H12037

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 Number: H12037

LOCALITY

State: Virginia

General Locality: Approaches to Chesapeake Bay, VA

Sub-locality: 17 NM NE of Cape Henry

2009

CHIEF OF PARTY
CDR P. TOD SCHATTGEN, NOAA

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72) U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12037**

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State:	**Virginia**		
General Locality:	**Approaches to Chesapeake Bay, VA**		
Sub-Locality:	**17 NM NE of Chesapeake Bay, VA**		
Scale:	**1:25,000**	Date of Survey:	**07Apr2009-~~20~~*26* May 2009**
Instructions Dated:	0**6 Apr 2009**	Project Number:	**OPR-D304-TJ-09**
Vessel:	**NOAA Ship THOMAS JEFFERSON**		
Chief of Party:	**CDR P. Tod Schattgen, NOAA**		
Surveyed by:	**THOMAS JEFFERSON Personnel**		
Soundings by:	**Reson 7125 echosounder**		
Graphic record scaled by:	**N/A**		
Graphic record checked by:	**N/A**		
Protracted by:	**N/A**	Automated Plot:	**N/A**
Verification by:	***Atlantic Hydrographic Branch Personnel***		
Soundings in:	**~~Meters~~** ***Feet*** **at MLLW**		

Remarks:
1) All Times are in UTC.
2) This is a Navigable Area Hydrographic Survey.
3) Projection is NAD83, UTM Zone 18.
Bold italic red notes in the Descriptive Report were made during office processing.

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Descriptive Report to Accompany Hydrographic Survey H12037

Project OPR-D304-TJ-09
17 NM NE of Cape Henry
Approaches to Chesapeake Bay, VA
Scale 1:25,000
April 7th – May ~~20~~ ***26***th 2009
NOAA Ship THOMAS JEFFERSON

A. AREA SURVEYED

This hydrographic survey was completed as specified by ***Hydrographic Survey Letter Instructions OPR-D304-TJ-09, dated 6 April 2009. ***Concur with clarification. Original survey limits revised to make present survey limits a complete survey.***
**** Data filed with original field records.***

The survey area includes the Approaches to Chesapeake Bay, VA, approximately 17 NM NE of Cape Henry.

Northern Limit	Southern Limit	Western Limit	Eastern Limit
37°05'30" N 075°42'00" W	36°59'00" N 075°39'40" W	36°59'00" N 075°42'00" W	37°05'30" N 075°39'40" W

Data acquisition was conducted from April 7th – May 2~~0~~ ***26***th 2009.

This project responds to a request from the Maryland and Virginia Pilots Associations for modern hydrographic data in the approaches to the Chesapeake Bay. Over the next several years, there are plans for vessels with increasingly deeper drafts to be transiting the area. These plans have created a critical need for updated bathymetry and object detection in the approaches to the Chesapeake Bay.

Lineal Nautical Miles	
Single Beam Only	0
Multibeam Only	0
Side Scan Sonar Only	11.89
MBES & SSS Combo	309.89
Crosslines	19.55
Multibeam Developments	0
Side Scan Developments	0
Shoreline Investigation	0
Data acquired from 7 April – 9 April 2009	
No bottom samples collected	0
No AWOIS items investigated	0

Table 1. Hydrographic Survey Statistics

Survey limits of H12037 are shown on the following page.

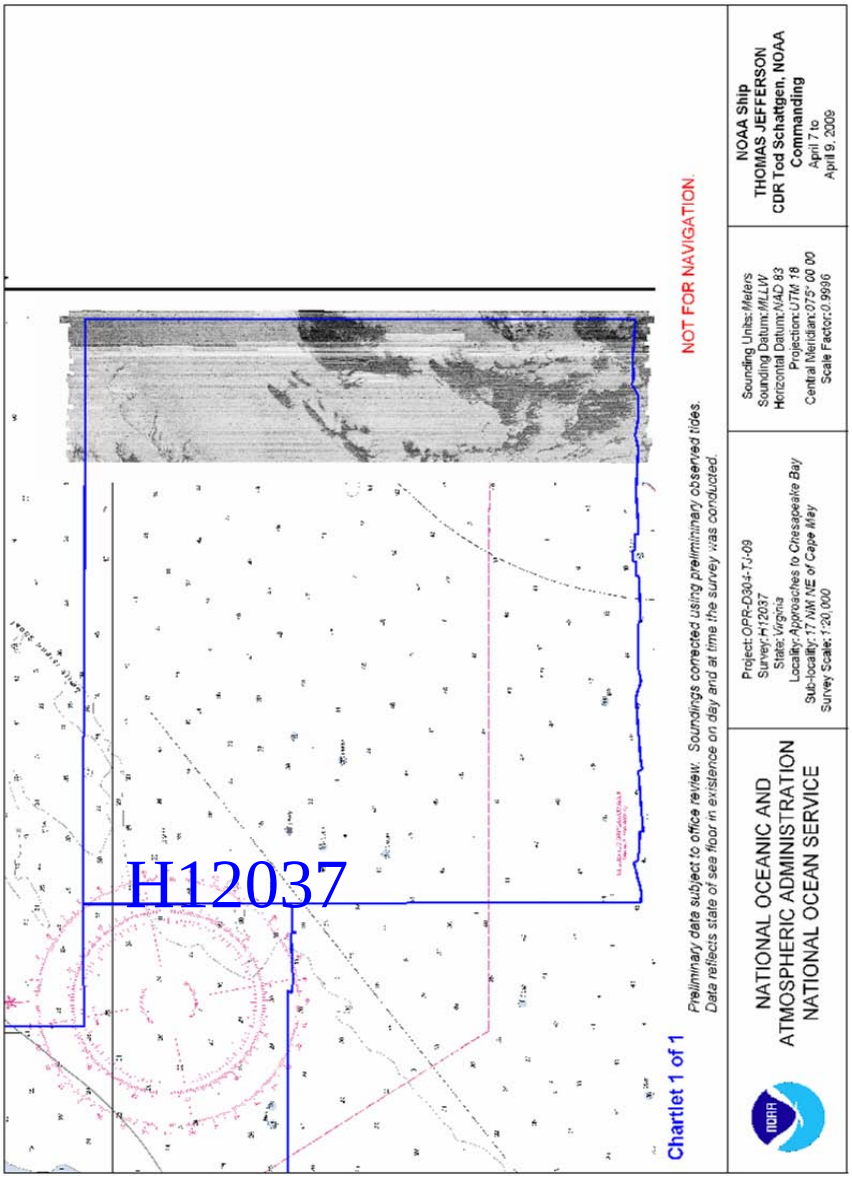


Figure 1. H12037 Sheet Limits ***(SSS area not blue limits is survey area)***

Calendar Date	Julian Day
07 April 2009	097
08 April 2009	098
09 April 2009	099
26 May 2009	146

