



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center
439 W. York Street
Norfolk, VA 23510-1114

August 15, 2017

MEMORANDUM FOR: Commander Christiaan Van Westendorp, NOAA
Commanding Officer, NOAA Ship *Thomas Jefferson*

FROM: Captain Scott M. Sirois, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for TJ-17-02
Approaches to Houston, TX

Attached is the final Project Instruction for TJ-17-02, Approaches to Houston, TX, which is scheduled aboard NOAA Ship *Thomas Jefferson* during the period of September 2017 to November 2017. Of the 50 DAS scheduled for this project, 50 days are funded by a Line Office Allocation. This project is estimated to exhibit a High Operational Tempo. Acknowledge receipt of these instructions via e-mail to chiefops.moa@noaa.gov at Marine Operations Center-Atlantic.





Final Project Instructions

Date Submitted: June 23, 2017

Platform: NOAA Ship *Thomas Jefferson*

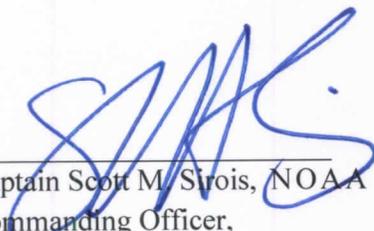
Project Number: OPR-K371-TJ-17

Project Title: Approaches to Houston, TX

Project Dates: September 2017 to November 2017

Prepared by:  Dated: July 19, 2017
Lieutenant Russell Quintero, NOAA
Chief, Operations Branch
Hydrographic Surveys Division

For Approved by:  Dated: July 20, 2017
Captain Richard Brennan, NOAA
Chief, Hydrographic Surveys Division
Office of Coast Survey

Approved by:  Dated: 8/17/17
Captain Scott M. Sirois, NOAA
Commanding Officer,
Marine Operations Center - Atlantic



I. Overview

A. Brief Summary and Project Period

This survey is scheduled to begin September 2017 and end November 2017. This project is being conducted in support of NOAA’s Office of Coast Survey to provide contemporary hydrographic data in order to update the nautical charting products and reduce survey backlog in the area.

B. Days at Sea (DAS)

As of the most recent sailing schedule there are approximately 50 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation as all are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are Other Agency funded. This project is estimated to exhibit a High Operational Tempo.

C. Operating Area (include optional map/figure showing op area)

The project area is located off the coast of Houston, TX. A map of the project area can be found with the detailed project instructions appended to these instructions.

D. Summary of Objectives

This project will support the following primary mission:
To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation as identified during the course of survey operations.

E. Participating Institutions

Office of Coast Survey

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Rita Bowker	Physical Scientist	9/9/2017	9/22/2017	F	NOAA	USA

G. Administrative

1. Points of Contacts:

Principal Investigator:
Lieutenant Russell Quintero, NOAA
Chief, Operations Branch
Hydrographic Surveys Division
1315 East West Hwy #6116
Silver Spring, MD 20910
240-533-0038
russell.quintero@noaa.gov

Project Manager:
Douglas Wood
Physical Scientist, Operations Branch
Hydrographic Surveys Division
1315 East West Hwy, #6202
Silver Spring, MD 20910
240-533-0042
Douglas.Wood@noaa.gov

Back up Project Manager:
Christy Fandel
Physical Scientist, Operations Branch
Hydrographic Surveys Division
1315 East West Hwy, #6110
Silver Spring, MD 20910
240-533-0032
Christina.Fandel@noaa.gov

Chief Scientist:
CDR Christiaan Van Westendorp, NOAA
Commanding Officer, NOAA Ship *Thomas Jefferson*
439 West York Street Norfolk, VA 23510-1114
(757) 647-0187
CO.Thomas.Jefferson@noaa.gov

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

The Office of Coast Survey is sensitive to the potential effects of its operations on the physical, biological, and cultural marine environment. In accordance with the National Environmental Policy Act, Coast Survey prepared a Programmatic Environmental Assessment to gauge the environmental impacts resulting from surveying and other data-gathering activities. As a result, the National Ocean Service has published a Finding of No Significant Impact (FONSI) for the Office of Coast Survey program of conducting hydrographic surveys for the calendar years 2013 - 2018.

In addition The Office of Coast Survey has implemented Best Management Practices (BMPs) based on the ESA mitigation and monitoring measures agreed to between the OCS Hydrographic Services Division (HSD) and the NMFS Office of Protected Resources (OPR-ESA) and documented in the April 30, 2013 Biological Opinion. They were adopted in the context of the ESA, but include BMPs for marine mammals listed in the ESA (“depleted” under MMPA).

For further information on the BMPs, please refer to the Environmental Compliance Section of the Hydrographic Survey Project Instructions. For further information on OCS Regulations and Policies go to:

<http://www.nauticalcharts.noaa.gov/Legal/>

II. Operations

The Chief Scientist is responsible for ensuring the scientific staff is trained in planned operations and are knowledgeable of project objectives and priorities. The Chief Scientist is responsible for ensuring all operations conform to the ship’s accepted practices and procedures.

A. Project Itinerary:

Itinerary will be based upon the ship’s schedule and executed under the direction of the Chief Scientist. Every effort shall be made by the Chief Scientist to maximize the operational efficiency of assigned projects. Please refer to the ship’s sailing schedule below.

