F00534

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Field Examination

Field No. N/A

Registry No. F00534

LOCALITY

State Commonwealth of the Northern Mariana Islands

General Locality North Pacific Ocean

Sublocality Rota Harbor

2007

CHIEF OF PARTY
Corey Allen, NOAA

LIBRARY & ARCHIVES

DATE 3-Jul-07

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

F00534

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.

State **Commonwealth of the Northern Mariana Islands**

General Locality **North Pacific Ocean**

Sublocality **Rota Harbor**

Scale **1:5,000** Date of Survey **May 16-17, 2007**

Instructions Dated **March 15, 2007** Project No. **M-T901-AHI-07**

Vessel **R/V AHI**

Chief of Party **Corey Allen, Physical Scientist, NOAA**

Surveyed by **Corey Allen, Erin Campbell, Kurt Brown, Scott Ferguson, Joyce Miller**

Soundings taken by echo sounder: **Reson 8101**

Graphic record scaled by **N/A**

Graphic record checked by **N/A**

Protracted by **NA** Automated plot by **NA**

Verification by **S. Wolfskehl**

Soundings in **Meters** at **MLLW**

REMARKS: **All times are UTC. The purpose of this survey was to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. Revisions and end notes in red were generated during office processing. As a result, page numbering may be interrupted or non-sequential. All seperates are filed with the hydrographic data.**

Descriptive Report to Accompany Hydrographic Survey F00534

Project M-T901-AHI-07
Rota Harbor
Commonwealth of the Northern Mariana Islands
Scale 1:5000
May, 2007
NOAA Research Vessel AHI

Introduction

The United States Navy and the Commonwealth of the Northern Mariana Islands (CNMI) Port Authority requested a modern hydrographic survey of Saipan Harbor. The US Navy plans to utilize Saipan as the primary port-of-call in the region for Navy vessels until such a time as Apra Harbor, Guam can be dredged to again support safe entry by Navy ships and submarines; this dredge work is scheduled to occur in FY2008 or later. The CNMI Port Authority has additionally requested modern hydrographic surveys of Tinian Harbor and Rota Harbor to support safe and efficient commerce and transportation in the region.

This project provides contemporary hydrographic data to update the nautical charts in the area and support sound navigational decision-making for both military and civilian mariners entering the ports of Saipan, Rota and Tinian.

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions M-T901-AHI-07, dated March 15, 2007[1] and all other applicable direction[1], with the exception of deviations noted in this report.

The survey area was located in Rota Harbor (Figures 1 and 2) on the Island of Rota, which is part of the Commonwealth of the Northern Mariana Islands. This survey corresponds to Sheet B in the sheet layout provided with the Letter Instructions, as shown in Figure 2 below.

Data acquisition was conducted from May 16 to May 17, 2007 (DN136 to DN137).

[1] NOS Hydrographic Surveys Specifications and Deliverables (April, 2007), OCS Field Procedures Manual for Hydrographic Surveying (March 2007), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

Figure 1 : Rota Harbor

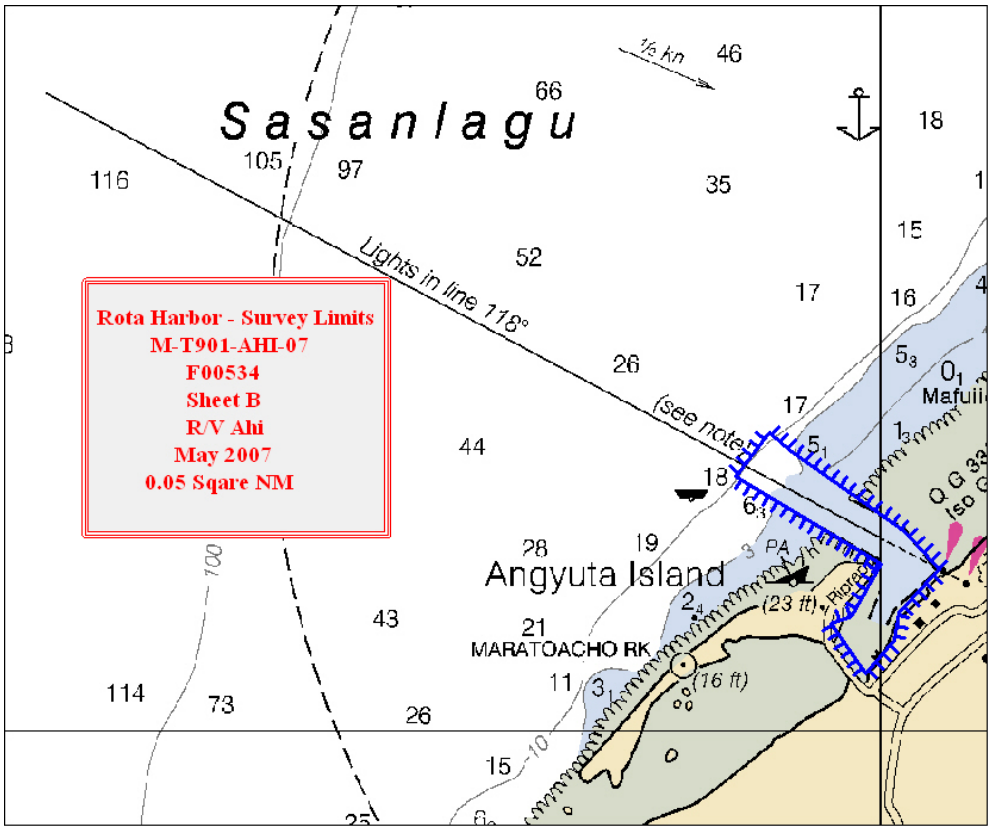

Figure 2: F00534 Survey Area

F00534 Statistics	
Linear Nautical Miles of Mainscheme Multibeam	5.5
Linear Nautical Miles of Side Scan Sonar Lines	0.0
Linear Nautical Miles of Crosslines	0.3
Linear Nautical Miles of Developments	0.0
Total Square Nautical Miles	0.05

Table 1: F00534 Statistics

Complete MBES coverage was obtained with the exception of an area on the northeastern side of the delineated survey limits. The southern portion of the gap in coverage was not accessible due to a dangerous shallow reef (Figure 3). The northern portion of the gap was missed due to the inability to display the survey limits because of a shift in chart 81063 at the time of survey operations (see Section D1 – Chart Comparison) The hydrographers therefore had to estimate the extents of the survey on the northern side as there were no obvious limits set by shoreline features. This gap is not deemed significant as it is in deep water and was not a part of the original survey area requested by the CNMI Port Authority (see Figure 3)[2].

Figure 3 – Reef at edge of channel into Rota Harbor

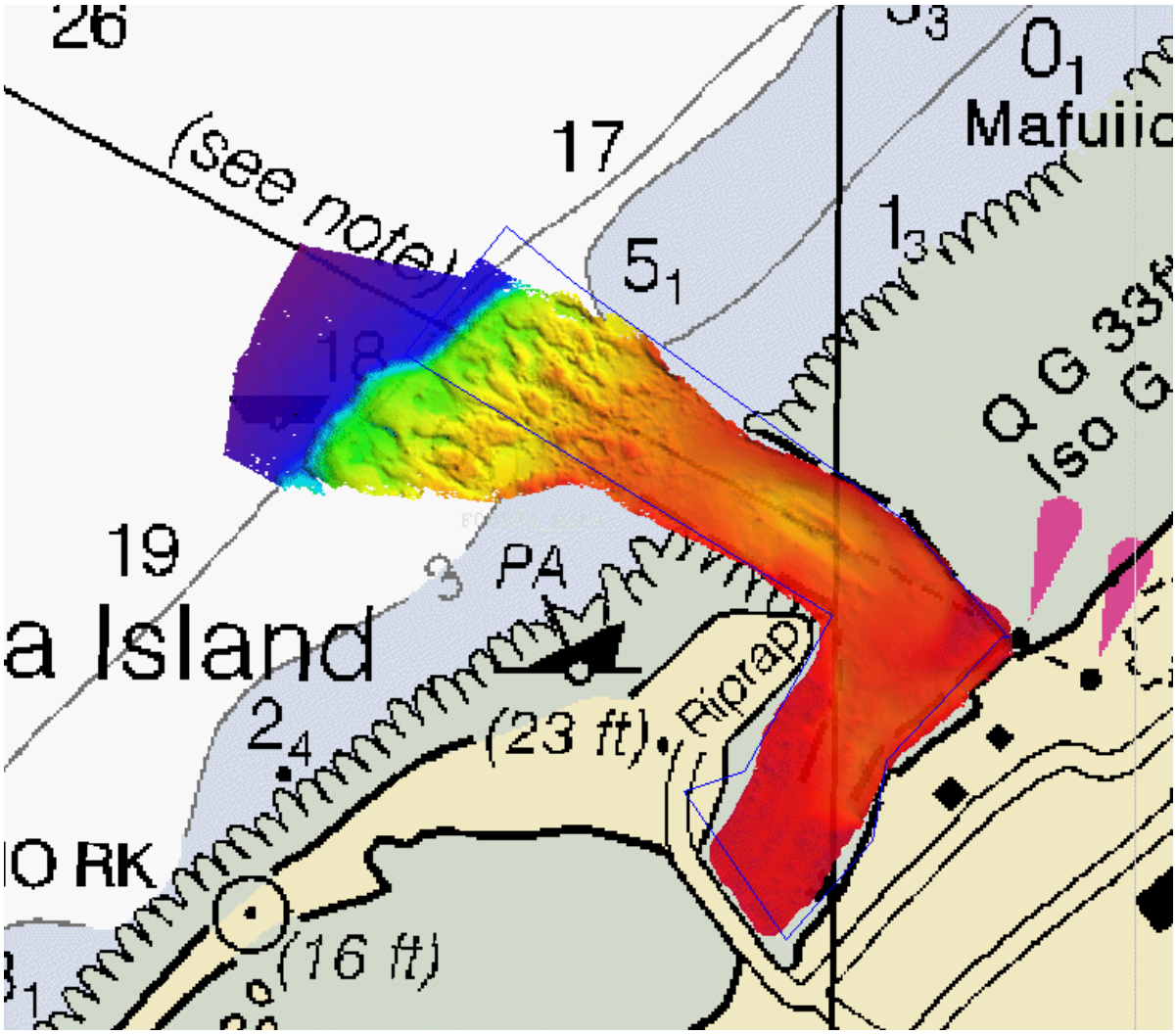

Figure 4 - Coverage

Rota Harbor desired survey coverage including recently dredged area (shown in green).

