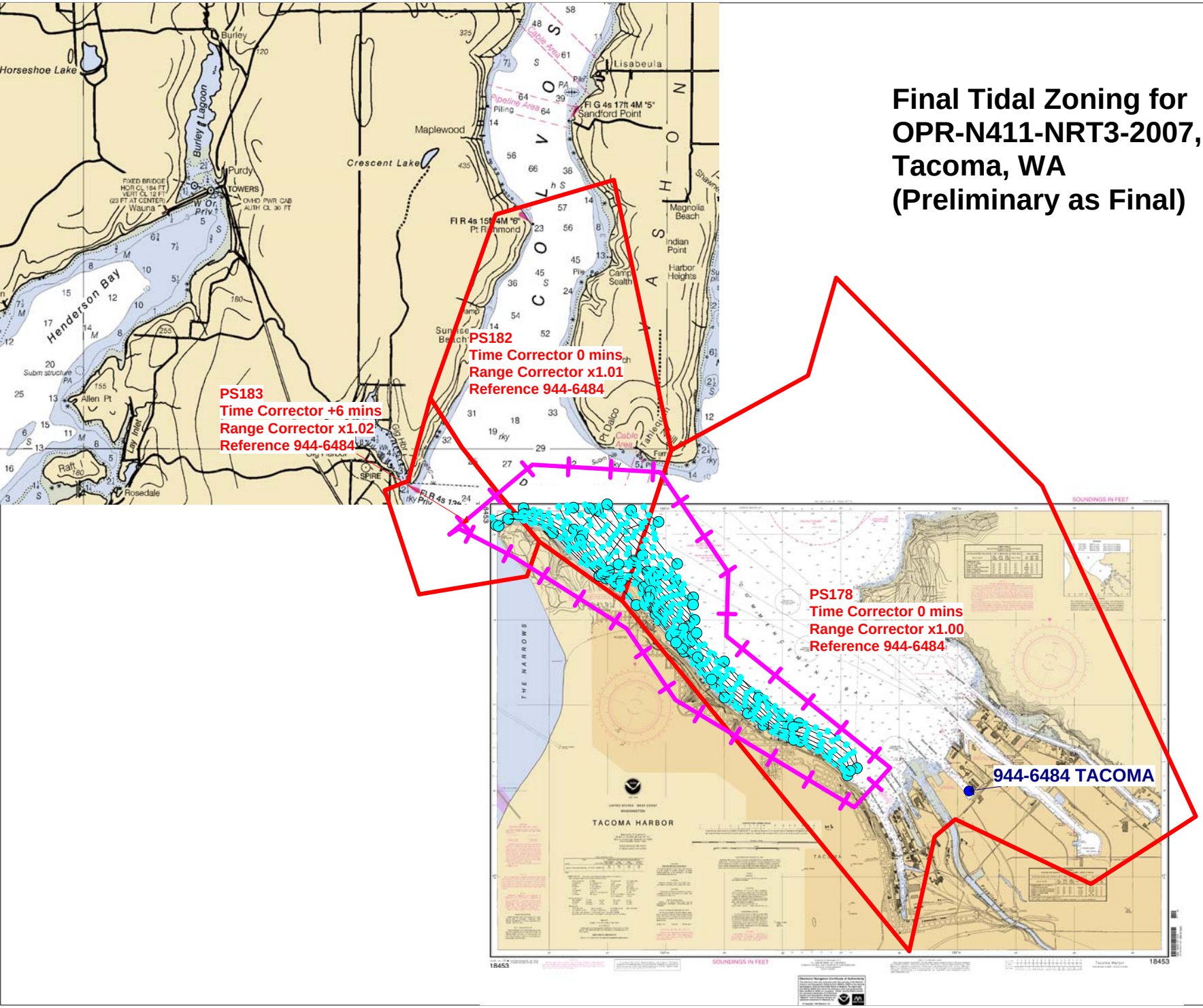
Please use the zoning file "N411NRT32007CORP" submitted with the project instructions for OPR-N411-NRT3-2007. Zones PS178, PS182 and PS183 are the applicable zones for H11458.