Table 1. Dates of Multibeam Data Acquisition in Calendar and Julian Days

B. DATA ACQUISTION AND PROCESSING *See also Evaluation Report*

Refer to ***OPR-D304-TJ-09 Data Acquisition and Processing Report (DAPR)**** for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the *DAPR are included in this descriptive report. **** Data submitted with H-Cell Deliverables.***

B 1. EQUIPMENT AND VESSELS

Data were acquired by *Thomas Jefferson*. *Thomas Jefferson* acquired side-scan imagery, multibeam echosounder soundings, and sound velocity profiles. Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the *DAPR. **** Data submitted with H-Cell Deliverables.***

B 2. QUALITY CONTROL

B 2.1 System Certification and Calibration

Refer to NOAA Ship THOMAS JEFFERSON DAPR and Hydrographic Systems Readiness Report (HSRR)* for a complete description of system integration and initial calibration results for equipment and sensors used for this survey. **** Data filed with original field records.***

B.2.2 Sounding Coverage

As per the Letter Instructions, this survey was conducted using 200% SSS with concurrent bathymetry from multibeam. Side Scan Sonar coverage was monitored by creation of 100% and 200% coverage mosaics, each with 1m resolution. A list of all side-scan sonar contacts is contained in *Separates II. ***Concur.***

The original survey limits prescribed for H12037 were not fully accomplished due to operational time constraints, ~~and~~ so revised survey limits were approved by HSD/OPS as per email. Data was acquired starting at the Eastern most limit of the sheet and spanned 1.7 NM Westward across the sheet. ***No record of this correspondence is present in data submitted by field.***

B 2.3 Crosslines

Multibeam echosounder cross-lines totaling 19.55 lineal nautical miles, comprising 6.3 percent of main scheme hydrography, were acquired during the course of the survey. Systematic artifacts were investigated and are discussed in section 2.5 below. ***Concur.***

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

B 2.4 Junctions and Prior Surveys

The following contemporary surveys junction with H12037:

Registry #	Scale	Date	Field Party	Junction side
H11302	1:10,000	2003	*Thomas Jefferson*	*South East*

Survey H12037 junctions with survey H11302 to the south east, figure 2. Survey H11302 is greater than 5 years old therefore no junction comparison was conducted. ***Concur with conditions.***