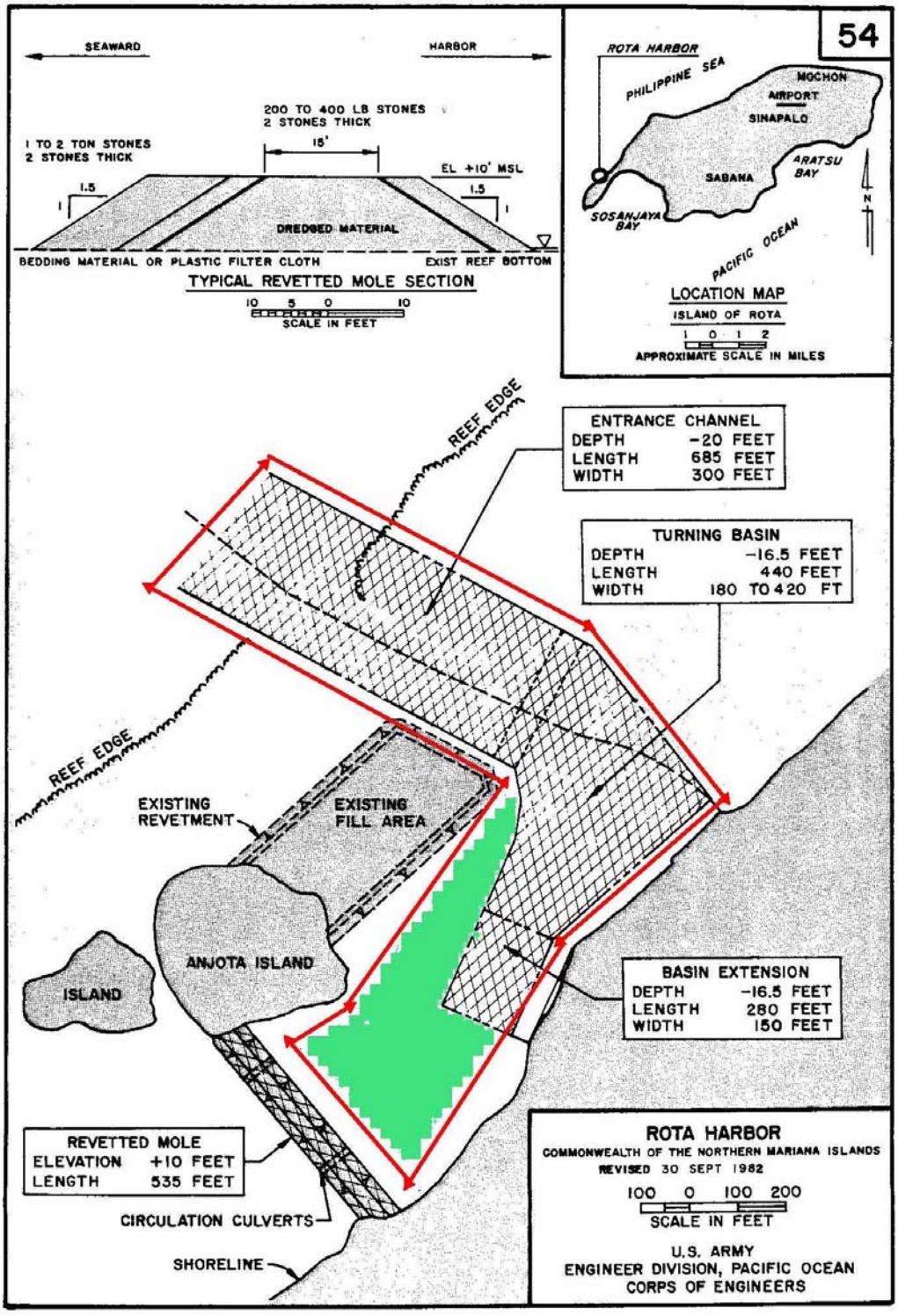

Figure 5 – Requested Survey Coverage

B. DATA ACQUISTION AND PROCESSING

A complete description of data acquisition and processing systems, the R/V AHI, quality control procedures and data processing methods are described in the *T-901-AHI-07 Data Acquisition and Processing Report (DAPR)*[3], submitted under separate cover. Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections.

Final approved water levels were applied to survey F00534 on June 26, 2007. See Section C for additional information.

B1. Equipment

R/V AHI was the only vessel used during survey F00534. Specifications for the AHI are listed in Table 2.

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

Table 2: AHI Specifications

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

B2. Quality Control

Data quality for survey F00534 was evaluated through examination of CUBE surfaces that were generated from raw soundings. Internal consistency and integrity of the data were manually examined by

the Hydrographer in CARIS subset mode. Soundings and surfaces in overlapping coverage and outer beams were reviewed for systematic errors and excessive noise. The data were found consistent in comparisons between day-day, and line-line coverage.

Data Logging

At the location of the Survey in the Mariana Islands, midnight UTC occurred at 10 am local time. DNs on acquisition logs and in CARIS are named according to the DN occurring after midnight UTC.

Crosslines

Explicit multibeam crosslines were not run on survey F00534. However, several of the mainscheme lines cross at approximately 90 degrees and can serve as crosslines for comparison purposes (Figure 8). Crossline mileage was calculated by adding up the distance of the segments of mainscheme lines. Using this method, crosslines totaled approximately 0.3 linear nautical miles (lnm), comprising 5.4% of the 5.5 lnm of total MBES hydrography. The mainscheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode and agreed well with differences of 0.1 meters or less.

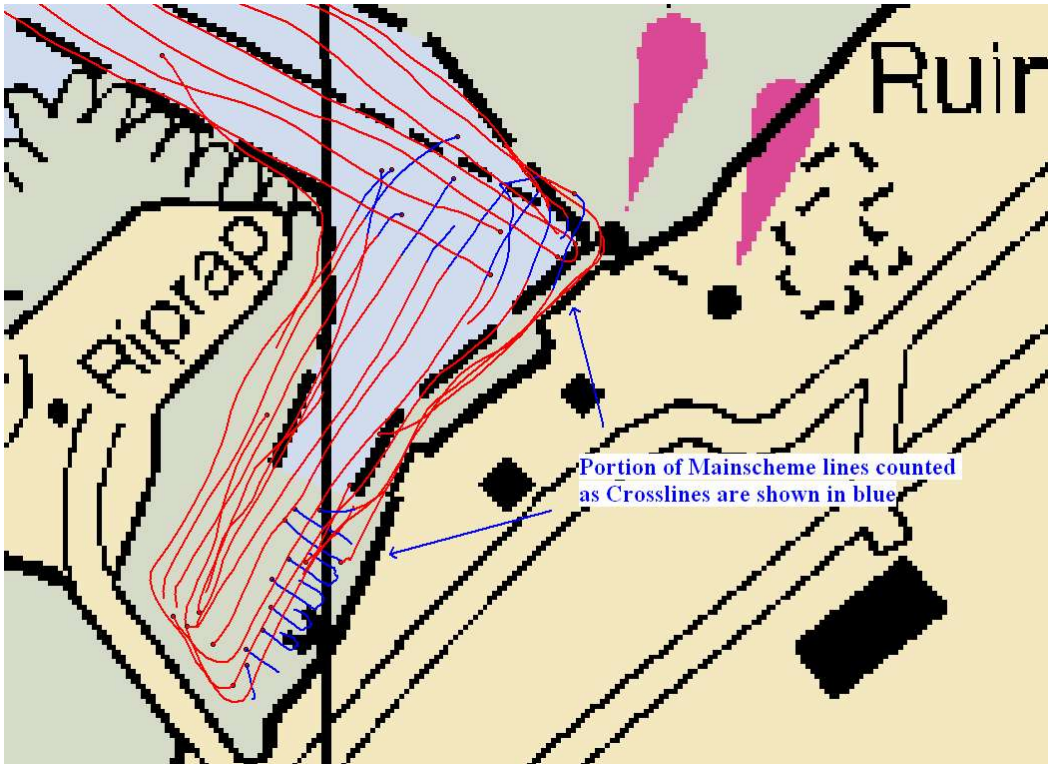

Figure 6 – Crossline Coverage

Crossline agreement with main scheme data meet the vertical accuracy requirements as stated in the *NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSDM).*

Junctions

No contemporary surveys junction with F00534[4].