**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).

_____
CHIEF, OCEANOGRAPHIC DIVISION

# Final Tidal Zoning for OPR-N411-NRT3-2007, H11458 Tacoma, WA (Preliminary as Final)



**Subject:** Mischarted ATON
**From:** kathryn simmons <Kathryn.Simmons@noaa.gov>
**Date:** Fri, 31 Oct 2008 11:49:26 -0700
**To:** Stephen.Hill@noaa.gov
**CC:** Philip Sparr <Philip.Sparr@noaa.gov>

Steve,

Attached is a corrected position for an aid to navigation on Chart 18523: LLN 17213 Point Defiance Ferry Dolphin Light. It looks like the light got separated from its foundation which is the charted dol (see attached graphic). The surveyed position of the light was acquired by detached position. If you need any additional information, please let me know.

Thanks for your help.

Kathryn

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| Lat | Long | Time | Easting | Northing | Zone | ConType | Range | Azimuth | |
|---|---|---|---|---|---|---|---|---|---|
| DisplayName | | Remarks | LatDMS | LongDMS | | | | | |
| 47.3065825 | | -122.5138395 | 2008-164.17:29:26.00 | | 536748.6 | | 5239349 | 10 | DP |
| 3 | 352 | 5089 | LLN 17213 Point Defiance Ferry Dolphin Light | | | | | 47:18:23.697 | |
| -122:30:49.8222 | ***See Evaluation Report for charting recommendation.*** | | | | | | | | |

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**H11458_Dton_Chartlet1.bmp**

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**H11458_ATON.TXT**

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**H11458_ATON.xls**

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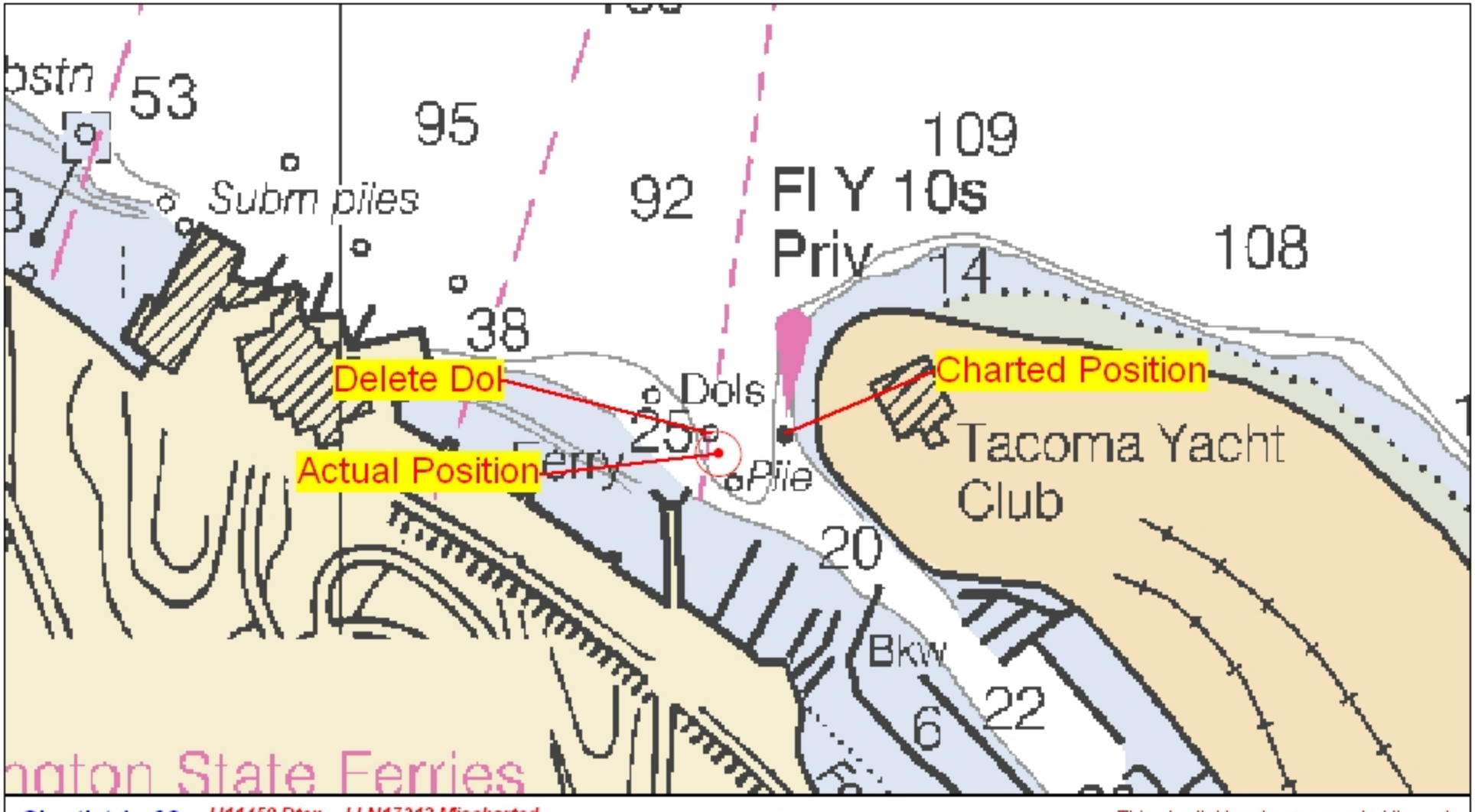
**Point Defiance Ferry Terminal.jpg**