POC: Chief, Operations Division
 Marine Operations Center - Atlantic
 439 W York St, Norfolk, VA 23510
 Tel: 757.441.6206

NOAA Ship
Thomas Jefferson

Revision date: 29-Jun-17

CY 2017 schedule

							Leg Days At Sea
DEP: 9/9/2017	Sat	Charleston, SC	TJ-17-01 Leg 4 (6 DAS) / TJ-17-04 Leg 1 (8 DAS)	NOS	Resilient Communities	14	
ARR 9/22/2017	Fri	Galveston, TX	App. To Savannah / Galveston Approaches				
DEP: 9/25/2017	Mon	Galveston, TX	TJ-17-04 Leg 2	NOS	Resilient Communities	18	
ARR 10/12/2017	Thu	Galveston, TX	Houston/Galveston Approaches				
DEP: 10/16/2017	Mon	Galveston, TX	TJ-17-04 Leg 3	NOS	Resilient Communities	12	
ARR 10/27/2017	Fri	Galveston, TX	Houston/Galveston Approaches				
DEP: 10/30/2017	Mon	Galveston, TX	TJ-17-04 Leg 4	NOS	Resilient Communities	11	
ARR 11/9/2017	Thu	Norfolk, VA	Houston/Galveston Approaches				

B. Staging and Destaging: N/A

C. Operations to be Conducted:

Hydrographic survey operations shall be conducted per the appended project instructions. The ship and/or survey launches shall operate for a total of 24 hr/day for data acquisition and project field support. To achieve this, the Chief Scientist may elect to run 24 hr ship survey operations for short or extended periods of time with reduced launch operations as long as the total hours per day are achieved.

D. Dive Plan

Dives are not planned for this project.

E. Applicable Restrictions

Conditions which preclude normal operations:

- Poor weather conditions
- Equipment failure
- Safety concerns
- Personnel shortage

III. Equipment

A. Equipment and Capabilities provided by the ship (itemized)

1. Two survey launches fully-outfitted with hydrographic survey equipment to support multibeam and/or side scan and/or vertical beam sonar survey operations.

2. Ship fully-outfitted with hydrographic survey equipment to support multibeam and/or side scan sonar survey operations.
 3. Personnel to staff and operate the survey equipment on the launches and ship for the required operational hours/day described in Section II. C. Operations to be Conducted.
 4. A fully-staffed survey department to efficiently manage the project's data processing requirements.
- B. Equipment and Capabilities provided by the scientists (itemized)

IV. Hazardous Materials

A. Policy and Compliance

No Hazardous Materials are being brought aboard the ship for this project.

B. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

No Supplementary Projects are planned.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information*. To guide the implementation of these NAOs, NOAA's Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

VII. Meetings, Vessel Familiarization, and Project Evaluations

- A. Pre-Project Meeting: The Principal Investigator and Chief Scientist will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all

concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.

- B. Vessel Familiarization Meeting: The Chief Scientist is responsible for ensuring that scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.
- C. Post-Project Meeting: The Chief Scientist is responsible for conducting a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and shortcomings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.
- D. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at <https://sites.google.com/a/noaa.gov/omao-intranet-dev/operations/marine/customer-satisfaction-survey> and provides a "Submit" button at the end of the form. It is also located at https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/v_iewform. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Although the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

- A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example: a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements

for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist will work on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Chief Scientist will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientist to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Chief Scientist. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website

<http://www.corporateservices.noaa.gov/noaforms/eforms/nf57-10-01.pdf>.

All NHSQs submitted after March 1, 2014 must be accompanied by [NOAA Form \(NF\) 57-10-02](#) - Tuberculosis Screening Document in compliance with [OMAO Policy 1008](#) (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant

will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure email process approved by NOAA is [Accellion Secure File Transfer](#) which requires the sender to setup an account. [Accellion's Web Users Guide](#) is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The "Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757-441-6320
Fax 757-441-3760
Email MOA.Health.Services@noaa.gov

Prior to departure, the Chief Scientist must provide an electronic listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship's Chief Scientist at least 30 days in advance.

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy 1.1* (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

- (1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
- (2) Installation of the latest critical operating system security patches.
- (3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

VIII. Appendices

1. Primary Project Instructions: OPR-K371-TJ-17, Approaches to Houston, TX
2. Water Level Instructions
3. Proposed Best Management Practices (BMP) for Hydrographic Surveys

Hydrographic Survey Project Instructions

Project Name:	Approaches to Houston, TX
Project Number:	OPR-K371-TJ-17
Assigned Field Unit:	NOAA Ship <i>Thomas Jefferson</i>
Assigned Processing Branch:	Atlantic Hydrographic Branch
Signed Date:	06/16/2017
Project Instructions Version:	Final
Planned Acquisition Time:	Start Date: 07/2017 End Date: 09/2017
Delivery Dates:	120 days from completion of data acquisition.