Coverage Assessment

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

Holidays resulting from shadows behind coral heads exist in several areas at the edge of the survey limits. These holidays are not deemed significant as the shoal point on the coral head was represented in the half meter BASE surface. There are several small holidays in the deeper part of the survey. The gaps are insignificant as they are generally not more than one node in size or occur at the very edge of the survey limits[5].

Trueheave

Trueheave was applied to all survey lines as described in the DAPR.

Sound Velocity

All sound velocity data were applied during data collection as described in the M-T901-AHI Data Acquisition and Processing Report. Sound velocity was not applied in CARIS and no CARIS .svp files exist for the survey. Sound velocity data remains in converted file (.cnv) format. The ISS-2000 software did not allow the extension of the sound velocity data based on the slope of the curve. As a result, CTDs were only taken in the deeper areas of the survey where depths were deeper than the expected survey depth. The sound velocity names, positions and times are shown below.

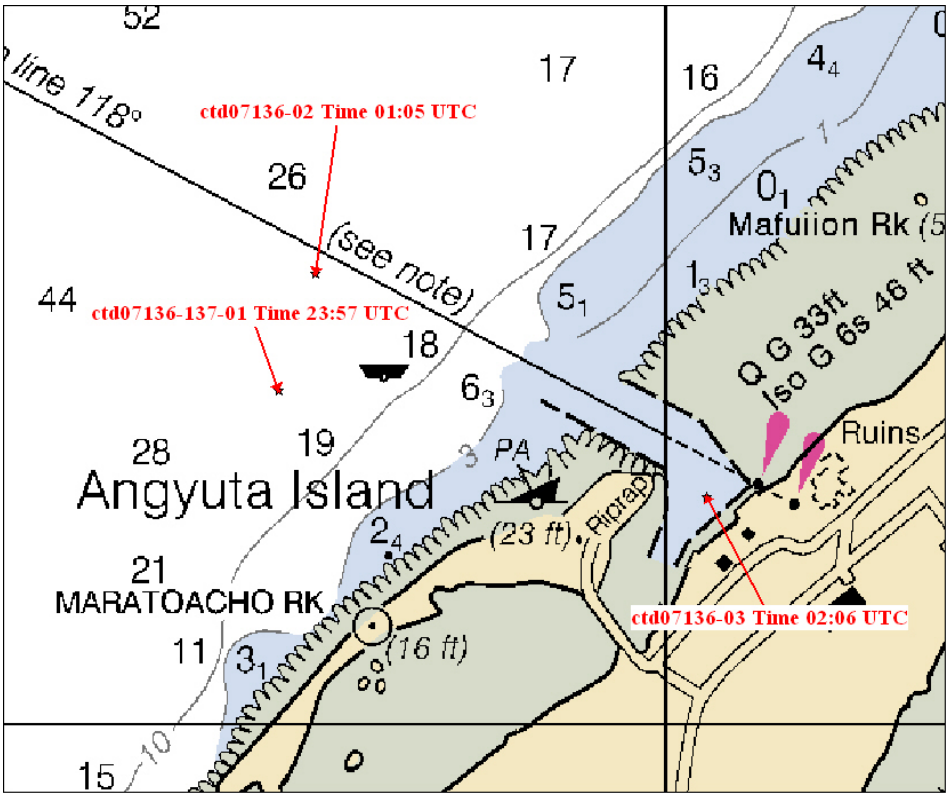

Figure 7 – Sound Velocity Positions, Names and Times

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

Accuracy Standards

Uncertainty values in the CUBE surface were generally close to 0.25 meters. Uncertainty values exceeding 0.3 meters exist in isolated spots throughout the finalized CUBE surface and are the result of high standard deviation from steeply sloped bottom features or coral heads. Data from survey F00534 meet data accuracy specifications as stated in the *HSSDM* [6].

B3. Corrections to Echo Soundings

Data reduction procedures for survey F00534 conform to those detailed in the DAPR.

B4. Data Processing

Data processing procedures for survey F00534 conform to those detailed in the DAPR

A single fieldsheet, F00534_Rota was created to encompass survey F00534, and contains a single half meter CUBE surface, F00534_0p5m and one finalized surface, F00534_0p5m_Final The fieldsheet is shown in Figure 5.

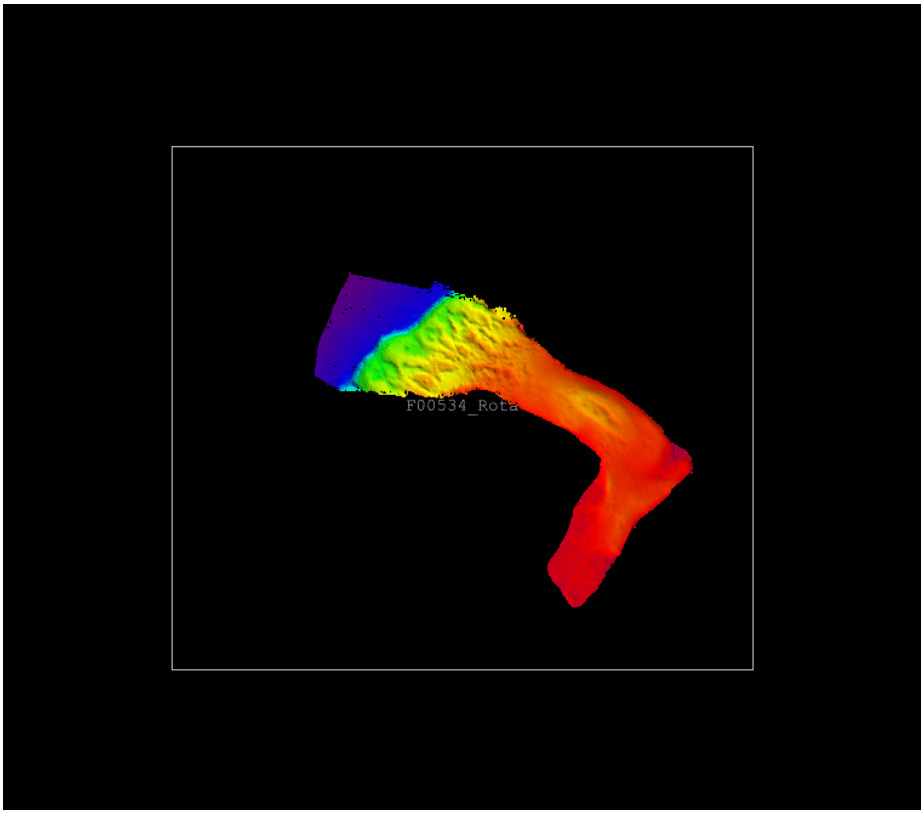

Figure 8 - Fieldsheet F00534_Rota

A half meter resolution BASE surface was chosen as the highest resolution surface the data would support without creating significant gaps in coverage. In addition, the half meter resolution was chosen to increase the likelihood of the surface representing the shoal points on the numerous coral heads of various shapes and sizes scattered throughout the survey area.

Designated Soundings

Soundings were designated on features in the survey area whose shoal points were not adequately represented in the half meter BASE surface. These occurred only in the shoaler areas (less than ten meters) and were mainly on coral heads. The most significant coral heads in a particular area were selected for designated soundings reflecting their shoal point. Other coral heads with deeper shoal depths were examined in the multibeam data but no sounding designated on their shoal point. In these cases the least depth on the coral head was adequately represented in the BASE surface or, if not, the least depth was not deemed significant in relation to nearby coral heads whose shoal depths were designated.

C. HORIZONTAL AND VERTICAL CONTROL

Horizontal control work was not done during Survey F00534 and a Horizontal and Vertical Control report was not written for this survey.

Horizontal Control

The horizontal datum for this project is the World Geodetic System of 1984 (WGS84). Differential GPS (using a C-Nav SF-2050G DGPS receiver to supply the POS/MV with differential correctors) was the sole method of positioning.

Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The primary tide station at Apra Harbor, Guam (163-0000) served as control for datum determination and as the primary source for water level correctors for survey F00534 during acquisition.

A request for delivery of final approved water level data (smooth tides) for survey F00534 was forwarded via email to N/OPS1 on May 30, 2007. A copy of the request is included in Appendix IV.

The Tide Note for Hydrographic Survey F00534 was received on June 18, 2007. The Tide Note for Hydrographic Survey F00534 states that preliminary zoning is accepted as the final zoning correctors. Therefore, verified water levels applied on June 26, 2007 are the final water levels. Final approved water levels consist of verified water level data downloaded from the CO-OPS website for station Guam in file 1630000.tid, and the tide zoning information in file T901AHI2007CORP.zdf. The Tide Note for Hydrographic Survey F00534 and ancillary correspondence are included in Appendix IV.

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

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Survey F00534 was compared only with chart 81063 (6th Ed.; March, 2006, 1:25,000), updated with Notice to Mariners through 06/16/2007[7].

Chart 81063

Only two soundings from chart 81063 fall within the survey area and both agree with depths from the present survey. The one and six fathom contours at the entrance to the harbor should be adjusted to reflect the new hydrography[8].