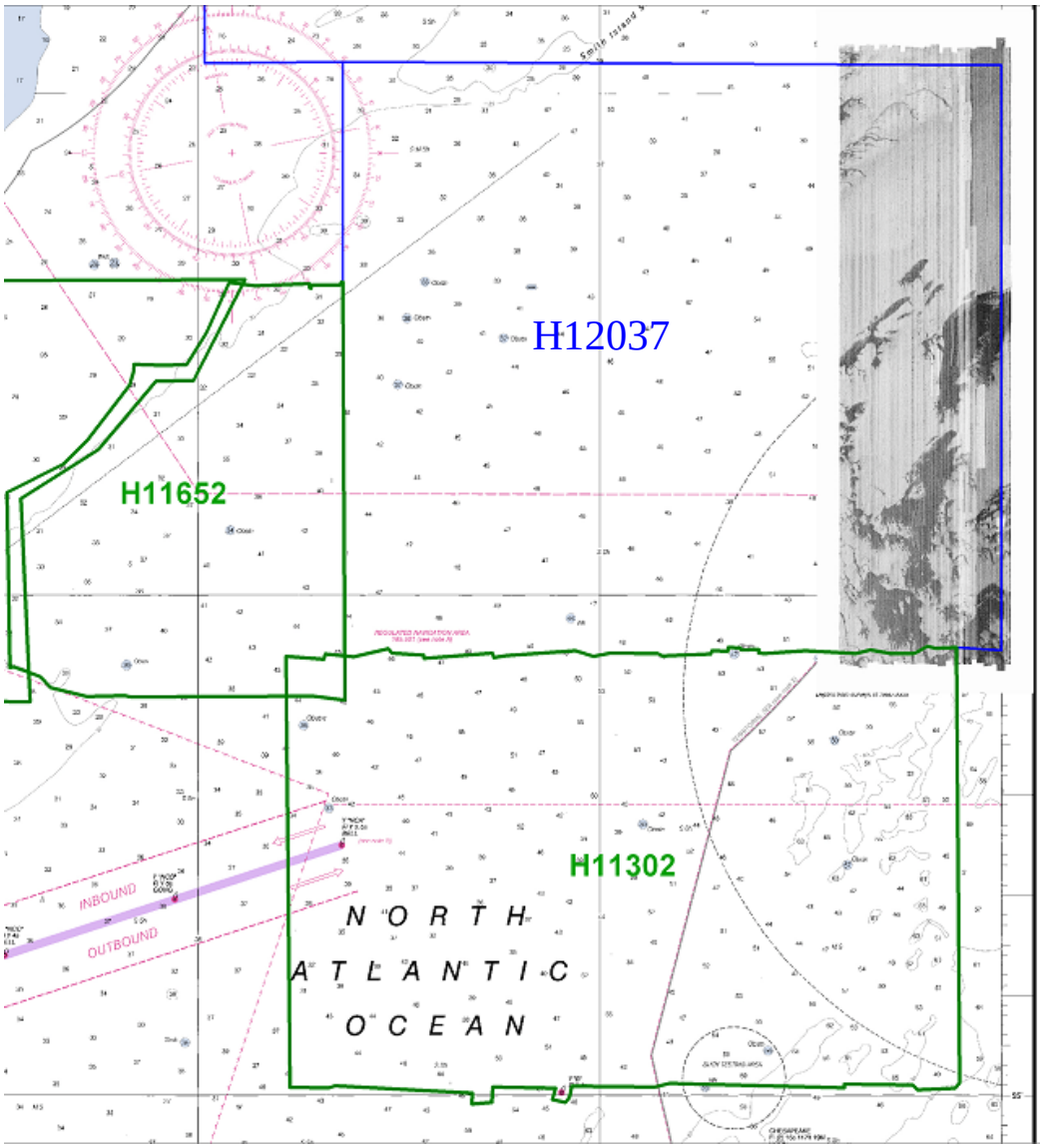


Figure 2. H12037 Survey Junctions

B 2.5 Systematic Errors

During Acquisition of Side Scan a loss of data occurred at random intervals due to recording data through the network to the raw data storage drive. Each data gap was approximately 250 meters long, see Figure 3. The problem was recognized on the second day of acquisition and corrected by saving the side scan data to the side scan acquisition local drive and then copying the data onto the network. A holiday line plan was created and data acquired for each of the holidays. ***Concur.***

Due to a faulty RESON 7125 multibeam receiver on the TJ, which was replaced after this survey, a systematic artifact appears throughout the data as dual along track striping near nadir, ranging in height from 10cm to 20cm. This error was accounted for in the CARIS vessel configuration (TJ_S222_RESON7125.hvf) by adding a 0.200 m value for the Total Propagated Error for the delta draft. ***Do not concur. The image below references side scan sonar navigational artifacts. The field unit rectified the problem by acquiring and processing additional data within the common area. The submitted side scan mosaics do not portray the artifact as documented in the image above.***

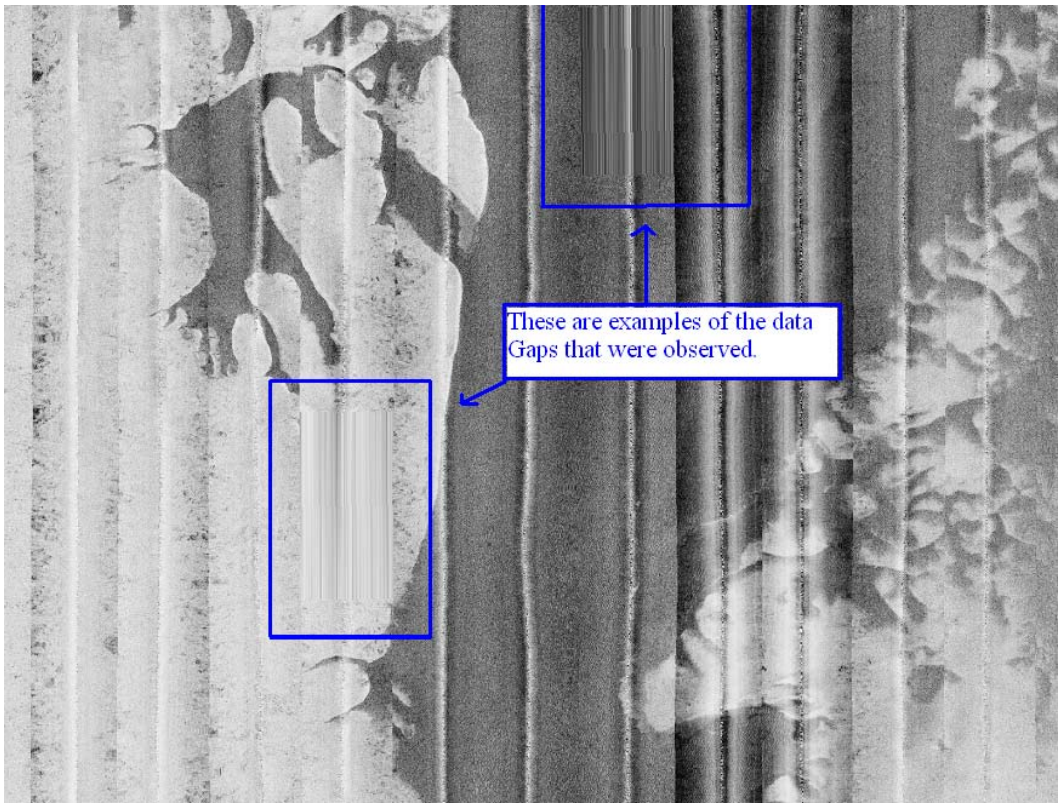


Figure 3. Systematic SSS Errors

B 3. CORRECTIONS TO ECHO SOUNDING

HDCS sounding data were reduced to mean lower-low water (MLLW) using approved tides from the primary station at Chesapeake Bay Bridge Tunnel, VA (8638863) and secondary station at Kiptopeke, VA (8632200), adjusted for tidal constituents and residuals provided by CO-OPS as specified in the Letter Instructions and illustrated in Figure 4. ***Concur.***

