

**APPENDIX C
JOINT PERMIT APPLICATION**

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National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337-5099



Reply to Attn of:

228

October 1, 2018

Hank Badger
Environmental Engineer, Habitat Management Division
Virginia Marine Resources Commission
2600 Washington Avenue,
Newport News, VA 23607

Re: NASA Wallops Flight Facility Shoreline Enhancement and Restoration Project
Joint Permit Application

Dear Hank,

Attached please find the Joint Permit Application and supporting documentation for the above referenced project. We have included the following:

1. Joint Permit Application
2. Permit drawings
3. Attachment 1: Purpose and Need, Alternatives Considered and Description of Project
4. Department of Historic Resources Finding (DHR File No. 2018-3863)
5. Breakwater Design and Analysis Report
6. Periodic Surveying Evaluation Fall 2015
7. Periodic Surveying Evaluation Fall 2017
8. Plans Wallops Island 100% Submittal
9. Specifications Wallops Island 100% Submittal
10. September 24, 2018 Pre- Application Meeting Minutes

We are providing this by posting to the Cardno FTP site. Please see link in email. If there are problems downloading the information, please let us know and we will assist. We appreciate your time and attention to this project. Do not hesitate to contact us with questions or comments.

Sincerely,

A handwritten signature in blue ink, appearing to read "Paul Bull".

Paul Bull, PE

Cc: Brian Denson, ACOE, with attachments
Shari Kattan, VDEQ, with attachments
Lyle Varnell, VIMS, with attachments
Dave O'Brien NOAA, with attachments
Chris Guvernator, Accomack County, with attachments
Shari Miller, NASA
John Saecker, NASA
John Lowenthal, Cardno
Elizabeth Burak, Cardno

FOR AGENCY USE ONLY	
	Notes:
JPA#	

APPLICANTS

PLEASE PRINT OR TYPE ALL ANSWERS. If a question does not apply to your project, please print N/A (not applicable) in the space provided. ***If additional space is needed, attach extra 8 1/2 x 11 inch sheets of paper.***

Check all that apply			
Pre-Construction Notification (PCN) <input type="checkbox"/> NWP # _____ (For Nationwide Permits ONLY - No DEQ-VWP permit writer will be assigned)	SPGP <input type="checkbox"/>	DEQ Reapplication <input type="checkbox"/> Existing permit number: _____	Receiving federal funds <input type="checkbox"/> Agency providing funding: _____

PREVIOUS ACTIONS RELATED TO THE PROPOSED WORK (Include all federal, state, and local pre-application coordination, site visits, previous permits, or applications whether issued, withdrawn, or denied)				
Historical information for past permit submittals can be found online with VMRC - https://webapps.mrc.virginia.gov/public/habitat/ - or VIMS - http://ccm.vims.edu/perms/newpermits.html				
Agency	Action / Activity	Permit/Project number, including any non-reporting Nationwide permits previously used (e.g., NWP 13)	Date of Action	If denied, give reason for denial
Corps/VMRC	Inter-agency Pre-Appl. Meeting	NAO-1992-1455	9/24/18	
VIMS/NOAA				

1. APPLICANT, AGENT, PROPERTY OWNER, AND CONTRACTOR INFORMATION						
The applicant(s) is/are the legal entity to which the permit may be issued (see How to Apply at beginning of form). The applicant(s) can either be the property owner(s) or the person/people/company(ies) that intend(s) to undertake the activity. The agent is the person or company that is representing the applicant(s). If a company, please also provide the company name that is registered with the State Corporation Commission (SCC), or indicate no registration with the SCC.						
Legal Name(s) of Applicant(s) NASA Wallops Flight Facility				Agent (if applicable)		
Mailing address Wallops Island/Accomack County				Mailing address		
City Wallops Island	State VA	ZIP Code 23337	City	State	ZIP Code	
Phone number w/area code	Fax		Phone number w/area code	Fax		
Mobile	E-mail		Mobile	E-mail		
State Corporation Commission Name and ID number (if applicable)				State Corporation Commission Name and ID number (if applicable)		
<i>Certain permits or permit authorizations may be provided via electronic mail. If the applicant wishes to receive their permit via electronic mail, please provide an e-mail address here:</i> _____						