Two 18 ft. soundings at the entrance to the Rota harbor channel are located in the area where the chart note for Rota Harbor states that the controlling depth is 20 ft. These soundings along with an area of shoaling in the inner harbor are shown in Figure 9. The two soundings and the shoal area were submitted as DTONs and are discussed in F00534_DTON Report located in Appendix 1.

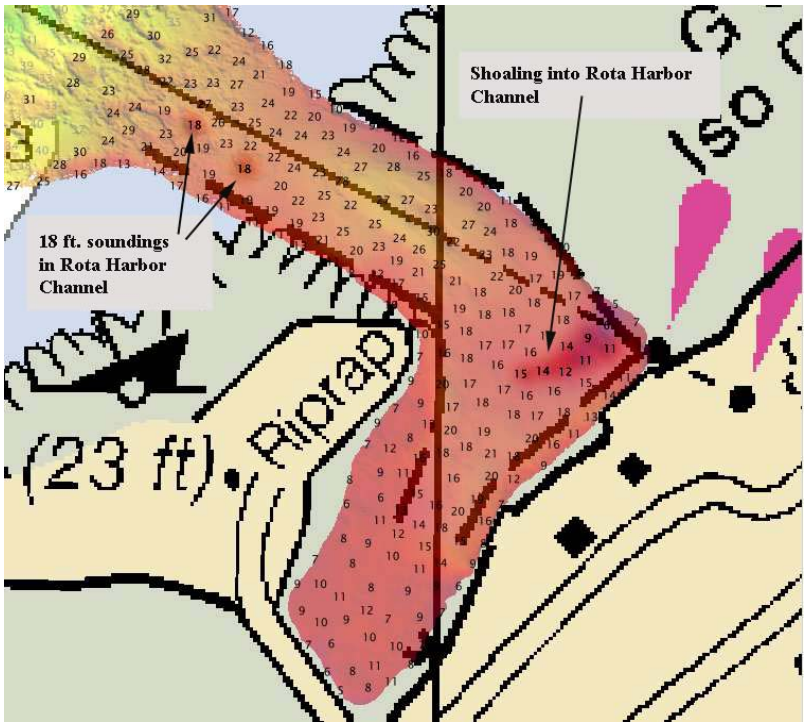

Figure 9

During the course of survey operations an offset of approximately 135 meters to the southwest was noted in chart 81063 (Figures 10 and 11). The shift was reported to MCD (see email in Appendix V) and the problem was fixed in the latest release of the chart[9].

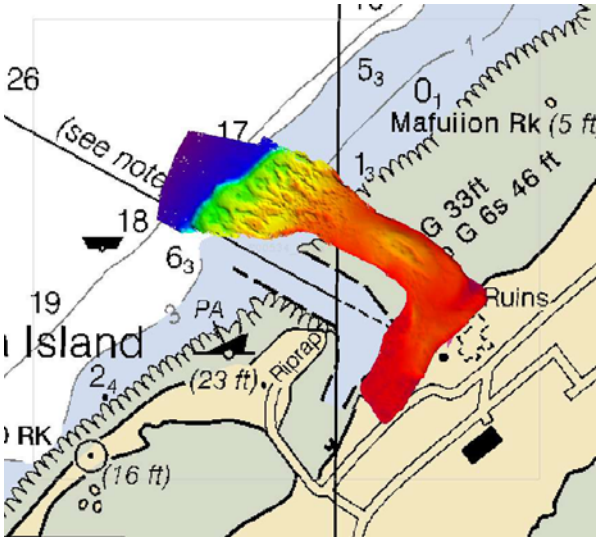

Figure 10 – Shifted Chart

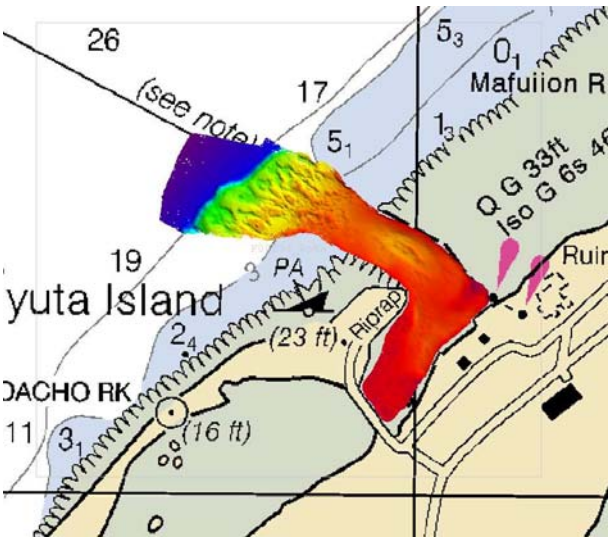

Figure 11 – Unshifted Chart

As the scale of chart 18063 is inadequate to portray depths and detailed shoreline in Rota Harbor, the hydrogapher recommends a 1:5000 or larger scale inset of the harbor be added to the chart with depth information and updated shoreline from survey F00534[10].

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the *HSSDM*. The surveyed soundings are adequate to supersede prior surveys in their common areas[11]**.** Based on the application of verified water level data, final chart comparisons are not required by the Pacific Hydrographic Branch.

Automated Wreck and Obstruction Information System (AWOIS) Investigations

There were no AWOIS items located within the limits of F00534[12].

Dangers to Navigation

One Danger to Navigation report was submitted. The report listed three items (described in the chart comparison section above) that affect the controlling depths in Rota Harbor. A recommendation to change the note to reflect the new hydrography was made[13]. See F00534_DTON Report in Appendix I.

Coast Pilot

Soundings shoaler than the 16 ft. depth reported in Coast Pilot 7 (Chart 81063 - Chapter 15, page 655) alongside berth 2 were found (Figure 12). Coast Pilot branch was notified of the change in depths and the Coast Pilot will be updated to reflect the current survey depths.

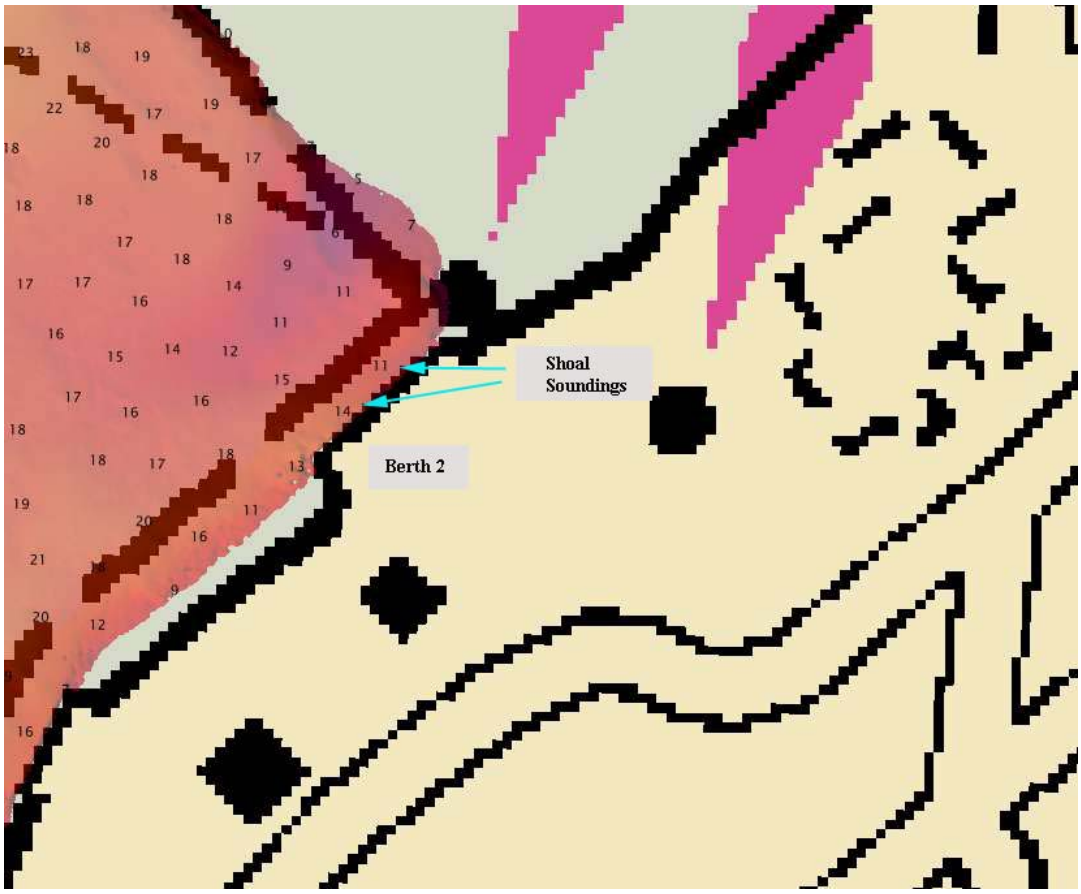

Figure 12

D.2 Additional Results

Shoreline Verification and Processing

Shoreline verification was not required for survey F00534. A new floating pier and uncharted launch ramp (Figures 13 and 14) were however, positioned in the harbor. As no high accuracy DGPS units were available, the pier was positioned using a non-differential recreational GPS unit. The positions of pier corners were written down on paper and transferred manually to Mapinfo software. Pilings at the end of the northernmost five fingers of the new floating pier, visible in the multibeam data, were used to more accurately position the new pier by adjusting the pier shape so that the end of the finger piers matched the pilings visible in the multibeam data. After all edits were made in Mapinfo, the data were then exported as a .shp file and imported into Notebook for classification and attribution. The hydrographer believes that the position and shape of the pier accurately reflect the construction and should be added to the chart as shown in the Notebook F00534 Shoreline HOB file (opened in Notebook session F00534_Shoreline) and as depicted in Figure 15[14].