**Chartlet 1 of 2** *H11458 Dton* *LLN17213 Mischarted*

This chartlet has been corrected through
Notice to Mariners dated
NOT FOR NAVIGATION.

| | | | | |
|---|---|---|---|---|
| No Window | NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION<br>NATIONAL OCEAN SERVICE | Project: OPR-N411-NRT3-08<br>Survey: H11458<br>State: WA<br>Locality: Commencement Bay<br>Sub-locality: Old Tacoma to Point Defiance<br>Survey Scale: 1:10,000 | Sounding Units: Feet<br>Sounding Datum: MLLW<br>Horizontal Datum: NAD 83<br>Chart Number: 18453<br>Chart Edition: 24, Jan./03<br>NOS Ref: | **NOAA NRT-3**<br>**Kathryn Simmons**<br>**Team Leader**<br><br>Survey Dates: May 19 to July 25, 2008 |

# Shoreline Verification Report
# OPR-N411-NRT3-07
# Tacoma, Washington
# Scale: 1:10000

## A. AREA SURVEYED

OPR-N411-NRT3-07 included shoreline verification for the latest revisions of the affected raster and ENC charts:

| Chart No. | Scale | Date | Edition | Downloaded |
|---|---|---|---|---|
| 18453 | 1:15,000 | October 2003 | 25th | January 21, 2009 |
| 18474 | 1:40,000 | September 2007 | 8th | January 21, 2009 |

| ENC Cell | Edition | Update Application Date | Issue Date |
|---|---|---|---|
| US5WA18M | 7 | 7/31/2007 | 7/10/2008 |
| US5WA22M | 5 | 10/4/2007 | 11/10/2008 |

### Data Acquisition

Equipment used for shoreline acquisition is listed in the table below:

| Equipment Type | Manufacturer | Model | Serial Number | Firmware and/or Software Version | Version Install Date |
|---|---|---|---|---|---|
| GPS Handheld Receiver/Datalogger | Trimble | GeoXT 50950-20 | 4428E01847 | Terra Sync 2.41<br>GPS Firmware 1.05 | 2/27/07<br>4/15/04 |
| Beacon-on-Belt DGPS Receiver/Antenna | Trimble | 38508-00 | 440111069 | | |

GPS data were collected on shoreline features throughout the project area. Some features were new; others were inaccurately depicted on the chart. Feature data were categorized at the time of acquisition by Object Class in accordance with S-57 standards in the form of points, lines or areas, consistent with the allowable geometry type for each Object Class. S-57 Attributes were defined in the field whenever possible.