1. APPLICANT, AGENT, PROPERTY OWNER, AND CONTRACTOR INFORMATION (Continued)					
Property owner(s) legal name, if different from applicant Paul Bull, PE			Contractor, if known		
Mailing address NASA Wallops Flight Facility, Building N-161, Code 228			Mailing address		
City Wallops Island	State VA	ZIP code 23337	City	State	ZIP code
Phone number w/area code 757-824-1168	Fax 757-824-1831	Phone number w/area code		Fax	
Mobile	E-mail paul.c.bull@nasa.gov	Mobile		E-mail	
State Corporation Commission Name and ID number (if applicable)			State Corporation Commission Name ID number (if applicable)		

2. PROJECT LOCATION INFORMATION	
(Attach a copy of a detailed map, such as a USGS topographic map or street map showing the site location and project boundary, so that it may be located for inspection. Include an arrow indicating the north direction. Include the drainage area if the SPGP box is checked on Page 7.)	
Street Address (911 address if available) Wallops Island	City/County/ZIP Code Accomack County
Subdivision	Lot/Block/Parcel #
Name of water body(ies) within project boundaries and drainage area (acres or square miles). Atlantic Ocean	
Tributary(ies) to: NA Basin: _____ Sub-basin: _____ (Example: Basin: <u>James River</u> Sub-basin: <u>Middle James River</u>)	
Special Standards (based on DEQ Water Quality Standards 9VAC25-260 et seq.): NA	
Project type (check one) <input type="checkbox"/> Single user (private, non-commercial, residential) <input checked="" type="checkbox"/> Multi-user (community, commercial, industrial, government) <input type="checkbox"/> Surface water withdrawal	
Latitude and longitude at center of project site (decimal degrees): 37-50-45 / -75-28-29 (Example: 37.33164/-77.68200)	
USGS topographic map name: Wallops Island	
8-digit USGS Hydrologic Unit Code (HUC) for your project site (See http://cfpub.epa.gov/surf/locate/index.cfm): 02040303 If known, indicate the 10-digit and 12-digit USGS HUCs (see http://dswcapps.dcr.virginia.gov/htdocs/maps/HUEXplorer.htm):	
Name of your project (Example: Water Creek driveway crossing) Shoreline Enhancement Restoration Project	
Is there an access road to the project? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No. If yes, check all that apply: <input type="checkbox"/> public <input checked="" type="checkbox"/> private <input type="checkbox"/> improved <input type="checkbox"/> unimproved	
Total size of the project area (in acres): 405	

2. PROJECT LOCATION INFORMATION (Continued)	
Provide driving directions to your site, giving distances from the best and nearest visible landmarks or major intersections: Access to project site will require NASA security badging. The NASA security office/badging facility directions are as follows: From Route 13 North, turn right on Chincoteague Road/Rt. 175. Travel east for 3.5 miles toward Town of Chincoteague. At Wallops Island stoplight, turn left (north) on Atlantic Road/Rt. 798. Travel north for one mile: veer off to the right (east) to parking area for NASA badging facility. NASA project personnel shall provide escort to the site.	
Does your project site cross boundaries of two or more localities (i.e., cities/counties/towns)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If so, name those localities:	
3. DESCRIPTION OF THE PROJECT, PROJECT PRIMARY AND SECONDARY PURPOSES, PROJECT NEED, INTENDED USE(S), AND ALTERNATIVES CONSIDERED (Attach additional sheets if necessary)	
<ul style="list-style-type: none"> ▪ The purpose and need must include any new development or expansion of an existing land use and/or proposed future use of residual land. ▪ Describe the physical alteration of surface waters, including the use of pilings (#, materials), vibratory hammers, explosives, and hydraulic dredging, when applicable, and <i>whether or not tree clearing will occur</i> (include the area in square feet and time of year). ▪ Include a description of alternatives considered and measures taken to avoid or minimize impacts to surface waters, including wetlands, to the maximum extent practicable. Include factors such as, but not limited to, alternative construction technologies, alternative project layout and design, alternative locations, local land use regulations, and existing infrastructure ▪ For utility crossings, include both alternative routes and alternative construction methodologies considered ▪ For surface water withdrawals, public surface water supply withdrawals, or projects that will alter in-stream flows, include the water supply issues that form the basis of the proposed project. 	
See Attachment 1	
Date of proposed commencement of work (MM/DD/YYYY) <u>3/1/19</u>	Date of proposed completion of work (MM/DD/YYYY) <u>3/1/19</u>
Are you submitting this application at the direction of any state, local, or federal agency? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Has any work commenced or has any portion of the project for which you are seeking a permit been completed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If you answered "yes" to either question above, give details stating when the work was completed and/or when it commenced, who performed the work, and which agency (if any) directed you to submit this application. In addition, you will need to clearly differentiate between completed work and proposed work on your project drawings.	
Are you aware of any unresolved violations of environmental law or litigation involving the property? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If yes, please explain)	