Purpose and Location:
The purpose of this project is to provide contemporary surveys to update National Ocean Service nautical charts and products. The Port of Houston is the second-busiest port in the United States in overall tonnage, first in the nation for foreign tonnage. The Port supports 1.17 million jobs, \$264.9B in economic impact, and over \$5B in state tax revenue. The approaches to the Houston-Galveston Complex see huge traffic volumes in an area of high oil production activity. All of this survey is in an area where the most recent survey was in 1963, and the chart contains numerous reported wrecks and obstructions with their positions reported to be approximate. These pose an immediate danger to surface navigation. This survey will identify changes to the bathymetry and resolve position uncertainty in known hazards.
Supporting Documents:
Hydrography shall consist of Navigable Area Surveys in accordance with the following support documents.
NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSD), April 2017
NOS Field Procedures Manual for Hydrographic Surveying (FPM), April, 2014
Hydrographic Survey Technical Directive (HTD): 2017-2 Variable Resolution Bathymetric Grids
Hydrographic Survey Technical Directive (HTD): 2017-3 Configuration Management

PERSONNEL SAFETY AND DATA QUALITY SHALL ALWAYS BE EMPHASIZED OVER DATA QUANTITY! THE HYDROGRAPHER SHALL NEVER SUBJECT PERSONNEL OR BOATS TO UNDUE RISKS AND HAZARDS.

Registry Details:**General Locality:** Galveston to Sabine, Tx

<i>Registry Number</i>	<i>Sheet Number</i>	<i>Sublocality</i>	<i>State or Territory</i>	<i>Scale</i>	<i>Estimated SNM</i>	<i>Instructions</i>
H13044	1	SE of Heald Bank	Texas	40000	111	
H13047	2	Between Galveston Bay Entrance and Sabine Bank Channel	Texas	40000	97	
H13048	3	Between Galveston Bay Entrance and Sabine Bank Channel	Texas	40000	97	
H13045	4	Between Galveston Bay Entrance and Sabine Bank Channel	Texas	40000	114	
H13046	5	Between Galveston Bay Entrance and Sabine Bank Channel	Texas	40000	88	
H13049	6	Between Galveston Bay Entrance and Sabine Bank Channel	Texas	40000	119	
H13050	7	Heald Bank	Texas	40000	110	
H13051	8	Sabine Bank west	Texas	40000	123	
H13053	9	Sabine Bank east	Louisiana Texas	40000	114	
H13052	10	Between Galveston Bay Entrance and Sabine Bank Channel	Louisiana Texas	40000	116	

Limits & Coverage:	
<i>Inshore Limit:</i> The Inshore Limit is the Navigable Area Limit Line (Refer to HSSD 1.3.2).	
Coverage Requirements:	
<i>Coverage Water Depth</i>	<i>Coverage Required</i>
All waters in survey area	Complete Coverage (refer to HSSD Section 5.2.2.3)

Assigned Tasks

Acknowledgement:
The project manager for this project is Douglas Wood. Contact information for the project manager may be found in the User Contacts section of this document. The field unit shall acknowledge receipt of these instructions and submit any comments or questions via email to the project manager. Additionally, the project manager shall be included on all discussions or correspondence involving issues concerning the project.

Environmental Compliance Requirements
Comply with the marine mammal observation and reporting requirements in HSSD Section 1.5 and all Best Management Practices (BMPs) listed at the end of the Project Instructions.

Aids to Navigation (ATONs):
There are no ATONs specifically assigned for this project. Any ATONs located within the survey area should be verified so that they serve their intended purpose in accordance with Section 7.3.5 of the HSSD.

Maritime Boundary Points (MBPs):
There are no Maritime Boundary investigation requirements for this project.

Bottom Samples:
Obtain bottom samples in accordance with HSSD Sections 7.2 and 7.2.3.

Chart Comparison:

Perform a chart comparison in accordance with Sections 8.1.4 and D.1 of the HSSD. Use only the latest editions of the largest scale ENC's, which can be found at "<http://www.nauticalcharts.noaa.gov/mcd/enc/index.htm>" Resolve any discrepancies identified in the field and explain them in the Descriptive Report. The charts listed are the largest scale ENC's which cover the survey area.

Affected ENC's					
<i>ENC Name</i>	<i>Scale</i>	<i>Edition</i>	<i>Update Application Date</i>	<i>Issue Date</i>	<i>Preliminary</i>
US4TX71M	80000	30	01/25/2017	01/25/2017	NO
US5TX52M	80000	23	02/01/2017	03/06/2017	NO
US3GC02M	250000	27	10/27/2014	02/28/2017	NO

Coast Pilot:

Perform a Coast Pilot Review as described in HSSD Section 8.1.3. There is a Coast Pilot Investigation document in the "Coast Pilot" folder of the project deliverables. This document contains issues that have been brought to the attention of the Coast Pilot Branch as needing verification.

Dangers to Navigation (DTONs):

Generate DTON reports in accordance with Section 1.6 of the HSSD. DTON reports should be sent to ocs.ndb@noaa.gov with a courtesy copy to the project manager. It is of paramount importance that DTONs be reported as soon as possible.

Junctions:

Perform a junction analysis with the surveys listed below and between current project sheets. Refer to HSSD Section 7.2.2 Junction guidance.

<i>Registry Number</i>	<i>Scale</i>	<i>Year</i>	<i>Platform</i>	<i>Relative Location</i>
H12187	40000	2010	NOAA Ship <i>Thomas Jefferson</i>	E
H12188	40000	2010	NOAA Ship <i>Thomas Jefferson</i>	E
H12059	20000	2009	C&C	SW
H10948	20000	2000	Fugro GeoServices, Inc.	E
H10873	20000	2000	SAIC	W

Progress Reports:

Submit weekly (refer to HSSD Section 8.1.1.1) and monthly (refer to HSSD Section 8.1.1.2) progress reports.