Positions on discrete point features were acquired by placing the antenna over the feature and recording GPS positions for a period of time, typically one minute. The collection period was

extended to five minutes on major lights and ten minutes on ranges. The position data files for fixed aids to navigation have been transmitted to Marine Chart Division.

For line and area features, GPS data positions were acquired by collecting position data along the outside edge of a feature at a vertex or intersection, then pausing data collection until the next vertex or intersection is reached, at which point a new position would be collected and added to the feature. These steps would be repeated until the feature was completely defined. The GPS Pathfinder Office software extrapolates between the points acquired to create a continuous line or complete area and to clearly delineate the feature.

Point data were post-processed in GPS Pathfinder Office version 3.00 using dgps correction data from the nearest Continually Operating Reference Station (CORS). All position data were evaluated by examining horizontal precision and standard deviation calculated with GPS Pathfinder Office software as well as by comparing the data with the chart, aerial photographs and/or photographs acquired on the site. Where multipathing was known to occur (i.e., under bridges or near other overhead obstructions), points were examined with more rigorous attention. Positions significantly inconsistent with the above sources were deleted and reacquired.

The Pathfinder data collected in the field were exported from GPS Pathfinder Office into shape files which were then imported into NOTEBOOK.

**Data Files**

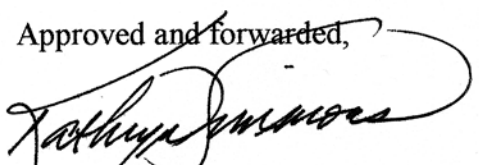
Two standalone hob files were created in NOTEBOOK: OPR_N411_NRT3-07.hob and OPR-N411_ATONs.hob. The ATON files were submitted to MCD on March 23, 2009, as text and excel files. Those files along with the ATON Notebook files accompany this report. (See Project Files.) On completion of post-processing, each of the above files was exported to S-57 files as well as to shape files. Notes to the cartographer were recorded in the Marker Layer of the respective hob file.

Photographs referenced in the PICREP field or in the Marker files are located in the Notebook/Images Used folder.

Marker notes concerning submerged or non-existent charted features are included with the Notebook data; however, remarks and recommendations are based on the data obtained with side scan and SWMB hydrography.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved.

Approved and forwarded,



Kathryn Simmons
Team Leader

**ATLANTIC HYDROGRAPHIC BRANCH**
**EVALUATION REPORT to Accompany**
**Surveys H11458 (2008-2009)**

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

## B. DATA ACQUISITION AND PROCESSING

### B.1 DATA PROCESSING

The following software was used to process and review data at the Atlantic Hydrographic Branch (AHB):

CARIS HIPS/SIPS version 6.1 SP2 HF 1-4
CARIS BASE Manager 2.1 SP1 HF 1-8
CARIS HOM ENC 3.3
PYDRO, version 8.7 r2586
CARIS S-57 Composer 2.0

### B.2 QUALITY CONTROL

**H-Cells**

The AHB source depth grid was generated from the field 1M MBES source grids. This process was used to create a 4M resolution combined surface which survey scale soundings were extracted from the AHB generated 1M Base surface at a 1:10000 scale using a radius of 1m. Soundings were selected for charting by hand using the latest raster charts 18453. Soundings were then checked for conflicts, corrected to remove conflicts, and edited to allow for proper sounding compilation placement with respect to existing charted depths outside the survey area. The BASE surface was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

Depth curves were drawn from the Base surface by hand. The contours are included in the final H-Cell product. The curves were utilized during chart scale sounding selection at AHB.

The compilation products and Stand Alone HOB Files (SAHOB) are detailed in the Compilation Process Log of this document. All individual SAHOB files were assembled in BASE Editor during H-Cell compilation.

The completed H-Cell was exported as a Base Cell File (ENC.000) in S-57 format with all values in metric units. The metric equivalent ENC.000 file was then converted to NOAA chart units (ENC_CS.000) with all values measured in feet following NOAA sounding rounding rules.