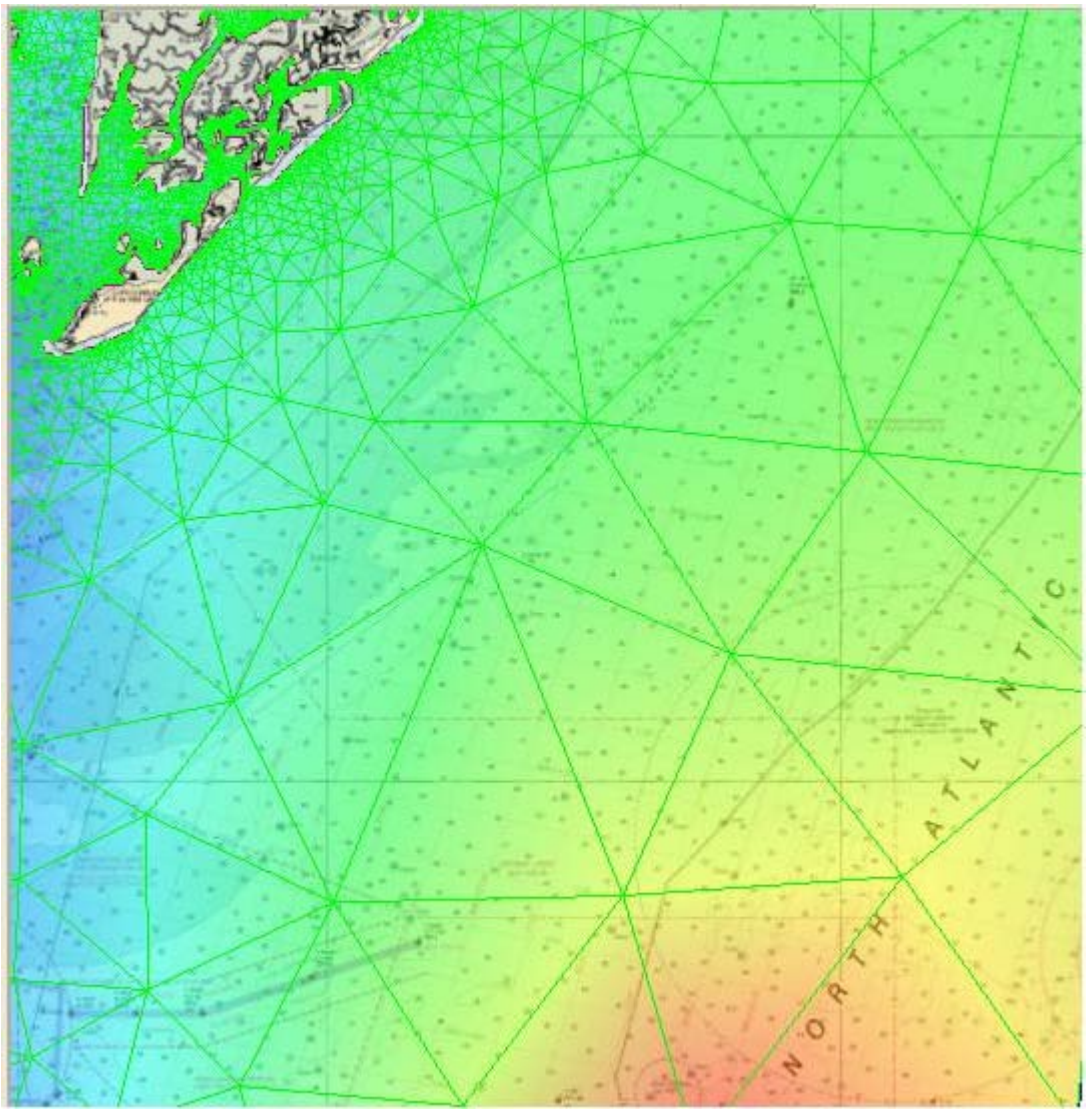


Figure 4. H12037 Final Tide Zoning

All other datum reduction procedures conform to those outlined in the ****DAPR.***

All methods and instruments used for sound velocity correction were as described in the ****DAPR***. A table detailing all sound velocity casts is located in Separate II of this Descriptive Report. ***Concur with conditions. Separate II contains calibration reports for the Digibar units. Sound velocity casts are located in H:\Compilation\H12037_D304_TJ\CARIS\SVP.***

B 4. DATA PROCESSING

B 4.1 Total Propagated Error

For the 2009 field season, Total Propagated Error (TPE) parameters for sound speed and tides are calculated separately for each project. The project-specific parameters for OPR-D304-TJ-09, Survey H12037 are as follows:

Vessel	Tide Values		Sound Speed Values	
	Measured	Zoning	Measured	Surface
S222	TCARI	TCARI	4.0	0.2

Table 3. TPE Parameters

These values were calculated for all MBES data immediately following CARIS Merge. ***Concur.***

B 4.2 BASE Surfaces and Mosaics

The following table describes all BASE Surfaces and Mosaics submitted as part of Survey H12037:

Name of Fieldsheet	Resolution	Type	Purpose
H12037_Mosaic_100_1m_final	1 meter	SSS	100% SSS Coverage
H12037_Mosaic_200_1m_final	1 meter	SSS	200% SSS Coverage
H12037_cube_2m_1	2 meter	cube	Sounding coverage
H12037_cube_2m_2	2 meter	cube	Sounding coverage

Table 4. Fieldsheets

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. As per NOAA Hydrographic Technical directive, The CUBE configuration was set to NOAA_2m for the two meter coverage surface for this entire survey. Refer to the ***2009 Data Acquisition and Processing Report, ****2009 Field Procedures Manual, and ****CARIS HIPS/SIPS manual for further discussion. ***Concur.***

**** Data submitted with H-Cell Deliverables.***

*****Filed with original field records.***

B 4.3 Data cleaning

The survey data was cleaned using the swath and subset editor tools in CARIS. All areas of the BASE surface that indicated a high standard deviation were examined and cleaned as required such that no residual errors exist in the surface that exceed the IHO order 1 depth accuracy requirements. ***Concur with conditions. Quite a bit of data cleaning was performed during office processing.***

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

As per FPM section 5.2.3.2.3, a ***HVCR report was not filed as no horizontal control stations were established by the field party for this survey. A summary of horizontal and vertical control for this survey follows. ***Concur.***

C 1.1 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. The differential corrections from U.S. Coast Guard beacon at Annapolis, MD (301 kHz) was used during this survey. The proximal DGPS station Driver (289 kHz) was down due to maintenance at the time of survey.

No horizontal control stations were established by the field party for this survey. ***Concur.***

C 1.2 Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) station at Chesapeake Bay Bridge Tunnel, VA (8638863) and secondary station at Kiptopeke, VA (8632200) ~~will serve~~ ***served*** as datum control for H12037. Verified tides with final TCARI constituents and residuals were applied to all sounding data. ***Concur.***

A request for delivery of final approved (verified) tides for this survey was forwarded to N/OPS1 on 21 April 2009 in accordance with the FPM and project letter instructions. Verified tides were applied on 22 August 2009 using approved TCARI zoning. ***Concur with clarification. Additional data was acquired on 26 May; therefore, the abstract of times of hydrography is incomplete.***

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

D.1 Chart Comparison

Survey H12037 was compared with chart 12208 (13th Ed.; August 2008, 1:50,000, Corrected through NM Mar 21, 2009), chart 12221 (80th Ed.; January 2009, 1:80,000, Corrected through LNM Jan 13, 2009, Corrected through NM Jan 17 ,2009), and ENC US5VA11M Chart comparisons were performed in CARIS, in Pydro using survey-scale excessed soundings, and in MapInfo using survey-scale and chart-scale excessed soundings exported from Pydro. ***Concur.***