Survey Outlines:

Generate and submit survey outline in accordance with Section 8.1.2 of the HSSD.

Horizontal Control Requirements:

Comply with the horizontal control requirements in Section 3 of the HSSD.

PPP

This project has a requirement to acquire survey data vertically-referenced to the ellipsoid. Based on analysis of existing infrastructure, this will most likely be achieved through a MarineStar subscription using a PPP processing solution.

Vertical Control Requirements:

Comply with the vertical control requirements in Section 4 of the HSSD.

Discrete Zoning

Comply with the requirements from CO-OPS which are included with the project data from the Operations Branch. Submit surveys with final approved water levels applied. Contact the Operations Branch if this causes the survey to miss a submission deadline.

Ellipsoidally-Referenced Survey via VDATUM

This project has a requirement to acquire survey data vertically-referenced to the ellipsoid. Based on analysis of existing infrastructure, this will most likely be achieved through a MarineStar subscription using a PPP processing solution. For this project, the field unit shall use a VDatum separation model to realize chart datum via the ellipsoid.

NWLON Gauges

<i>Operating Water Level Station</i>	<i>Station ID</i>
Galveston Bay Entrance, North Jetty, TX	8771341

Orthometric Imagery:

No Orthometric Imagery has been provided for this project.

Shoreline and Nearshore Features:

Submit a Final Feature File in accordance with HSSD Section 7. For the purpose of disproval, charted features labeled with a 'PA' will have a search radius of 160 meters, charted features labeled with 'PD' will have a search radius of 240 meters, and other features without a position qualifier will have a search radius of 80 meters. With respect to BSSE wellheads, follow the recommendations under HSSD 7.5.1 S-57 attribution.

Additional Task: *Coast Survey Public Relations Product*

Submit a Coast Survey blog content as per the attached guidance at least once per project.

User Contacts

The following primary offices and persons shall be contacted at or near the beginning and end of the field operations to discuss survey objectives and accomplishment (Mandatory) or are listed for contact at the discretion of the Commanding Officer (Reference).