The H11458 CARIS H-Cell final deliverables include the following products:

| | | |
|---|---|---|
| H11458_CS.000 | 1:15,000 Scale | H11458 Selected Soundings (Chart Scale) |
| H11458_SS.000 | 1:10,000 Scale | H11458 Selected Soundings (Survey Scale) |

**JUNCTIONS**

H11642 (2007-2009) to the south

The present survey junctions to the north end with survey H11642 (2007-2009). Present survey soundings are in perfect agreement with survey H11642 (2007-2009).

## C. VERTICAL AND HORIZONTAL CONTROL

Final vertical correction processing was completed by the field unit with no additional corrections required by Atlantic Hydrographic Branch personnel. The field unit applied verified water levels in conjunction with the preliminary tidal zoning which was accepted and approved by N/OPSI CO-OPS as the final zoning for H11458. Sounding datum is Mean Lower Low Water (MLLW). Vertical datum is Mean High Water (MHW).

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 10. Office ENC processing of this survey required translating the datum to meet S-57 ENC requirements. The horizontal geodetic datum was translated to Latitude and Longitude (LLDG) World Geodetic System-84 (WGS-84) during CARIS Base Manager processing.

## D. RESULTS AND RECOMMENDATIONS

**Chart Comparison** **18453 (25th. Edition, Sep. /07**
Corrected through NM, Sep. 15/07
Corrected through LNM, Sep. 18/07
Scale 1:15,000

**ENC Comparison** **US5WA22M**
Tacoma harbor
Edition 12
Update Application Date 2009-06-15
Issue Date 2009-06-15
References: Charts 18453

**Hydrography**

The charted Hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section D., Appendix 1 and 2. of the Descriptive Report. The following should be noted:

A charted ***Subm Pile*** in the vicinity of Latitude 47°18′28.30″N, Longitude 122°31′04.60″W was disproved by multibeam and side scan sonar investigation. It is recommended that the ***Subm Pile*** be deleted.

A charted visible ***dolphin*** in the vicinity of Latitude 47°16′25.65″N, Longitude 122°27′19.54″W was not visually verified during present survey operations. It is recommended that the ***dolphin*** be revised to ***Obstn (Subm dol)***.

A charted visible ***Pile*** in the vicinity of Latitude 47°16′21.78″N, Longitude 122°27′13.72″W was not visually verified during present survey operations. It is recommended that the ***Pile*** be revised to ***Obstn (Subm Pile)***.

A charted visible ***Pile*** in the vicinity of Latitude 47°16′19.09″N, Longitude 122°27′07.94″W was not visually verified during present survey operations. It is recommended that the ***Pile*** be revised to ***Obstn (Subm Pile)***.

A charted visible ***Pile*** in the vicinity of Latitude 47°16′15.40″N, Longitude 122°27′02.34″W was not visually verified during present survey operations. It is recommended that the ***Pile*** be revised to ***Obstn (Subm Pile)***.

A charted ***Dol*** in the vicinity of Latitude 47°16′21.11″N, Longitude 122°27′12.14″W was not visually verified during present survey operations. It is recommended that the ***Dol*** be revised to ***Obstn Subm dol***.