D 1.1 Chart 12208 Comparison

Depths from charts 12208 generally agree with the current survey, with differences generally 2 feet shoaler than charted depths. ***Concur with conditions. See section B.2.4. of the Evaluation Report.***

D 1.2 Chart 12221 Comparison

Depths from charts 12221 generally agree with the current survey, with differences generally 2 feet shoaler than charted depths. ***Comparison not made during office processing.***

D 1.3 ENC US5VA11M Comparison

Depths from ENC US5VA11M generally agree with the current survey, with differences generally 0.6 Meters shoaler than charted depths. ***Concur with conditions. See Section B.2.4. of the Evaluation Report.***

D.2.1 Charted Pipelines and Cables

There are no charted pipelines or cables in the survey area. ***Concur.***

D.2.2 Bridges, Ferry Routes, and Overhead Cables

There are no ferry routes, bridges, or overhead cable crossings within the limits of the survey. ***Concur.***

D.3 Dangers to Navigation and Shoals

D 3.1 Dangers to Navigation

There are no dangers to navigation within the survey limits. ***Concur.***

D 3.2 Shoals

There are no Shoals within the limits of H12037. ***Concur.***

D.4 Aids to Navigation

There are no charted Aids to Navigation (ATON) within the limits of H12037. ***Concur.***

D.5 Coast Pilot Information

The Hydrographer has no recommendations for changes or addenda to the Coast Pilot.

D.6 Miscellaneous

Bottom Samples

Bottom samples were not collected within the survey area. ***Do not concur. See Evaluation Report Section D.1.1.a.***

D.7 Adequacy of Survey

This survey is considered complete and adequate to supersede charted depths and features within the common area as per requirements specified in the Project Letter Instructions. ***Concur.***

Summary and Recommendations for Additional Work

This survey is squared off and complete. The remainder of the two thirds of this sheet has been reassigned as H12100. ***Concur.***

E. APPROVAL

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Office of Coast Survey Hydrographic Surveys Division's *Field Procedures Manual*, and NOS *Hydrographic Surveys Specifications and Deliverables*. Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to N/CS33, Atlantic Hydrographic Branch.

Survey H12037 is adequate to supersede charted soundings in their common areas.

The Data Acquisition and Processing Report for OPR-D304-TJ-09 is submitted separately and contains additional information relevant to this survey.

Approved and Forwarded:

Jasper Schaer
cn=Jasper Schaer, o=NOAA, ou=NOAA Ship THOMAS JEFFERSON, email=jasper.schaer@noaa.gov, c=US
2009.09.11 10:15:56 -04'00'

LT Jasper Schaer, NOAA
Field Operations Officer

CDR P. Tod Schattgen, NOAA
Commanding Officer

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

Survey Managers:

Ryan Wartick
cn=Ryan Wartick, o=NOAA, ou=THOMAS JEFFERSON, email=ryan.wartick@noaa.gov, c=US
2009.09.11 10:14:54 -04'00'

ENS Ryan A, Wartick, NOAA
Junior Officer

Daniel Wright
2009.09.11
13:25:01 -04'00'

Daniel B. Wright
Chief Hydrographic Survey Technician

Appendix I

Dangers to Navigation

*No Dangers to Navigation were found during survey H12037.

Appendix II

Survey Features Report

1. AWOIS Items

   -None

2. Charted Features

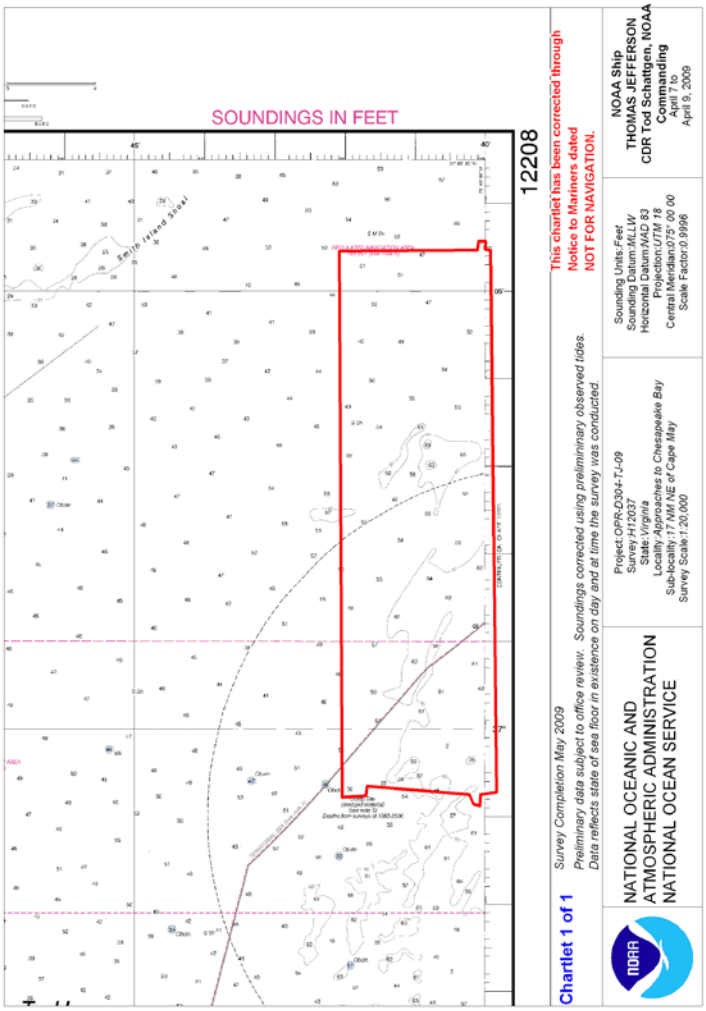
   -None

3. Uncharted Features

   -None

Appendix III

Progress Sketch



OPS	FIELD																
Project Number and Name	Sheet Identifier	Registry Numbe	HQ Estimated	Sheet Start Date	Sheet End Date	Smooth Tides Request	Smooth Tides Received	Cumulative % Complete at the end	Cumulative % Complete at the end	Cumulative % Complete at the end of	Cumulative % Complete at the end of	Cumulative % Complete at the end	Cumulative % Complete at the end of	Cumulative % Complete at the end of	Cumulative % Complete at the end of	Cumulative % Complete at the end of	Cumulative % Complete at the end of
OPR-D304,	1	H12037	39	4/6/09	4/17/09	4/21/09	5/18/09		100%								

Appendix IV

Tides and Water Levels

1. **Tide Notes**

2. **Request for Approved Tides**

3. **Final Tide Notes**

Appendix V

Supplemental Survey Records & Correspondence

No supplemental records for survey H12037.