Figure 13

Figure 14

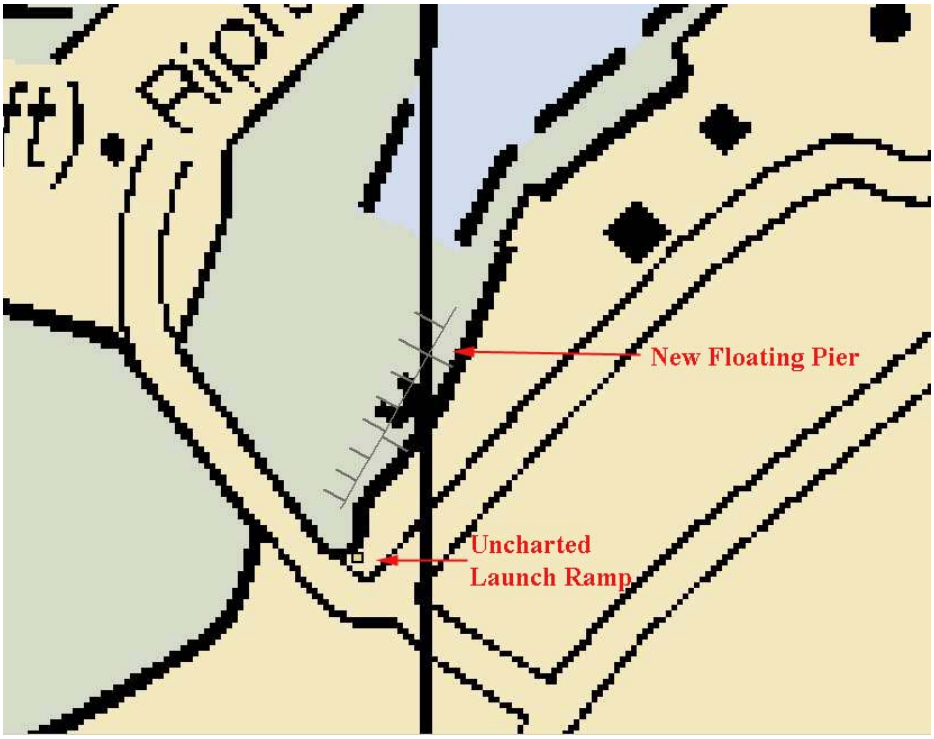

Figure 15

Prior Survey Comparison

No prior surveys were listed in the Project Instructions for comparison to survey F00534.

Aids to Navigation

All aids to Navigation were positioned accurately and found to serve their intended purpose[15].

Bottom Samples

Bottom samples were not required for survey F00534[16].

E. APPROVAL

As team leader, field operations for hydrographic survey F00534 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2007 edition), Field Procedures Manual (March 2007 edition), and all HSD Technical Directives issued through March 2007. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required . All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

Title	Date Sent	Office
AHI_HSRR_Memorandum	April 23, 2007	N/CS34
M-T901-AHI-07 Data Acquisition and Processing Report	June 14, 2007	N/CS34

Approved and Forwarded: _____

Corey Allen, Physical Scientist, NOAA

In addition, the following individuals were also responsible for overseeing data acquisition and processing of this survey:

Kurt Brown
2007.07.13 13:50:17
-07'00'

_____

Kurt Brown
Physical Scientist, NOAA

_____

Erin Campbell
Physical Scientist, NOAA

Revisions Compiled During Office Processing and Certification

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[1] Concur
[2] Concur
[3] Filed with project records
[4] Concur
[5] Concur
[6] Concur
[7] Chart comparisons were performed with the most recent edition of Chart 81063 (6th Ed.; March, 2006, 1:25,000), updated with Notice to Mariners through 1/05/2008
[8] Concur
[9] Concur
[10] Concur
[11] Concur
[12] Concur
[13] Recommendations have been applied to the latest edition of the chart
[14] Concur with clarification. Use the latest shoreline available
[15] Concur
[16] Concur

Danger to Navigation Report – Survey F00534

Report of Danger to Navigation

Registry Number: F00534
State: Commonwealth of the Northern Mariana Islands
Locality: North Pacific Ocean
Sub-Locality: Rota Harbor
Project Number: M-T901-AHI-07
Survey Dates: May 16-17, 2007

Features are reduced to Mean Lower Low Water using verified water levels and are positioned on WGS84.

Chart Affected: 81063 (6th Ed.; March, 2006, 1:25,000)

Dangers to Navigation

Feature	Depth (ft.)	Latitude (N)	Longitude (E)
Shoal	18	14/08/16.2	145/07/55.7
Shoal	18	14/08/17.2	145/07/54.6
Shoal	6 to 15	14/08/12.2	145/08/03.1

Table 1

DTON Details

This Danger to Navigation concerns two 18 ft. shoals at the positions listed in Table 1 and a shoal encroaching into the eastern corner of the inner harbor channel. The two 18 ft. shoals are located in an area where the chart note states the controlling depth is 20 ft. The shoal in the inner harbor, with depths ranging from 15 ft. in the center of the channel to 6 ft. at the edge, is located in an area where the chart note could be interpreted as stating that the controlling depth is 16 ft. The 18 ft. soundings and inner harbor shoal are shown in Figure 1. The chart note is shown in Figure 2.

Recommendations:

Change chart note to reflect current conditions of Rota Harbor. The controlling depth "for the center 250 feet to the first turn" should be changed to 18 feet.

The latter part of the chart note is unclear as to where the "center 150 feet for the remaining 720 feet of the channel" is located. This statement is true if the channel is considered to be the area 150 meters from the western side of the channel (Figure 3), but untrue if it is considered to be the visual center of the area between the lines delineating the channel. The note should be changed to clarify where the area of deeper water is located or to incorporate this shoal.