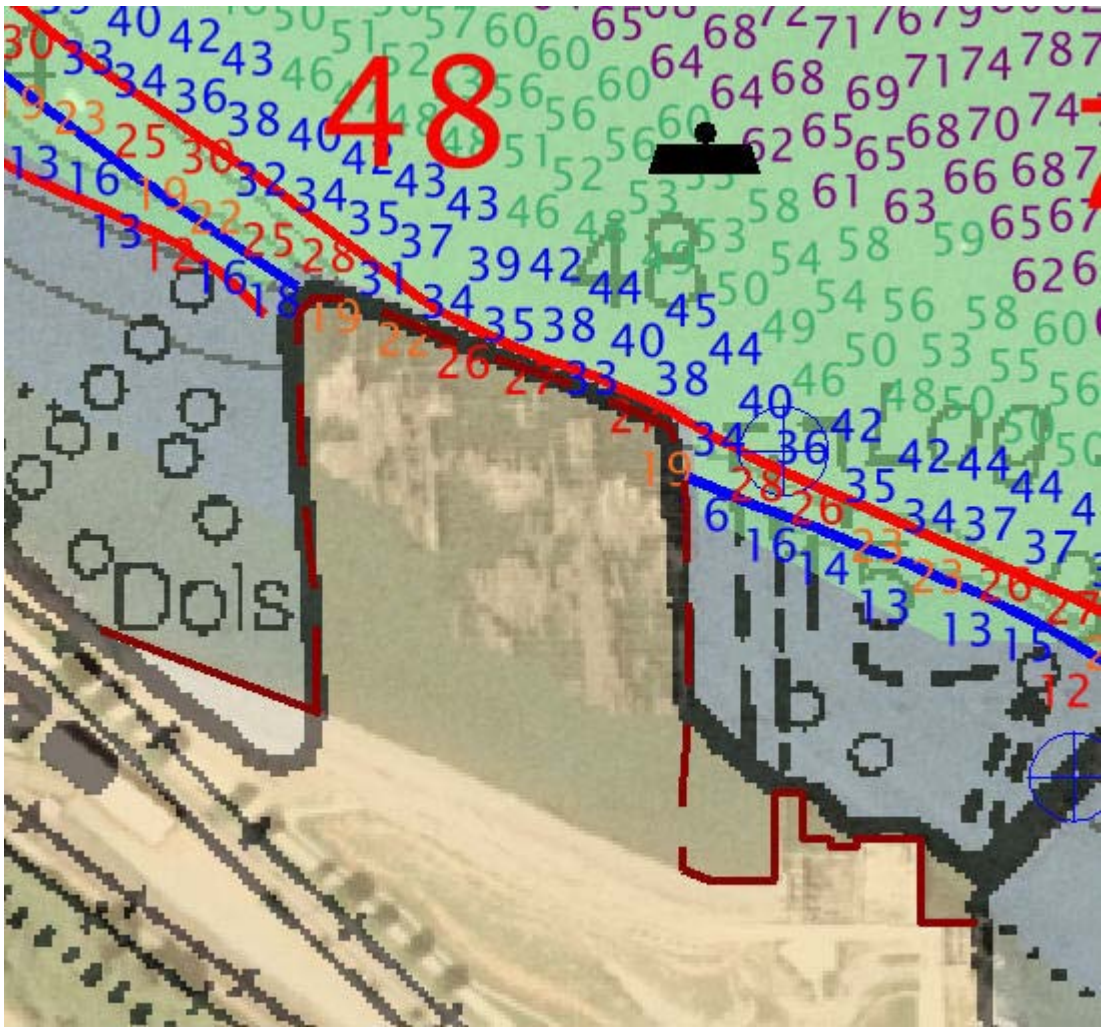
A charted ***Dol*** in the vicinity of Latitude 47°16′20.58″N, Longitude 122°27′10.34″W was not visually verified during present survey operations. It is recommended that the ***Dol*** be revised to ***Obstn Subm dol***.

A charted ***dolphin (Point Defiance Ferry Light)*** in the vicinity of Latitude 47°18′24.06″N, Longitude 122°30′49.99″W was determined to be in a new location. The ***dolphin*** was located in Latitude 47°18′23.70″N, Longitude 122°30′49.83″W. It is recommended that the ***dolphin (Point Defiance Ferry Light)*** be revised to present survey location.

In the vicinity of Latitude 47°18′18″N, Longitude 122°30′40″W the ***shoreline and piers*** have change. A shoreline investigation was performed by the field unit and corrections submitted to Remote Sensing Division. The data has been brought forward to supplement the present survey.

A charted ***Pier*** in the vicinity of Latitude 47°16′40.40″N, Longitude 122°28′10.10″W was seen on Ortho Photo #93150176 as being in ruins. It is recommended that the ***Pier*** be revised to ***Pier ruins***.

Charted ***Shoreline (wharf)*** in the vicinity of Latitude 47°16′42″N, Longitude 122°28′17″W was seen on U.S. Geological Survey Orthoimagery #93150176, for Zone 10 Washington State Quarter Quadrangle TACOMA, 20070312, as being in ruins. The shoreline change has been digitized to the H-Cell from the Orthophoto. It is recommended that the ***Shoreline (build up area)*** be revised from present survey H-Cell.