4. PROJECT COSTS

Approximate cost of the entire project, including materials and labor: \$ 24,400,000
 Approximate cost of only the portion of the project affecting state waters (channelward of mean low water in tidal areas and below ordinary high water mark in nontidal areas): \$ 24,400,000

5. PUBLIC NOTIFICATION (Attach additional sheets if necessary)

Complete information for all property owners adjacent to the project site and across the waterway, if the waterway is less than 500 feet in width. If your project is located within a cove, you will need to provide names and mailing addresses for all property owners within the cove. If you own the adjacent lot, provide the requested information for the first adjacent parcel beyond your property line.

Failure to provide this information may result in a delay in the processing of your application by VMRC.

Property owner's name	Mailing address	City	State	ZIP code
USFWS Chincoteague NWR, (Robert Leffel, interim refuge manager)	PO Box 62, 8231 Beach Road	Chincoteague	VA	23336

Name of newspaper having general circulation in the area of the project: Eastern Shore News
 Address and phone number (including area code) of newspaper: PO Box 288 Tasley VA23441 757-787-1200

Have adjacent property owners been notified with forms in Appendix A? ☐ Yes ☒ No (attach copies of distributed forms)

6. THREATENED AND ENDANGERED SPECIES INFORMATION

Please provide any information concerning the potential for your project to impact state and/or federally threatened and endangered species (listed or proposed). Attach correspondence from agencies and/or reference materials that address potential impacts, such as database search results or confirmed waters and wetlands delineation/jurisdictional determination. Include information when applicable regarding the location of the project in Endangered Species Act-designated or -critical habitats. Contact information for the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, Virginia Dept. of Game and Inland Fisheries, and the Virginia Dept. of Conservation and Recreation-Division of Natural Heritage can be found on page 4 of this package.

7. HISTORIC RESOURCES INFORMATION

Note: Historic properties include but are not limited to archeological sites, battlefields, Civil War earthworks, graveyards, buildings, bridges, canals, etc. Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the USACE from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the USACE, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant.

Are any historic properties located within or adjacent to the project site? ☒ Yes ☐ No ☐ Uncertain
 If Yes, please provide a map showing the location of the historic property within or adjacent to the project site.

Are there any buildings or structures 50 years old or older located on the project site? ☐ Yes ☒ No ☐ Uncertain
 If Yes, please provide a map showing the location of these buildings or structures on the project site.

Is your project located within a historic district? ☐ Yes ☒ No ☐ Uncertain

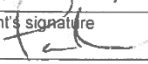
If Yes, please indicate which district: _____

7. HISTORIC RESOURCES INFORMATION (Continued)	
Has a survey to locate archeological sites and/or historic structures been carried out on the property? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Uncertain	
If Yes, please provide the following information: Date of Survey: <u>November 2003 and June/July 2010</u>	
Name of firm: <u>URS Group and EG&G Technical Services</u>	
Is there a report on file with the Virginia Department of Historic Resources? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Uncertain	
Title of Cultural Resources Management (CRM) report: <u>Cultural Resources Assessment of Wallops Flight Facility</u>	
Was any historic property located? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Uncertain	

8. WETLANDS, WATERS, AND DUNES/BEACHES IMPACT INFORMATION					
Report each impact site in a separate column. If needed, attach additional sheets using a similar table format. Please ensure that the associated project drawings clearly depict the location and footprint of each numbered impact site. For dredging, mining, and excavating projects, use Section 17.					
	Impact site number 1	Impact site number 2	Impact site number 3	Impact site number 4	Impact site number 5
Impact description (use all that apply): F=fill EX=excavation S=Structure T=tidal NT=non-tidal TE=temporary PE=permanent PR=perennial IN=intermittent SB=subaqueous bottom DB=dune/beach IS=hydrologically isolated V=vegetated NV=non-vegetated MC=Mechanized Clearing of PFO (Example: F, NT, PE, V)	F, T, PE, SB, DB, NV	S, T, PE, SB, NV			
Latitude / Longitude (in decimal degrees)	37-50-45/75-28-29	37-50-45/75-28-29			
Wetland/waters impact area (square feet / acres)	6,073,039/139.42	71,820/1.64			
Dune/beach impact area (square feet)	3,941.296/90.48	0			
Stream dimensions at impact site (length and average width in linear feet, and area in square feet)	NA	NA			
Volume of fill below Mean High Water or Ordinary High Water (cubic yards)	858,426	23,940			