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT to ACCOMPANY
SURVEY H12037 (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 data at the Atlantic Hydrographic Branch:

CARIS HIPS/SIPS version 6.1 SP2 HF 7
CARIS Bathy Manager version 2,1,0,0 SP1 HF 1-10
CARIS S-57 Composer version 2.1 HF 4
CARIS HOM version 3.3 SP3 HF 8
dKart Inspector version 5.0 Build 732 SP1

B.2. QUALITY CONTROL

B.2.1. H-Cell

The AHB source depth grid for the survey's nautical chart update product entailed the field's original 2 meter MBES CUBE surfaces combined at 4 meter resolution. The survey scale soundings were created from the combined surface at single defined radius of one millimeter at chart scale, 1:50,000. A TIN was created from the survey scale soundings from which an interpolated surface was generated. The chart scale soundings were selected from the filtered interpolated surface using a singled defined radius at the 50,000 chart scale. The chart scale selected soundings are a subset of the survey scale selected soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

Depth contours were created from a shifted interpolated TIN surface of 50m resolution. The depth contours are forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The pre-compilation products or components (Stand Alone HOB files (SAHOB)) are detailed in the Compile Log attached at the end of this document. The SAHOB files included depth areas (DEPARE), depth contours (DEPCNT), sounding selections (SOUNDG), features (SBDARE), Meta objects (M_QUAL, M_COVR), and H12037_ENC_US5VA11M_Features_Retain(SBDARE).

All of the components with the exception of the SS Sounding selection and depth contours were inserted into one feature layer (as dictated by Hydrographic Technical Directive 2008-8), and this layer was exported into S-57 format in order to

create the H-Cell deliverable. Similarly, the SS Sounding selection and depth contours were exported into S-57 format separately, and then both S-57 files were processed in CARIS HOM to convert the metric units to feet. The final products are two S-57 files, in Lat/Lon NAD-83, one that contains the chart soundings (CS), all the features, Meta object (H12037_CS.000), and one that contains the sounding selection (SS) and depth contours (H12037_SS.000). Finally, quality assurance checks were made utilizing CARIS S-57 Composer version 2.1 validation checks.

Chart compilation was performed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

H12037 CARIS H-Cell final deliverables include the following products:

H12037_CS.000	1:50,000 Scale	H12037 H-Cell with Chart Scale Selected Soundings
H12037_SS.000	1:25,000 Scale	H12037 Selected Soundings (Survey Scale)

B.2.4. Junctions

Survey H12037 (2009) junctions with survey H12100 (2009) to the west. Comparison was not made between these surveys because H12100 has not been processed to the point of having soundings at this time. A junction will be completed during the compilation of H12100. Present survey depths are in harmony with the charted hydrography to the north and south. To the west, present survey depths are in harmony with charted depths, except in the areas south of Latitude 37-01-53.001N where present survey depths are 1 to 9 feet deeper than charted depths.

C. VERTICAL AND HORIZONTAL CONTROL

A Horizontal and Vertical Control Report (HVCR) was not submitted with survey H12037 survey.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON — **12208 (14th Edition, Aug./09)**
Corrected through NM 08/29/2009
Corrected through LNM 08/25/2009
Scale 1:50,000

ENC Comparison — **US5VA11M**
Approaches to Chesapeake Bay
Edition 14
Application Date 03-01-2010
Issue Date 03-02-2010
Chart 12208

D.1.1 Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section “D” and Appendix 1&2 of the Descriptive Report. The following exceptions are noted:

a. The field unit collected nine seabed area (SBDARE) characteristic samples but only two are within the limits of the present survey. A file was not submitted for these samples, but a bottom sample log was submitted for the entire project. The samples collected are listed below and they have been added to the survey.

SURVEY	JD	LATITUDE	LONGITUDE	CHARACTERISTIC	CHART
H12037	195	37/04/13.8	075/41/55.9	med S, brk Sh	Add to chart
H12037	195	37/05/02.5	075/40/45.3	fine S, brk Sh	Add to chart
H12037	195	37/02/48	075/44/27	fine S, brk Sh	Outside survey limits
H12037	195	37/03/55	075/47/08	fine S, brk Sh	Outside survey limits
H12037	195	37/03/56.5	075/47/07.4	fine S, brk Sh	Outside survey limits
H12037	195	37/02/23	075/47/33	fine S, brk Sh	Outside survey limits
H12037	195	37/04/56.8	075/42/42.9	fine S, brk Sh	Outside survey limits
H12037	195	37/00/26	075/47/50	fine S, brk Sh	Outside survey limits
H12037	195	36/59/38	075/44/52	fine S, brk Sh	Outside survey limits

D.3. 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 Charts (ENC) used for compiling the present survey:

D.4. 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 BlueNotes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	**H12037**
PROJECT No.	**OPR-D304-TJ-09**
FIELD UNIT	**NOAA SHIP THOMAS JEFFERSON**
DATE OF SURVEY	**APRIL 07, 2009 – MAY 26, 2009**
LARGEST SCALE CHART	***12208, edition 14, 20090829, 1:50,000***
ADDITIONAL CHARTS	
SOUNDING UNITS	**Feet**
COMPILER	**Cartographer (Reginald L. Keene Sr./ Deborah Bland)**