48
Dols

Charted ***Shoreline*** in the vicinity of Latitude 47°16′24.02″N, Longitude 122°27′18″15W was seen on U.S. Geological Survey Orthoimagery #22113295, for Zone 10 Washington State Quarter Quadrangle TACOMA, 20070312, has changed. The shoreline change has been digitized to the H-Cell from the Orthophoto. It is recommended that the ***Shoreline*** be revised from present survey H-Cell.

**Adequacy of Survey**

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell File or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further survey requirements recommended by the hydrographer.

**Miscellaneous**

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. See Section D.1. of this report for a list of the Raster Charts and Electronic Navigation Chart (ENC) used for compiling the present survey.

# H11458 COMPILATION LOG

| General Survey Information | |
|---|---|
| REGISTRY No. | ***H11458*** |
| PROJECT No. | ***OPR-N411-NRT3-07*** |
| FIELD UNIT | ***NOAA-NRT3*** |
| DATE OF SURVEY | ***MAY 19, 2008 TO APRIL 3, 2009*** |
| LARGEST SCALE CHART | ***18453, edition #25, 20070901, 1:15000*** |
| SOUNDING UNITS | ***feet*** |
| COMPILER | ***Norris A. Wike*** |
| | |

| Source Grids | File Name |
|---|---|
| | ***H11458_A_1M_FINAL.hns*** |
| | ***H11458_B_1M_FINAL.hns*** |
| | ***H11458_C_1M_FINAL.hns*** |
| **Surfaces** | **File Name**<br>H:\Compilation\HXXXXX_XXXX-XXXX\AHB_HXXXXX\COMPILE\Working |
| *Combined* | ***H11458_Combined_4M.hns*** |
| **Final HOBs** | **File Name** |
| *Survey Scale Soundings* | ***H11458_SS_Soundings.hob*** |
| *Chart Scale Soundings* | ***H11458_CS_Soundings.hob*** |
| *Contour Layer* | ***H11458_Contours.hob*** |
| *Feature Layer* | ***H11458_Features.hob*** |
| *Meta-Objects Layer* | ***H11458_MetaObjects.hob*** |
| *Blue Notes* | ***H11458_BlueNotes.hob*** |
| *ENC Retain Soundings* | ***H11458_ENC_Retain.hob*** |
| | |
| | |
| | |

| Meta-Objects Attribution | |
|---|---|
| **Acronym** | **Value** |
| **M_COVR** | |
| CATCOV | ***1*** |
| SORDAT | ***20090403*** |
| SORIND | ***US,US,survy,H11458*** |
| **M_QUAL** | |
| CATZOC | ***U*** |
| INFORM | ***Registry Number, Project Number, Vessel*** |
| POSACC | ***10*** |
| SORDAT | ***20090403*** |
| SORIND | ***US,US,survy,H11458*** |
| SUREND | ***20090403*** |
| SURSTA | ***20080519*** |
| **DEPARE** | |
| DRVALV 1 | ***1.00*** |
| DRVALV2 | ***510.00*** |
| SORDAT | ***20090403*** |
| SORIND | ***US,US,nsurf,H11458*** |

**APPROVAL SHEET**
**H11458**

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, representation of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the Evaluation Report.

All final products have undergone a comprehensive review as per the Atlantic Hydrographic Branch Processing Manual and are verified to be accurate and complete except where noted.

Norris Wike
Digitally signed by Norris Wike
DN: cn=Norris Wike, o=NOAA, ou=AHB, email=norris.a.wike@noaa.gov, c=US
Date: 2009.11.23 08:24:01 -05'00'

**Norris A. Wike**
Cartographer
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.

Richard T. Brennan
I am approving this document
2009.11.20 02:00:23 -05'00'

Approved:

**Richard T. Brennan**
Commander, NOAA
Chief, Atlantic Hydrographic Branch

Kelly Kriner
AWOIS Check
2009.11.23 16:42:49 -05'00'