Primary Project Manager

Douglas Wood

NOAA

Phone: 240-533-0042

Email: douglas.wood@noaa.gov

Obligation: Mandatory

Back-up Project Manager

Christy Fandel

NOAA

Phone: 240-533-0032

Email: christina.fandel@noaa.gov

Obligation: Mandatory

NOAA Navigation Manager, Western Gulf Coast

Alan Bunn

NOAA

Phone: 409-621-5151 x118

Email: alan.bunn@noaa.gov

Obligation: For Reference

NOAA Navigation Manager, Central Gulf Coast

Tim Osborn

NOAA

Phone: 337-291-2111

Fax: 337-254-5933

Email: tim.osborn@noaa.gov

Obligation: For Reference

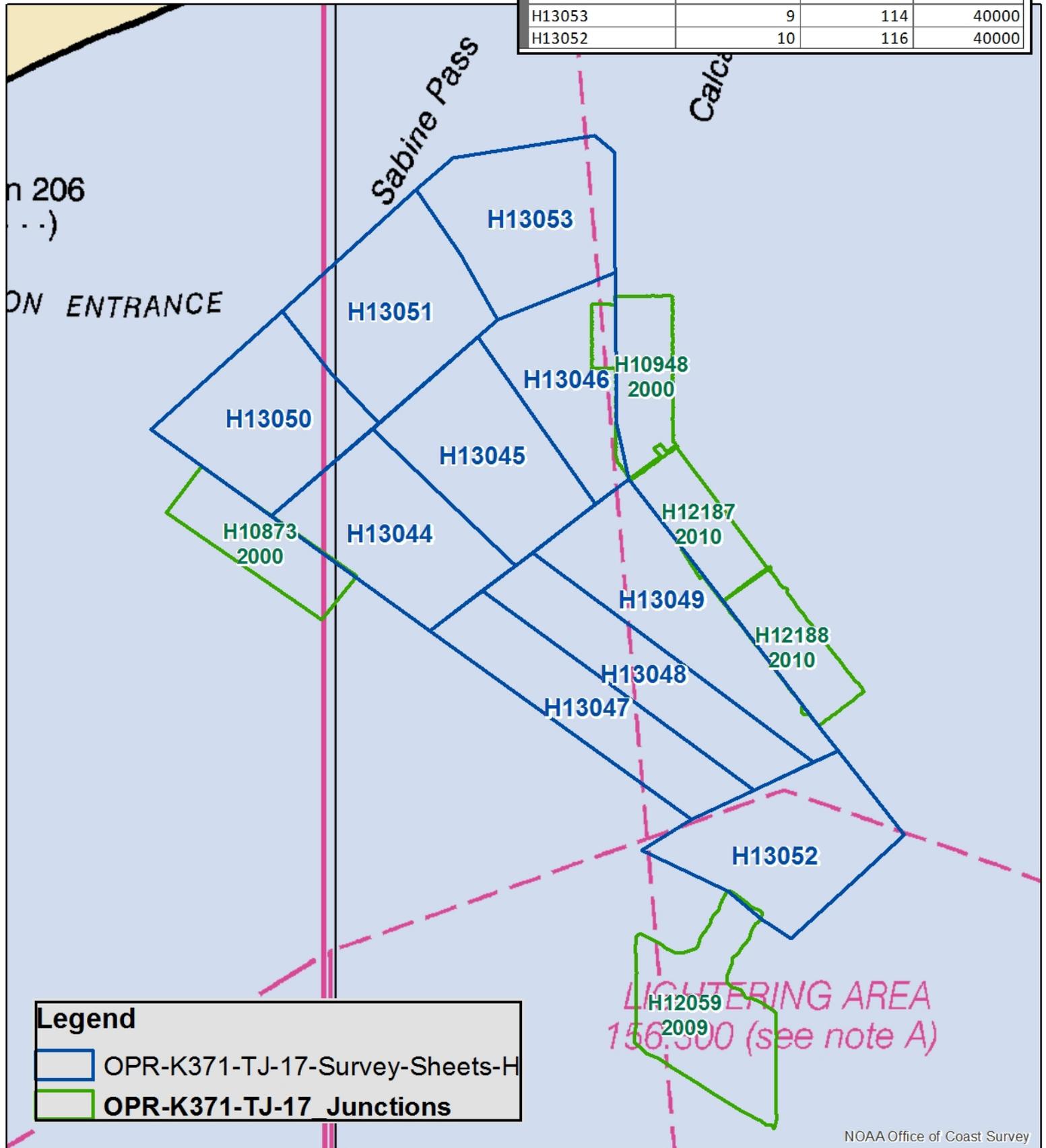
OPR-K371-TJ-17

Approaches to Houston, TX

Sheet Layout

6/21/2017

Registry Number	Sheet Priority	Area (SNM)	Survey Scale
H13044	1	111	40000
H13047	2	97	40000
H13048	3	97	40000
H13045	4	114	40000
H13046	5	88	40000
H13049	6	119	40000
H13050	7	110	40000
H13051	8	123	40000
H13053	9	114	40000
H13052	10	116	40000



Legend

- OPR-K371-TJ-17-Survey-Sheets-H
- OPR-K371-TJ-17 Junctions

3. PROPOSED BEST MANAGEMENT PRACTICES (BMPS) FOR HYDROGRAPHIC SURVEYS

The following BMPs are based on the ESA mitigation and monitoring measures agreed to between the OCS Hydrographic Services Division (HSD) and the NMFS Office of Protected Resources (OPR-ESA) and documented in the April 30, 2013 Biological Opinion. They were adopted in the context of the ESA, but include BMPs for marine mammals listed in the ESA (“depleted” under MMPA). OCS proposes that these BMPs be applied to all OCS hydro work while MMPA compliance is underway. In all cases BMPs will be communicated to ship and boat crews via project instructions. Contractors will additionally be made aware of BMPs via contract RFPs.

Universal BMPs (those to be included in *all* OCS project instructions):

Vessel Speed Limits

- Vessels over 65 feet in overall length are limited to a speed of 13 knots or less at all times, unless a slower speed limit applies to the area (e.g., posted speed limits for the protection of manatees).
- Vessels of 65 feet in overall length or less are limited to a speed of 13 knots or less while mapping, unless a slower speed limit applies to the area.

Echosounder Restrictions

- Avoid using sonar frequencies < 180 kHz when possible
 - If **multibeam** sonar frequencies < 180 kHz must be employed, use echosounders at ≥ 50 kHz frequencies, with the lowest possible power and ping-rate
 - If **single beam** sonar frequencies < 180 kHz must be employed, use echo sounders at ≥ 30 kHz frequencies, with the lowest possible power and ping-rate and a 12° beam angle.
 - If **single beam** sonar frequencies < 30 kHz must be employed, suspend transmissions of 30 kHz or lower when ESA-listed cetacean species (whales, dolphins, and porpoises) are within hearing range (i.e., the 4.2 meter beam width).

Vessel Maintenance Requirements

- Meet all EPA Vessel General Permits and Coast Guard requirements
- Use anti-fouling coatings
- Clean hull regularly to remove aquatic nuisance species
- Avoid cleaners with nonylphenols
- Rinse anchor with high-powered hose after retrieval

Anchoring Restrictions

- Use designated anchorage area when available
- Use mapping data to anchor in mud or sand, to avoid anchoring on corals
- Minimize anchor drag

Visual Monitoring Requirements

- Maintain trained observers aboard all vessels; 100% observer coverage
- Make species identification keys (for marine mammals, sea turtles, corals, abalone, and seagrasses) available on all vessels

Animal Approach Restrictions

- Avoid approaching within 200 yards of cetaceans (whales, dolphins, and porpoises), 500 yards for right whales
- Suspend single beam sonar transmissions of <30 kHz when ESA-listed cetaceans (whales, dolphins, and porpoises) are within hearing range (i.e., within the 4.2 meter beam width).
- Avoid approaching within 100 yards of in-water seals and walrus
- When possible, suspend single beam sonar transmissions when ESA-listed seals and walrus are within hearing range (i.e., within the 4.2 meter beam width).
- Avoid approaching within 50 yards of sea turtles

Discharge Restrictions

- Avoid discharge of ballast water and hull cleaning in designated critical habitat

Animal Approach Restrictions

- Avoid cetacean (whales, dolphins, and porpoises) critical habitat, when possible

2. WATER LEVEL INSTRUCTIONS

OPR-K371-TJ-2017 Approaches to Houston, TX

(04/07/2017 CU)

1.0. TIDES AND WATER LEVELS

1.1. Specifications

Tidal data acquisition, data processing, tidal datum computation and final tidal zoning shall be performed utilizing sound engineering and oceanographic practices as specified in National Ocean Service (NOS) Hydrographic Surveys Specifications and Deliverables (HSSD), dated March 2016, and OCS Field Procedures Manual (FPM), dated April, 2014. Specifically reference Chapter 4 of the HSSD and Sections 1.5.8, 1.5.9, 2.4.3, and 3.4.2 of the FPM.