Source Grids	**File Name** H:\Compilation\H12037_D304_TJ\AHB_H12037\ E-SAR Final Products\GRIDS
	H12037_1_cube_NOAA_2m_Final
	H12037_2_cube_NOAA_2m_Final
Surfaces	**File Name** H:\Compilation\ H12037_D304_TJ\AHB_H12037\COMPILE\Working
Combined	**H12037_4m_Combined.hns**
Interpolated TIN	**H12037_50k_InterpTIN_50mres.hns**
Shifted Interpolated TIN	**H12037_50m_InterpTIN_Shifted_Ft.hns**
Product Surface	**None**
Final HOBs	**File Name** H:\Compilation\ H12037_D304_TJ\AHB_H12037\COMPILE\Final_Hobs\
Survey Scale Soundings	**H12037_SS_Soundings.hob**
Chart Scale Soundings	**H12037_CS_Soundings.hob**
Contour Layer	**H12037_Contours.hob**
Feature Layer	**H12037_Features.hob**
Meta-Objects Layer	**H12037_MetaObjects.hob**
Blue Notes	**None**
ENC Retain	**H12037_ENC_US5VA11M_Features.hob**

Meta-Objects Attribution	
Acronym	**Value**
M_QUAL	
CATZOC	**U (data not assessed)**
INFORM	H12037,OPR-D304-TJ-09,NOAA Ship THOMAS JEFFERSON
POSACC	**10**
SORDAT	**20090526**
SORIND	**US,US,graph,H120037**
SUREND	**20090526**
SURSTA	**20090407**
DEPARE	
DRVALV 1	37.94291 ft
DRVALV2	71.90617 ft

SORDAT	**20090526**
SORIND	**US,US,graph,H12037**
M_COVR	
CATCOV	available
SORDAT	**20090526**
SORIND	**US,US,graph,H12037**

SPECIFICATIONS:

I. COMBINED SURFACE:
   a. Number of ESAR Final Grids: 2 Final Grids
   b. Resolution of Combined (m): 4m

II. SURVEY SCALE SOUNDINGS (SS):
   a. Radius
   b. Shoal biased
   c. Use Single-Defined Radius (mm at Map Scale): ; Radius Value = 1
   d. Queried Depth of All Soundings
      i. Minimum: 37.94291
      ii. Maximum: 71.90617

III. INTERPOLATED TIN SURFACE:
   a. Resolution (m): 50m
   b. Linear
   c. Shifted value: *-0.229m (feet), (≤ 10 fathoms)*

IV. CONTOURS:
   a. Use a Depth List: H12037_NOAA_depth_curves_list.txt
   b. Line Object: DEPCNT
   c. Value Attribute: VALDCO

V. FEATURES:
   a. Total Number of Features: 2
   b. Number of Insignificant Features: 7 (outside survey limits)

VI. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings: 64 sdg
   b. Radius
   c. Shoal biased
   d. Use Single-Defined Radius: m on the ground
      i. Radius Value (m):
      ii. Or use a Sounding Space Range Table (if applicable): XXXXX_SSR.txt
   e. Filter: Interpolated != 1
   f. Number Survey CS Soundings: 81 sdg.

VII. Notes:

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	**H12037**
PROJECT No.	**OPR-D304-TJ-09**
FIELD UNIT	**NOAA SHIP THOMAS JEFFERSON**
DATE OF SURVEY	**APRIL 07, 2009 – MAY 26, 2009**
LARGEST SCALE CHART	***12208, edition 14, 20090829, 1:50,000***
ADDITIONAL CHARTS	
SOUNDING UNITS	**Feet**
COMPILER	**Cartographer (Reginald L. Keene Sr./ Deborah Bland)**

Source Grids	**File Name** H:\Compilation\H12037_D304_TJ\AHB_H12037\ E-SAR Final Products\GRIDS
	H12037_1_cube_NOAA_2m_Final
	H12037_2_cube_NOAA_2m_Final
Surfaces	**File Name** H:\Compilation\ H12037_D304_TJ\AHB_H12037\COMPILE\Working
Combined	**H12037_4m_Combined.hns**
Interpolated TIN	**H12037_50k_InterpTIN_50mres.hns**
Shifted Interpolated TIN	**H12037_50m_InterpTIN_Shifted_Ft.hns**
Product Surface	**None**
Final HOBs	**File Name** H:\Compilation\ H12037_D304_TJ\AHB_H12037\COMPILE\Final_Hobs\
Survey Scale Soundings	**H12037_SS_Soundings.hob**
Chart Scale Soundings	**H12037_CS_Soundings.hob**
Contour Layer	**H12037_Contours.hob**
Feature Layer	**H12037_Features.hob**
Meta-Objects Layer	**H12037_MetaObjects.hob**
Blue Notes	**None**
ENC Retain	**H12037_ENC_US5VA11M_Features.hob**

Meta-Objects Attribution	
Acronym	**Value**
M_QUAL	
CATZOC	**U (data not assessed)**
INFORM	H12037,OPR-D304-TJ-09,NOAA Ship THOMAS JEFFERSON
POSACC	**10**
SORDAT	**20090526**
SORIND	**US,US,graph,H120037**
SUREND	**20090526**
SURSTA	**20090407**
DEPARE	
DRVALV 1	37.94291 ft
DRVALV2	71.90617 ft
SORDAT	**20090526**
SORIND	**US,US,graph,H12037**

M_COVR	
CATCOV	available
SORDAT	**20090526**
SORIND	**US,US,graph,H12037**

SPECIFICATIONS:

I. COMBINED SURFACE:
   a. Number of ESAR Final Grids: 2 Final Grids
   b. Resolution of Combined (m): 4m

II. SURVEY SCALE SOUNDINGS (SS):
   a. Radius
   b. Shoal biased
   c. Use Single-Defined Radius (mm at Map Scale): ; Radius Value = 1
   d. Queried Depth of All Soundings
      i. Minimum: 37.94291
      ii. Maximum: 71.90617

III. INTERPOLATED TIN SURFACE:
   a. Resolution (m): 50m
   b. Linear
   c. Shifted value: *-0.229m (feet), (≤ 10 fathoms)*

IV. CONTOURS:
   a. Use a Depth List: H12037_NOAA_depth_curves_list.txt
   b. Line Object: DEPCNT
   c. Value Attribute: VALDCO

V. FEATURES:
   a. Total Number of Features: 2
   b. Number of Insignificant Features: 7 (outside survey limits)

VI. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings: 64 sdg
   b. Radius
   c. Shoal biased
   d. Use Single-Defined Radius: m on the ground
      i. Radius Value (m):
      ii. Or use a Sounding Space Range Table (if applicable): XXXXX_SSR.txt
   e. Filter: Interpolated != 1
   f. Number Survey CS Soundings: 81 sdg.