8. WETLANDS/WATERS IMPACT INFORMATION (Continued)					
Cowardin classification of impacted wetland/water or geomorphological classification of stream <i>Example wetland: PFO; Example stream: 'C' channel and if tidal, whether vegetated or non-vegetated wetlands per Section 28.2-1300 of the Code of Virginia</i>	Marine, Intertidal/ Subtidal, Rock	Marine, Intertidal/ Subtidal, Rock			
Average stream flow at site (flow rate under normal rainfall conditions in cubic feet per second) and method of deriving it (gage, estimate, etc.)	NA	NA			
Contributing drainage area in acres or square miles (VMRC cannot complete review without this information)	NA	NA			
DEQ classification of impacted resource(s): Estuarine Class II Non-tidal waters Class III Mountainous zone waters Class IV Stockable trout waters Class V Natural trout waters Class VI Wetlands Class VII http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC25-260-50	Class I Open Ocean	Class I Open Ocean			
For DEQ permitting purposes, also submit as part of this section a wetland and waters boundary delineation map – see (3) in the Footnotes section in the form instructions.					
For DEQ permitting purposes, also submit as part of this section a written disclosure of all wetlands, open water, or streams that are located within the proposed project or compensation areas that are also under a deed restriction, conservation easement, restrictive covenant, or other land-use protective instrument.					

9. APPLICANT, AGENT, PROPERTY OWNER, AND CONTRACTOR CERTIFICATIONS
READ ALL OF THE FOLLOWING CAREFULLY BEFORE SIGNING
PRIVACY ACT STATEMENT: The Department of the Army permit program is authorized by Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, and Section 103 of the Marine Protection Research and Sanctuaries Act of 1972. These laws require that individuals obtain permits that authorize structures and work in or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters prior to undertaking the activity. Information provided in the Joint Permit Application will be used in the permit review process and is a matter of public record once the application is filed. Disclosure of the requested information is voluntary, but it may not be possible to evaluate the permit application or to issue a permit if the information requested is not provided.
CERTIFICATION: I am hereby applying for permits typically issued by the DEQ, VMRC, USACE, and/or Local Wetlands Boards for the activities I have described herein. I agree to allow the duly authorized representatives of any regulatory or advisory agency to enter upon the premises of the project site at reasonable times to inspect and photograph site conditions, both in reviewing a proposal to issue a permit and after permit issuance to determine compliance with the permit.
In addition, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

9. APPLICANT, AGENT, PROPERTY OWNER, AND CONTRACTOR CERTIFICATIONS (Continued)		
Is/Are the Applicant(s) and Owner(s) the same? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Legal name & title of Applicant Paul Bull, PE NASA Project Manager	Second applicant's legal name & title, if applicable	
Applicant's signature 	Second applicant's signature	
Date 10/04/18	Date	
Property owner's legal name, if different from Applicant	Second property owner's legal name, if applicable	
Property owner's signature, if different from Applicant	Second property owner's signature	
Date	Date	
CERTIFICATION OF AUTHORIZATION TO ALLOW AGENT(S) TO ACT ON APPLICANT'S(S)' BEHALF (IF APPLICABLE)		
I (we), _____ (and) _____ APPLICANT'S LEGAL NAME(S) – complete the second blank if more than one Applicant hereby certify that I (we) have authorized _____ (and) _____ AGENT'S NAME(S) – complete the second blank if more than one Agent to act on my (our) behalf and take all actions necessary to the processing, issuance, and acceptance of this permit and any and all standard and special conditions attached. I (we) hereby certify that the information submitted in this application is true and accurate to the best of my (our) knowledge.		
Applicant's signature	Second applicant's signature, if applicable	
Date	Date	
Agent's signature and title	Second agent's signature and title, if applicable	
Date	Date	
CONTRACTOR ACKNOWLEDGEMENT (IF APPLICABLE)		
I (we), _____ (and) _____ APPLICANT'S LEGAL NAME(S) – complete the second blank if more than one Applicant have contracted _____ (and) _____ CONTRACTOR'S NAME(S) – complete the second blank if more than one Contractor to perform the work described in this Joint Permit Application, signed and dated _____ I (we) will read and abide by all conditions as set forth in all federal, state, and local permits as required for this project. I (we) understand that failure to follow the conditions of the permits may constitute a violation of applicable federal, state, and local statutes and that we will be liable for any civil and/or criminal penalties imposed by these statutes. In addition, I (we) agree to make available a copy of any permit to any regulatory representative visiting the project site to ensure permit compliance. If I (we) fail to provide the applicable permit upon request, I (we) understand that the representative will have the option of stopping our operation until it has been determined that we have a properly signed and executed permit and are in full compliance with all of the terms and conditions.		
Contractor's name or name of firm (printed/typed)	Contractor's or firm's mailing address	
Contractor's signature and title	Contractor's license number	Date
Applicant's signature	Second applicant's signature, if applicable	
Date	Date	