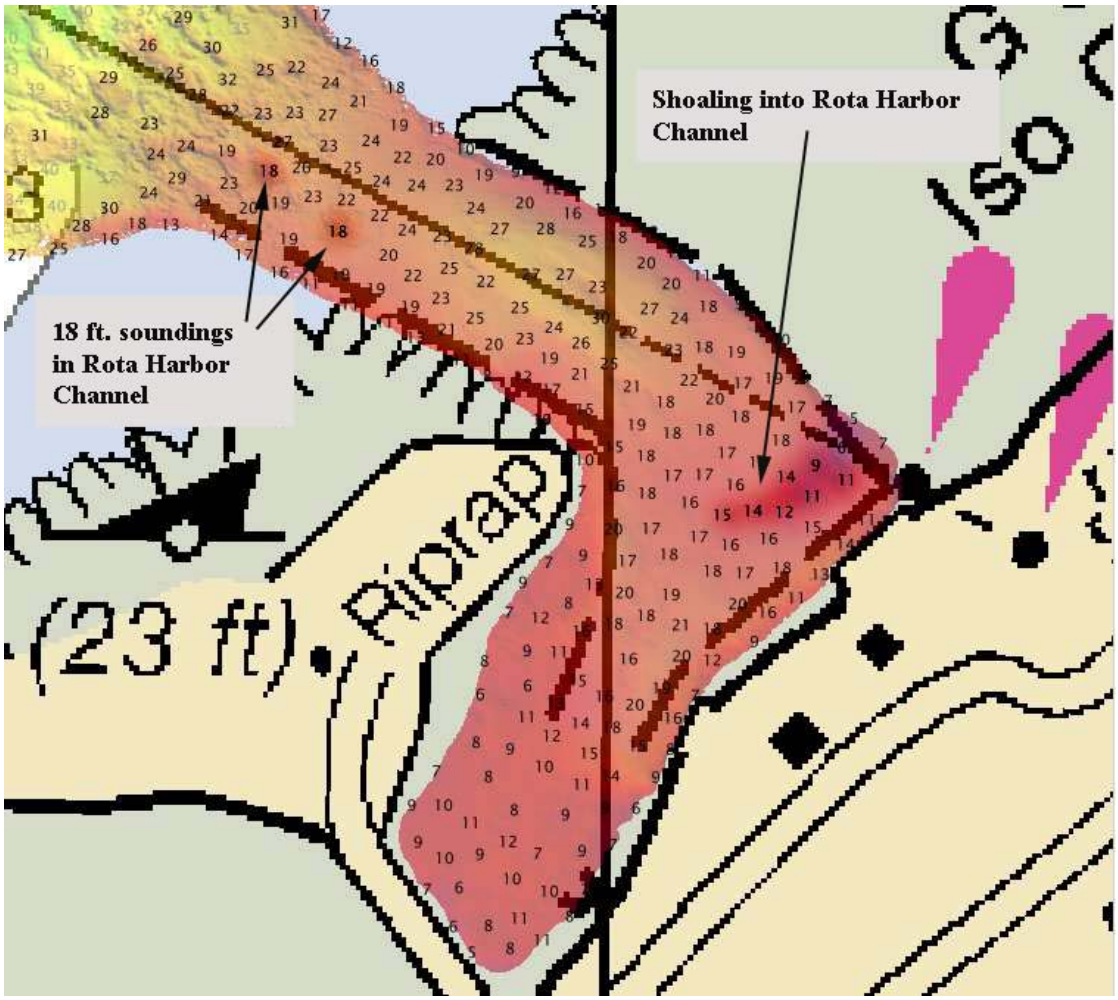


Figure 1 – 18 ft. soundings and shoal in Rota Harbor channel

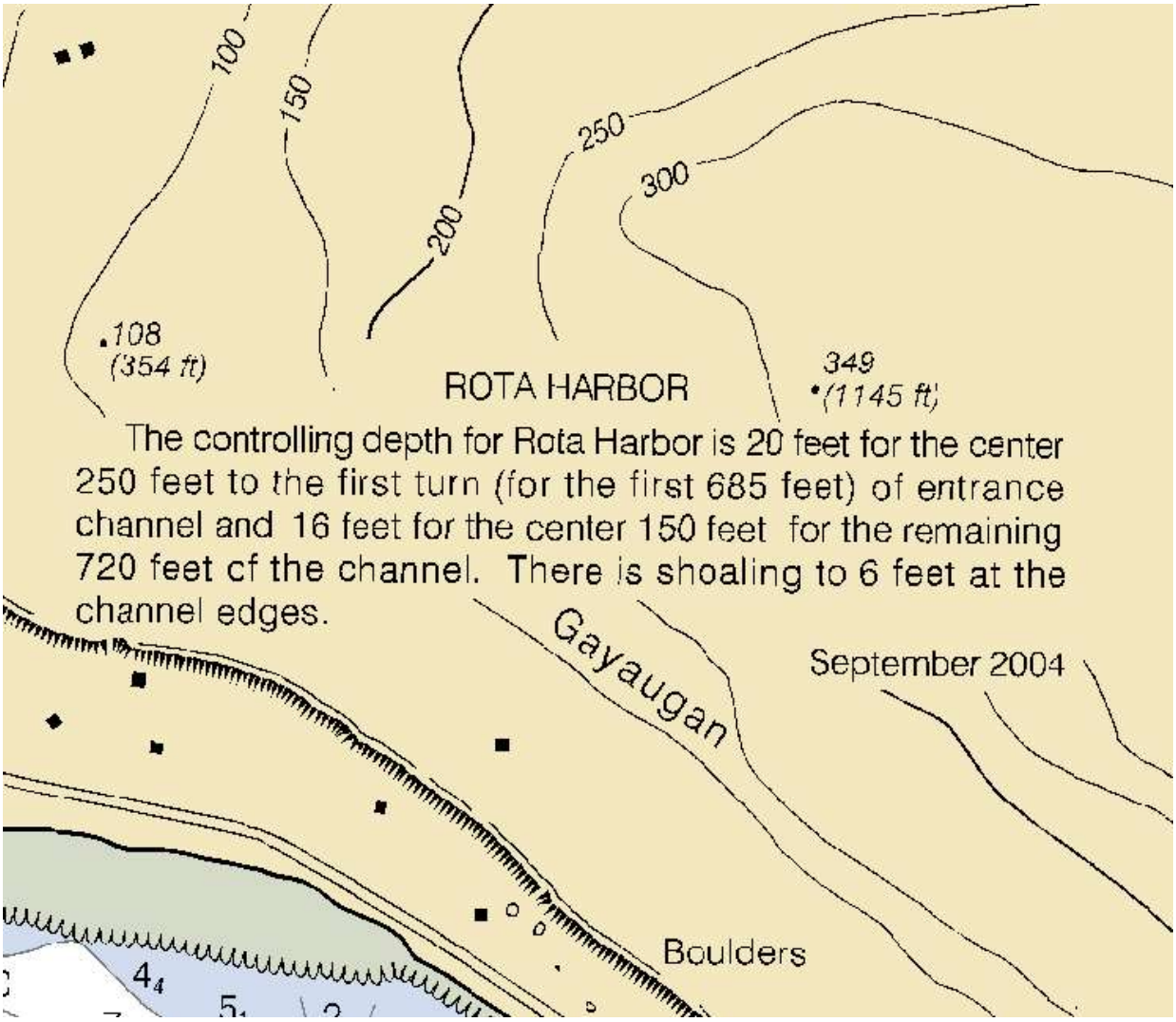


Figure 2 – Note on chart 81063 concerning Rota Harbor

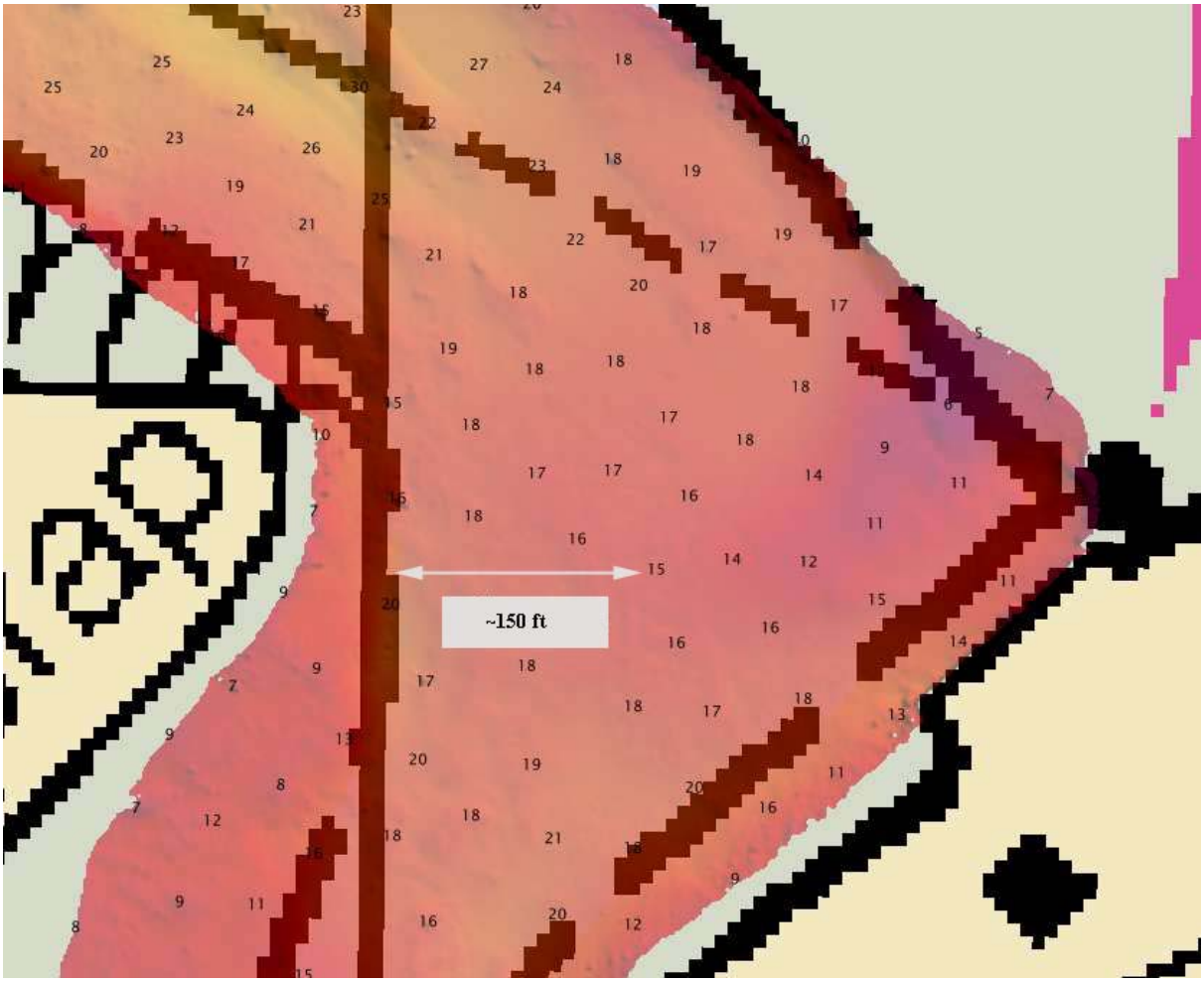


Figure 3 – Inner harbor - 150 ft. channel as measured from western side.

F00534 Dangers to Navigation

Registry Number: F00534

State:

Locality: North Pacific Ocean

Sub-locality: Rota Harbor

Project Number: M-T901-AHI-07

Survey Date: 05/16/2007

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Shoal	5.63 m	14° 08' 16.239" N	145° 07' 55.709" E	---

1 - Features from Bathymetry

1.1) Profile/Beam - 4262/91 from f00534 / ahi_f2505_reson8101_07 / 2007-136 / ahmba07136_d08

DANGER TO NAVIGATION

Survey Summary

Survey Position: 14° 08' 16.239" N, 145° 07' 55.709" E

Least Depth: 5.63 m

Timestamp: 2007-136.01:36:34.406 (05/16/2007)

Survey Line: f00534 / ahi_f2505_reson8101_07 / 2007-136 / ahmba07136_d08

Profile/Beam: 4262/91

Charts Affected: [no CHAPP data available]

Remarks:

18 ft. sounding in Rota Harbor channel. The note on the chart indicates a controlling depth of 20 ft. Submitted as a DTON. The DTON report included this sounding and another 18 ft. sounding in the channel along with a shoal in the inner channel. The submitted report was not generated by Pydro.