1.2. Vertical Datums

The tidal datums for this project are referenced to Chart Datum, Mean Lower Low Water (MLLW) and Mean High Water (MHW). Soundings are referenced to MLLW and heights of overhead obstructions (bridges and cables) are referenced to MHW.

1.2.1. Water Level Data Acquisition Monitoring

The Commanding Officer (or Team Leader) and the Center for Operational Oceanographic Products and Services (CO-OPS) are jointly responsible for ensuring that valid water level data are collected during periods of hydrography. The Commanding Officer (or Team Leader) is required to monitor the pertinent water level data via the CO-OPS Web site at <http://tidesandcurrents.noaa.gov/hydro.shtml>, or through regular communications with CO-OPS/Oceanographic Division (OD) personnel before and during operations. During traditional non-duty hours, the Commanding Officer/Team Leader may contact the Continuous Operational Real-Time Monitoring System (CORMS) watch stander who is available 24 hours/day - 7 days/week for assistance in assessing the status of applicable water level station operation. The CORMS watch stander may be contacted either by phone at 301-713-2540 or by email: CORMS@noaa.gov. Problems or concerns regarding the acquisition of valid water level data identified by the Commanding Officer/Team Leader shall be communicated with CO-OPS/OD (nos.coops.hpt@noaa.gov) to coordinate the appropriate course of action to be taken such as gauge repair and/or developing contingency plans for hydrographic survey operations. In addition, CO-OPS is required to coordinate with the Commanding Officer (or Team Leader) before interrupting the acquisition of water level data for the NWLON stations mentioned above for any reason during periods of hydrography.

1.2.2. The Hydro Hot List (HHL)

Please contact the CO-OPS/Hydrographic Planning Team (HPT) at nos.coops.hpt@noaa.gov and the Operational Engineering Team (OET) at nos.coops.oetteam@noaa.gov at least three business days before survey operations begin, and within 1 business day after survey operations are completed so that the appropriate CO-OPS National Water Level Observation Network (NWLON) control water level station is added to, or removed from, the CO-OPS Hydro Hotlist (HHL) (<http://tidesandcurrents.noaa.gov/hydro>). Include start and end survey dates, full project number (e.g. OPR-K371-TJ-17), and control station numbers. The notification must be sent to both teams as OET is responsible for configuring the stations in the CO-OPS data base and HPT manages the addition and removal of stations from the HHL.

Station	Station ID	Residual Control	Type (NWLON, PORTS®, etc.)	Comment
Galveston Bay Entr., TX	8771341	Residual Control	NWLON	

Table 1: All stations that need to be added to the HHL in support of OPR-K371-TJ-17

It is important to know that the addition of a water level station to the HHL ensures the station is monitored by CORMS and any problems are reported daily. However, platforms should view the HHL each morning of active survey operations and click on the “Plot” to double check that there are no problems with the required stations on that day. If a platform notices problems with data on their survey day of operation, please contact HPT at nos.coops.hpt@noaa.gov, CORMS at CORMS@noaa.gov, and their respective headquarters point of contact at HSD or NSD. Stations on the HHL are given priority for maintenance should a station cease normal operation during scheduled times of hydrography. CO-OPS will notify a field unit within 1 business day if a HHL water level station ceases operation during scheduled times of hydrography. This is in addition to the daily CORMS report that CORMS sends to NOAA field units, if the field unit's e-mail address is added to the CORM's daily e-mail list. To be added to the CORMS daily HHL report, the platform should contact CO-OPS’ Data Monitoring and Analysis Team (DMAT) at nos.co-ops.dmat@noaa.gov and request to be added.

If the stations are listed on HHL, then weekly priority processing will occur and, for those water level stations, verified 6-minute water level data will be made available every week on Monday or Tuesday. If Monday happens to be a federal holiday, then the 6-minute verified water level data will be made available on the following Tuesday or Wednesday. In order to ensure that verified data is correctly downloaded please **select a date that is more than 7 days prior to the day of interest** in the 'From' field on the CO-OPS website.

1.3. Operating Tide Reducer Stations

1.3.1. CO-OPS Long Term Water Level Station Operation and Maintenance

The operating water level station Galveston Bay Entr., TX (8771341), will provide water level reducers for this project. Therefore, it is critical that it remains in operation during the survey. See Sections 1.1. and 1.2. concerning responsibilities.

No leveling is required at Galveston Bay Entr., TX (8771341) by NOAA’s THOMAS JEFFERSON personnel.