VII. Notes:

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : May 15, 2009

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-D304-TJ-2009
HYDROGRAPHIC SHEET: H12037

LOCALITY: 17 NM NE OF Cape Henry, Approaches to Chesapeake Bay, VA
TIME PERIOD: April 7 - 9, 2009

TIDE STATION USED: CBBT, VA 863-8863
Lat.36° 58.0' N Long. 76° 06.8' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.814 meters

TIDE STATION USED: Kiptopeke, VA 863-2200
Lat. 37° 10.0' N Long. 75° 59.3' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.827 meters

REMARKS: RECOMMENDED GRID

Please use the TCARI grid "D304TJ2009-TCARI" as the final grid for project OPR-D304-TJ-2009, H12037 during the time period between April 7 - 9, 2009.

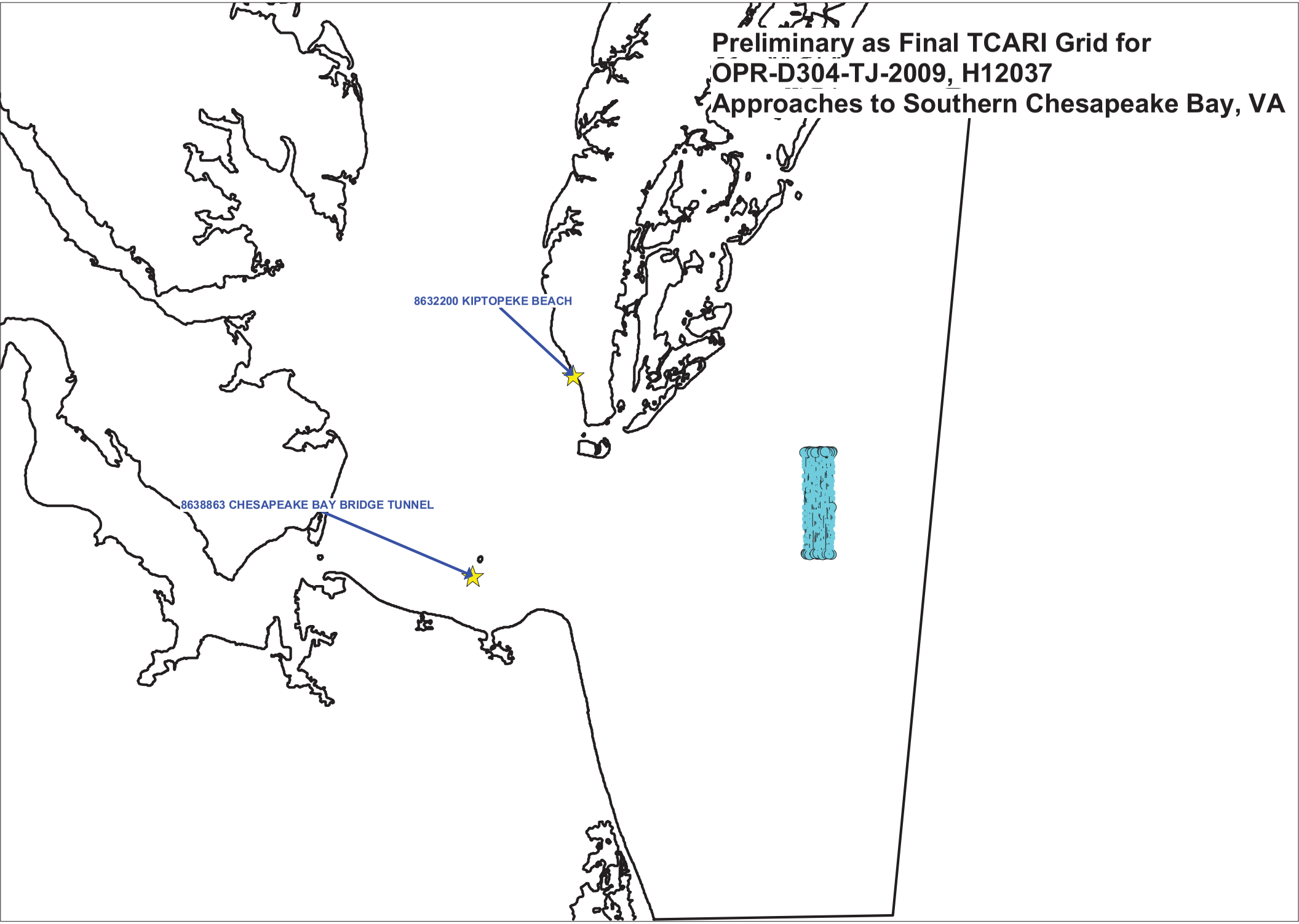
Refer to attachments for grid information.

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

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/NOS, email=peter.stone@noaa.gov, c=US
Date: 2009.05.18 14:13:49 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION


Preliminary as Final TCARI Grid for
OPR-D304-TJ-2009, H12037
Approaches to Southern Chesapeake Bay, VA
8632200 KIPTOPEKE BEACH
8638863 CHESAPEAKE BAY BRIDGE TUNNEL

APPROVAL SHEET
H12037

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth contours, disposition 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 reviews per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

2010.03.17
14:33:28 -04'00'

Reginald L. Keene Sr.
Cartographer
Atlantic Hydrographic Branch

Digitally signed by Deborah A. Bland
DN: cn=Deborah A. Bland, o=Atlantic Hydrographic Branch, ou=NOAA/NOS, email=Deborah.A.Bland@NOAA.gov, c=US
Date: 2010.03.17 14:31:54 -04'00'

Deborah A. Bland
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
2010.03.31 16:11:21 -04'00'

Approved: _____

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

Digitally signed by Rachel Soraruf
DN: cn=Rachel Soraruf, o=NOAA/NOS/OCS/HSD, ou=Operations Branch, email=Rachel.Sorasuf@noaa.gov, c=US
Reason: AWOIS and SURF check complete
Date: 2010.04.02 09:27:48 -04'00'