Feature Correlation

Address	Feature	Range	Azimuth	Status
f00534/ahi_f2505_reson8101_07/2007-136/ahmba07136_d08	4262/91	0.00	000.0	Primary

Hydrographer Recommendations

Change note on chart to read "...18 feet for the center 250 feet to the first turn...".

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20070517

SORIND - US,US,graph,F00534

Office Notes

Hydrographers recommendations have been applied to the chart. Do not chart soundings.

F00534 Features

Registry Number: F00534

State:

Locality: North Pacific Ocean

Sub-locality: Rota Harbor

Project Number: M-T901-AHI-07

Survey Date:

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	GP	[None]	14° 08' 06.323" N	145° 07' 59.530" E	---
1.2	GP	[None]	14° 08' 05.963" N	145° 07' 59.304" E	---
1.3	GP	[None]	14° 08' 07.164" N	145° 07' 59.868" E	---
1.4	GP	[None]	14° 08' 06.773" N	145° 07' 59.644" E	---
1.5	GP	[None]	14° 08' 05.177" N	145° 07' 59.776" E	---
1.6	GP	[None]	14° 08' 05.636" N	145° 07' 59.118" E	---
1.7	GP	[None]	14° 08' 04.920" N	145° 07' 58.720" E	---
1.8	GP	[None]	14° 08' 06.381" N	145° 08' 00.426" E	---
1.9	GP	[None]	14° 08' 05.225" N	145° 07' 58.909" E	---
1.10	GP	[None]	14° 08' 04.626" N	145° 07' 58.536" E	---
1.11	GP	[None]	14° 08' 03.647" N	145° 07' 59.046" E	---
1.12	GP	[None]	14° 08' 07.254" N	145° 08' 00.480" E	---

1 - Geographical Positions (GPs)

1.1) GP No. - AToN 3 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 06.323" N, 145° 07' 59.530" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 3

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 3	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

1.2) GP No. - AToN 4 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 05.963" N, 145° 07' 59.304" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 4

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 4	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

1.3) GP No. - AToN 1 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 07.164" N, 145° 07' 59.868" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 1

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 1	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

1.4) GP No. - AToN 2 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 06.773" N, 145° 07' 59.644" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 2

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 2	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

1.5) GP No. - AToN 5 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 05.177" N, 145° 07' 59.776" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 5

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 5	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Causeway

1.6) GP No. - AToN 6 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 05.636" N, 145° 07' 59.118" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 6

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 6	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

1.7) GP No. - AToN 9 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 04.920" N, 145° 07' 58.720" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 9

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 9	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

1.8) GP No. - AToN 7 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 06.381" N, 145° 08' 00.426" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 7

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 7	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Causeway

1.9) GP No. - AToN 10 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 05.225" N, 145° 07' 58.909" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 10

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 10	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

1.10) GP No. - AToN 8 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 04.626" N, 145° 07' 58.536" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 8

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 8	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

1.11) GP No. - AToN 11 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 03.647" N, 145° 07' 59.046" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 11

Charts Affected: [no CHAPP data available]

Remarks:

Position of uncharted launch ramp.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 11	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart boat ramp as point feature

1.12) GP No. - AToN 12 from ChartGPs - ENC shoreline

Survey Summary

Survey Position: 14° 08' 07.254" N, 145° 08' 00.480" E

Least Depth: [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC shoreline

GP No.: AToN 12

Charts Affected: [no CHAPP data available]

Remarks:

Part of new floating pier.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC shoreline	AToN 12	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per Notebook F00534 Shoreline .hob file.

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: SORDAT - 20070517

SORIND - US,US,Graph,F00534

Office Notes

Chart Pier

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : June 18, 2007

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: M-T901-AHI-2007
HYDROGRAPHIC SHEET: F00534

LOCALITY: Rota Harbor, North Pacific Ocean,
Commonwealth of the Northern Mariana Islands
TIME PERIOD: May 16 - May 17, 2007

TIDE STATION USED: 163-0000 Guam-Apra Harbor
Lat. 13° 26.6'N Long. 144° 39.4' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.678 meters

REMARKS: RECOMMENDED ZONING

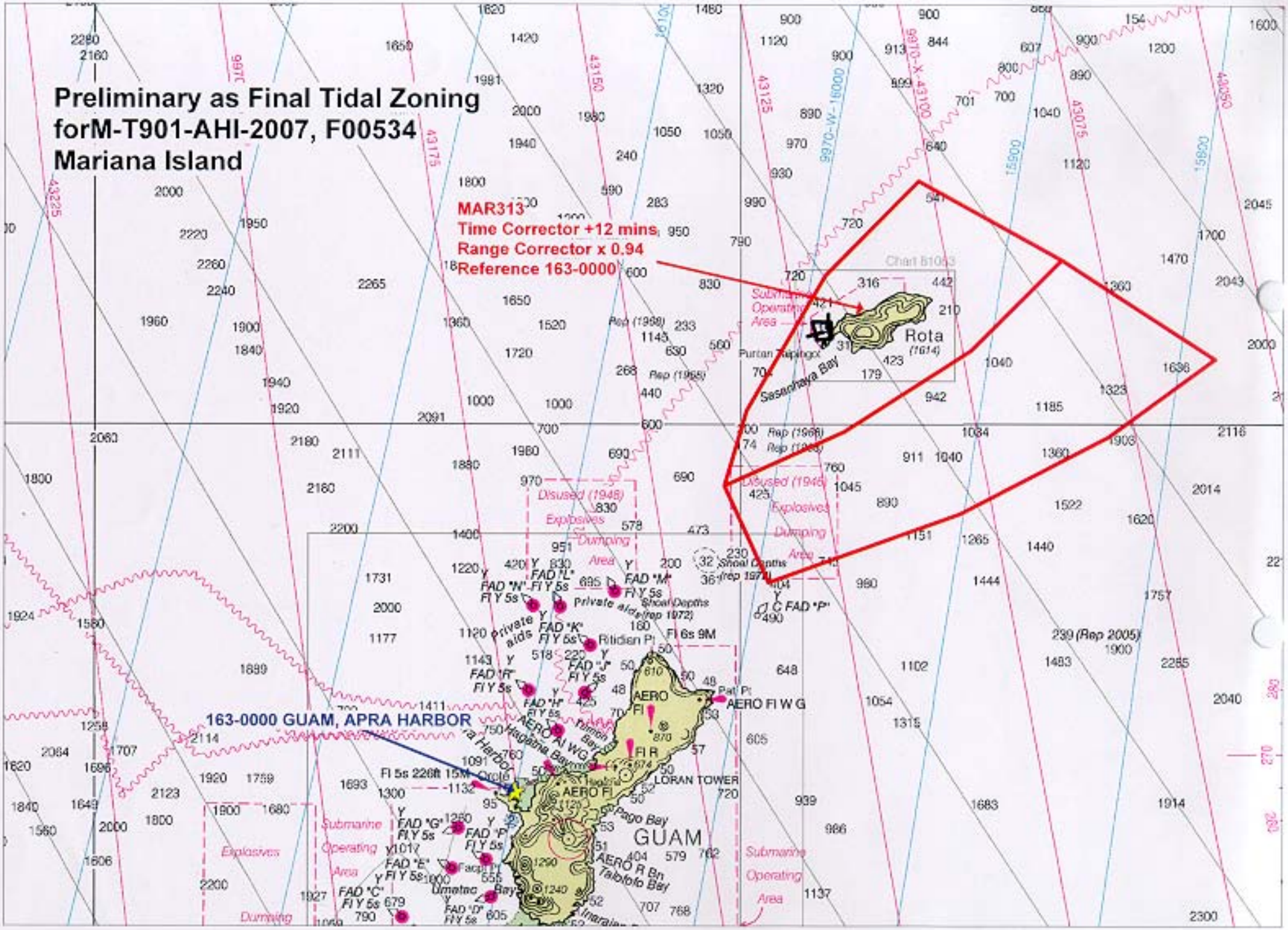
Preliminary zoning is accepted as the final zoning for project M-T901-AHI-2007 during the time period between May 16 to May 17, 2007.

Please use the zoning file "T901AHICORP" submitted with the project instructions for M-T901-AHI-2007. Zone MAR313 is the applicable zone for F00534.