CO-OPS/FOD is responsible for the operation and maintenance of all NWLON primary control stations. If a problem is identified at an NWLON primary control station, FOD shall make all reasonable efforts to repair the malfunctioning station. However, CO-OPS may request assistance from the NOAA ship or NRT personnel in the actual repair of the water level station to facilitate a rapid repair. CO-OPS/FOD and the Commanding Officer (or Team Leader) shall maintain the required communications until the repairs to the water level station have been completed.

1.3.2. Subordinate Station Requirements

No subordinate water level stations are required for this project, however, supplemental and/or back-up water level stations may be necessary depending on the complexity of the hydrodynamics and/or the severity of the environmental conditions of the project area. The installation and continuous operation of water level measurement systems (tide gauges) at subordinate station locations is left to the discretion of the Commanding Officer (or Team Leader), subject to the approval of CO-OPS. If the Commanding

Officer (or Team Leader) decides to install additional water level stations, then a 30-day minimum of continuous data acquisition is required. For all subordinate stations, data must be collected throughout the entire survey period for which they are applicable, and not less than 30 continuous days. This is necessary to facilitate the computation of an accurate datum reference as per NOS standards.

1.3.3. Tide Component Error Estimation

The estimated tidal error contribution to the total survey error budget in the vicinity of Approaches to Houston, TX is 0.24 meters at the 95% confidence level, and includes the estimated gauge measurement error, tidal datum computation error, and tidal zoning error. It should be noted that the tidal error component can be significantly greater than stated if a substantial meteorological event or condition should occur during time of hydrography.

1.3.4. GOES Satellite Enabled Subordinate Stations

This section is not applicable for this project.

1.3.5. Benchmark Recovery and GPS Requirements

This section is not applicable for this project.

1.3.6. Residual Water Level Station(s) Data

Tidal Constituent And Residual Interpolation (TCARI) method uses harmonic constituents and residuals from historical and operating water level stations to provide precise water level correction for bathymetric surveys. Download the Preliminary/Verified data at following water level station(s) data for all periods of survey.

The operating station at Galveston Bay Entrance, TX (8771341) will provide residuals for this project and must remain in operation during all periods of hydrography.

<u>Station Number</u>	<u>Station Name</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
8771341	Galveston Bay Entrance, TX	29°21.4'	94°43.5'

1.4. Tidal Constituent and Residual Interpolation (TCARI)

1.4.1. For hydrography in the area of approaches to Houston, TX, apply the TCARI grid “K371KR22017.tc” supplied in conjunction with the water level data from Section 1.3.6 to produce a seamless tide correction. Refer to the TCARI Field SOP for detailed TCARI instructions.

1.4.2. This section is not applicable for this project.

1.4.3. TCARI Graphic

A diagram which includes the exported TCARI grid boundary, is provided in digital copy format to assist with the information provided in section 1.4.1.

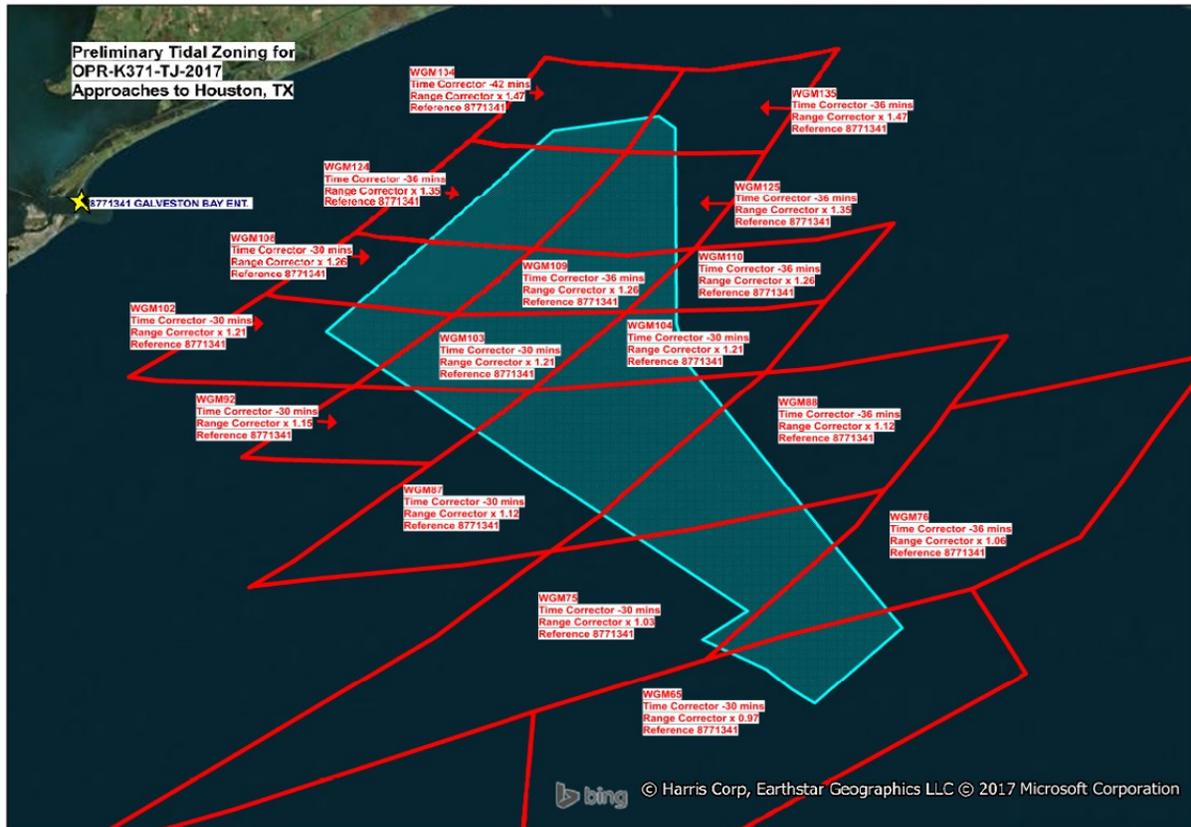
1.4.4. TCARI Final Solutions

Upon completion of project, submit a Pydro generated request for smooth tides, with times of hydrography abstract and mid/mif tracklines attached. Forward this request to final.tides@noaa.gov. Provide the project number, as well as sheet number, in the subject line of the email.

CO-OPS will review the times of hydrography, final tracklines, and six-minute water level data from all applicable water level gauges. If there are any discrepancies, CO-OPS will make the appropriate adjustments and forward a revised TCARI grid and solutions to the field group and processing branch for final processing.

1.4.A Discrete Tidal Zoning

1.4.1. The water level station at Galveston Bay Entr., TX (8771341) is the reference station for preliminary tides for hydrography in Approaches to Houston, TX. The time and height correctors listed below for applicable zones should be applied to the preliminary data at Galveston Bay Entr., TX (8771341) during the acquisition and preliminary processing phases of this project. **Preliminary data may be retrieved in one month increments over the Internet from the CO-OPS SOAP web services at <http://opendap.co-ops.nos.noaa.gov/axis/text.html>.** The Commanding Officer (or Team Leader) must notify CO-OPS/ED personnel immediately of any problems concerning the preliminary tides. Preliminary data are six-minute time series data relative to MLLW in metric units on Greenwich Mean Time. For the time corrections, a negative (-) time correction indicates that the time of tide in that zone is earlier than (before) the preliminary tides at the reference station. A positive (+) time correction indicates that the time of tide in that zone is later than (after) the predicted tides at the reference station. For height corrections, the water level heights **relative to MLLW** at the reference station are multiplied by the range ratio to estimate the water level heights relative to MLLW in the applicable zone.



<u>Zone</u>	<u>Time Corrector (min)</u>	<u>Range Ratio</u>	<u>Predicted Reference Station</u>
WGM65	-30	x0.97	8771341
WGM75	-30	x1.03	8771341
WGM76	-36	x1.06	8771341
WGM87	-30	x1.12	8771341
WGM88	-36	x1.12	8771341
WGM92	-30	x1.15	8771341
WGM102	-30	x1.21	8771341
WGM103	-30	x1.21	8771341
WGM104	-30	x1.21	8771341
WGM108	-30	x1.26	8771341
WGM109	-36	x1.26	8771341
WGM110	-36	x1.26	8771341
WGM124	-36	x1.35	8771341
WGM125	-36	x1.35	8771341
WGM134	-42	x1.47	8771341
WGM135	-36	x1.47	8771341

1.4.2.A Polygon nodes and water level corrections referencing Galveston Bay Entr., TX (8771341) are provided in CARIS® format denoted by a *.zdf extension file name.

NOTE: The tide corrector values referenced to Galveston Bay Entr., TX (8771341) are provided in the zoning file “K371TJ2017CORP” for this project and are in the fourth set of correctors designated as TS4. Longitude and latitude coordinates are in decimal degrees. Negative (-) longitude is a representation of West longitude.

“Preliminary” data for the control water level station, Galveston Bay Entr., TX (8771341), are available in near real-time and verified data will be available on a weekly basis for the previous week. **These water level data may be obtained from the CO-OPS SOAP web services at <http://opendap.co-ops.nos.noaa.gov/axis/text.html>.**

1.4.3.A Zoning Diagram(s)

Zoning diagrams are provided in digital format to assist with the zoning in section 1.4.1.

1.4.4.A Final Zoning

Upon completion of project OPR-K371-TJ-2017, submit a Pydro generated request for final tides, with times of hydrography abstract and mid/mif tracklines attached. Forward this request to Final.Tides@noaa.gov . Provide the project number, as well as a sheet number, in the subject line of the email.

CO-OPS will review the times of hydrography, final tracklines, and six-minute water level data from all applicable water level gauges. After review, CO-OPS will send a notice indicating that the tidal zoning scheme sent with the project instructions has been approved for final zoning. If there are any discrepancies, CO-OPS will make the appropriate adjustments and forward a revised tidal zoning scheme to the field group and project manager for final processing.

1.5 Fetchtides

Preliminary and verified six minute water level time series data may be retrieved from the CO-OPS database via the Fetchtides application. Fetchtides provides a mechanism to store imported data locally and combines multiple days of data into one CARIS readable tide (.tid) file. Fetchtides is available for download at Hydrosoft Online (<https://inside.nos.noaa.gov/hydrosoft/hydrosoftware.html>). For more information, please see the Fetchtides User Manual in the FPM chapter 3 appendix.

1.6 Water Level Records

This section is not applicable for this project.