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, PRODUCT AND SERVICES DIVISION


Preliminary as Final Tidal Zoning
forM-T901-AHI-2007, F00534
Mariana Island
MAR313
Time Corrector +12 mins
Range Corrector x 0.94
Reference 163-0000
163-0000 GUAM, APRA HARBOR
Rota
(1614)
Sasanhaya Bay
Puntan Tapahgot
GUAM
Agana Bay
Piti
Apra Harbor
Orote Pt
Facpi Pt
Umatac Bay
Talofofo Bay
Pago Bay
LORAN TOWER
AERO Fl W G
AERO Fl
AERO R Bn
Fl 5s 226ft 15M
Fl 6s 9M
Fl R
Fl Y 5s
Private aids (rep 1972)
Shoal Depths (rep 1972)
Rep (1968)
Disused (1948)
Explosives
Dumping
Area
Submarine
Operating
Area
Chart 81043

F00534 HCell Supplemental Report

Sarah Wolfskehl, Hydrographic Survey Intern
Pacific Hydrographic Branch

Introduction

The primary purpose of the HCell is to directly update NOAA ENCs with new survey information in International Hydrographic Organization (IHO) format S-57. HCell compilation of survey F00534 utilized Office of Coast Survey HCell Specifications Versions 2.0. HCell F00534 will be used to update chart 81063, 1:25,000 (6th Ed.; March 1, 2006, NM 1/05/2008). ENC US4SP05M covers the area of this survey. The scale of the ENC does not accurately portray the area of survey F00534 and was not used in compilation.

1. Compilation Scale

Contours and the density of soundings are compiled as appropriate to emulate those of Chart 81063, 1:25,000. Position and density of features included in the HCell have not been generalized from the scale of the hydrographic survey, 1:5,000.

2. Soundings

2.1 Source Data

A 0.5 m resolution Finalized BASE surface, **F00534_0p5m_Final.bag** was used as the basis for HCell production following Branch certification. This surface contained 61 designated soundings, two of which were submitted as DtoNs by the field.

A survey-scale full density sounding (SOUNDG) feature object source layer was built from the **F00534_0p5m_Final.bag** surface in CARIS BASE Editor. A shoal-biased selection was made at the 1:5,000 survey scale using a radius table with values shown in Table 1. The radius values were scaled to support the future creation of a 1:5,000 or greater chart inset for Rota Harbor. The sounding feature object source layer was exported as **F00534_sound_ss.hob**, and imported into HOM.

Upper Limit (m)	Lower Limit (m)	Radius (mm)
0	10	2.5
10	20	3.5
20	50	4.5

Table 1.

2.2 Sounding Feature Objects

In CARIS BASE Editor soundings were manually selected from the survey scale sounding set **F00534_sound_ss.hob** to create a chart scale sounding set **F00534_sound_cs.hob**. The F00534_sound_cs.hob sounding selection emulates the density and distribution of soundings on chart 81063, while more closely representing

the seafloor morphology. The soundings were selected with regard to a 10, 6, 3 and 1 fathom contour.

3. Depth Areas

3.1 Source Data

The finalized Base Surface, **F00534_0p5m_Final.bag**, was used to generate a depth area, and for survey evaluation and verification purposes only, a set of contours. The contour set included the chart equivalent, 10 fathom, 6 fathom, 3 fathom and 1 fathom contours. The depth contours were not submitted as deliverables, as according to OCS HCell Specifications ver. 2.0.

3.2 Depth Area Feature Objects

One all-encompassing depth range, 40 meters to 0 meters, was used for all depth area objects below MLLW. Upon conversion to NOAA charting units, this depth range is 21.8 to 0 fathoms. A second depth area was created outside the extents of hydrography to encase a shoreline construction. The range for this depth area is 0 to -0.640 meters and was taken from chart 81063. Upon conversion to NOAA charting units, this depth range is 0 to -0.349 fathoms.

4. Meta Areas

The following Meta object areas are included in HCell F00534:

M_QUAL
M_COVR
M_NSYS

Meta area objects were constructed from filtered perimeter lines delineating the survey limits. The perimeter was first used to create the Skin of the Earth (SOTE) layer, then duplicated to the Meta object layers and attributed per the OCS HCell Specifications ver. 2.0.

5. Survey Features

Two features exist for survey F00534. The features for F00534 were delivered in Pydro and Notebook format. The features were imported into HOM where the final decisions on the charting of individual features were made. The cartographic actions taken for each feature were noted in the Pydro file **F00534_Office.pss** under the office notes tab. The office notes are printed in red at the bottom of each page of the feature report exported from Pydro.

6. Shoreline / Tide Delineation

No shoreline features, including MLLW or MHW lines were used in the creation of HCell F00534.

7. Attribution

All S-57 Feature Objects have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with OCS HCell Specifications ver. 2.0.

8. Layout

8.1 CARIS HOM Layering Scheme

100	Survey Scale Soundings
101	Chart Scale Soundings
200	Depth Area/Skin of the Earth
301	Notebook Features
600	M_covr
601	M_qual
602	M_nsys
800	Blue Notes (spatial only)
1001	Contours (spatial only)

8.2 Blue Notes

Notes regarding HCell feature compilation are on layer 800 and as shape file sets **F00534_bluenotes_p.shp** and **F00534_bluenotes_l.shp** for point and line figures, respectively. A copy of the survey perimeter is included in the line shape file set for orientation purposes.

9. Spatial Framework

9.1 Coordinate System

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

9.2 Horizontal and Vertical Units

During creation of sounding sets and contours, and creation of the HCell, units are maintained as metric with millimeter resolution. NOAA rounding is applied at the same time that conversion to chart units is made to the metric HCell base cell file, at the end of the HCell compilation process.

The CARIS environment variable, uslXsounding_round, controls the depth at which rounding occurs. Setting this variable to NOAA fathoms and feet displays all soundings equal to or greater than 11 fathoms as whole units.

In an ENC viewer fathoms and feet display in the format X**.**YZZZ, where X is fathoms, Y is feet, and ZZZ is decimals of the foot. For fathoms and feet between 0 and 10 fathoms 4.5 feet (10.75 fms), soundings round to the deeper foot if the decimals of the foot are X**.**Y75000 or greater. For fathoms and feet deeper or equal to 11 fathoms, soundings round to the deeper fathom if feet and decimals of the foot are X**.**45000 (X**.**Y75000) or greater. Drying heights are in feet and are rounded using arithmetic methods. In an ENC viewer, heights greater than 6 feet will register in fathoms and feet using the above stated rules.

HOM Units

Sounding Units:	Meters rounded to the nearest millimeter
Spot Height Units:	Meters rounded to the nearest meter

Chart Unit Base Cell Units

Depth Units (DUNI):	Fathoms and feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

10. QA/QC

10.1 Data Processing Notes

Manual chart scale sounding selections were made for this survey.

The area of the chart delineating the channel no longer complies with the bathymetry in the eastern corner of the channel. The dredge area line may need to be adjusted or replaced with the 3 fathom contour.

It has been suggested by the Hydrographer that a chart inset be made for this survey area of 1:5,000 or greater. The survey scale sounding plot F00534_ss.hob supports the creation of this inset.

10.2 ENC Validation Checks

F00534 was subjected to QA and Validation checks in HOM prior to exporting to the HCell base cell (000) file. Full millimeter precision was retained in the export of the metric S-57 base cell data set. This data set was then converted to a chart unit 000 file. dKart Inspector 5.0 (Service Pack 1) was then used to further check the data set for conformity to the S-58 version 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and errors investigated and corrected where necessary.

11. Products

11.1 MCD Deliverables

- F00534 Base Cell File, Chart Units, Soundings compiled to 1:25,000
- F00534 Base Cell File, Chart Units, Soundings compiled to 1:5,000
- F00534 Descriptive Report including end notes compiled during office processing and certification
- F00534 HCell Supplemental Report
- Blue Notes shape files
- .000 Features File

11.2 File Naming Conventions

HOM file set prefix: *F00534_hc.**

MCD Chart units base cell file: *US500534_CU.000*

MCD Chart units base cell file, survey scale soundings: *US500534_SS.000*

BAG (for CGTP): *F00534_0p5m_Final.bag*

Features File (for CGTP): *US500534_Features.000*

11.3 Software

HIPS 6.1:	Management and inspection of Combined BASE surfaces; generation of the BAG
BASE Editor 2.1:	Combination of Product Surfaces and initial creation of the S-57 bathymetry-derived features, examination of base cell files against the chart; chart density sounding selection
HOM 3.3:	Assembly of the HCell, S-57 products, QA
GIS 4.4a:	Setting the sounding rounding variable
Pydro v7.3 (r2014_TCfix)	Creation of AWOIS and DTON reports; export of features for the HCell
dKart Inspector 5.0:	S-58 Validation of the HCell base cell file

12. Contacts

Inquiries regarding this HCell content or construction should be directed to:
Sarah Wolfskehl, Hydrographic Survey Intern, PHB, Seattle, WA; 206-526-6859
Sarah.Wolfskehl@noaa.gov.

APPROVAL SHEET
F00534

Initial Approvals:

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

Sarah Wolfskehl
cn=Sarah Wolfskehl, c=US,
o=NOAA, ou=Pacific Hydrographic
Branch, email=sarah.
wolfskehl@noaa.gov
2008.02.28 15:42:15 -08'00'

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

Digitally signed by Gary C. Nelson
DN: cn=Gary C. Nelson, c=US,
o=NOAA, ou=Pacific Hydrographic
Branch, email=gary.nelson@noaa.
gov
Date: 2008.02.29 07:43:31 -08'00'

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

David Neander
2008.02.29
08:16:37 -08'00'

Rachel Soraruf

Digitally signed by Rachel Soraruf
DN: cn=Rachel Soraruf, c=US,
o=NOAA/NOS/OCS/HSD,
ou=Operations Branch,
email=Rachel.Sorasuf@noaa.gov
Date: 2008.03.03 16:24:57 -05'00'