13. FREE STANDING MOORING PILES, OSPREY NESTING POLES, MOORING BUOYS, AND DOLPHINS (not associated with piers)				
Number of vessels to be moored: _____		Type and number of mooring(s) proposed: _____		
In the spaces provided below, give the type (e.g., sail, power, skiff, etc.), size, and registration number of the vessel(s) to be moored				
TYPE	LENGTH	WIDTH	DRAFT	REGISTRATION #
Give the name and complete mailing address(es) of the owner(s) of the vessel(s) if not owned by applicant (attach extra sheets if needed):				
Do you plan to reach the mooring from your own upland property? <input type="checkbox"/> Yes <input type="checkbox"/> No If "no," explain how you intend to access the mooring.				

14. BOAT RAMPS	
Will excavation be required to construct the boat ramp? <input type="checkbox"/> Yes <input type="checkbox"/> No. If "yes," will any of the excavation occur below the plane of the ordinary high water mark/mean high water line or in wetlands? <input type="checkbox"/> Yes <input type="checkbox"/> No. If "yes," you will need to fill out Section 17 for this excavation. Where will you dispose of the excavated material? _____	
What type of design and materials will be used to construct the ramp (open pile design with salt treated lumber, concrete slab on gravel bedding, etc.)?	
Location of nearest public boat ramp	Driving distance to that public ramp _____ miles
Will other structures be constructed concurrent with the boat ramp installation? <input type="checkbox"/> Yes <input type="checkbox"/> No If "yes," please fill out the appropriate sections of this application associated with those other activities.	

15. TIDAL/NONTIDAL SHORELINE STABILIZATION STRUCTURES (INCLUDING BULKHEADS AND ASSOCIATED BACKFILL, RIPRAP REVETMENTS AND ASSOCIATED BACKFILL, MARSH TOE STABILIZATION, GROINS, JETTIES, AND BREAKWATERS, ETC.)	
<small>Information on non-structural, vegetative alternatives (i.e., Living Shoreline) for shoreline stabilization is available at http://ccrm.vims.edu/coastal_zone/living_shorelines/index.html.</small>	
Is any portion of the project maintenance or replacement of an existing and currently serviceable structure? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, give length of existing structure: _____ linear feet	
If your maintenance project entails replacement of a bulkhead, is it possible to construct the replacement bulkhead within 2 feet channelward of the existing bulkhead? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If not, please explain below:	
Length of proposed structure, including returns: _____ linear feet	

15. TIDAL/NONTIDAL SHORELINE STABILIZATION STRUCTURES (Continued)	
Average channelward encroachment of the structure from Mean high water/ordinary high water mark: <u>380</u> feet	Maximum channelward encroachment of the structure from Mean high water/ordinary high water mark: <u>759</u> feet
Mean low water: <u>334</u> feet	Mean low water: <u>668</u> feet
Maximum channelward encroachment from the back edge of the Dune <u>NA</u> feet	Maximum channelward encroachment from the back edge of the Beach <u>150</u> feet
Describe the type of construction including all materials to be used (including all fittings). Will filter cloth be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Cedar Mountain Stone	
What is the source of the backfill material? <u>Mitchells VA</u>	
What is the composition of the backfill material? <u>rock</u>	
If rock is to be used, give the average volume of material to be used for every linear foot of construction: <u>21</u> cubic yards What is the volume of material to be placed below the plane of ordinary high water mark/mean high water? <u>23,940</u> cubic yards	
For projects involving stone: Average weight of core material (bottom layers): <u>150-500 lbs</u> pounds per stone (Class <u>Type II</u>) Average weight of armor material (top layers): <u>1,500-4,000 lbs</u> pounds per stone (Class <u>Type I</u>)	
Are there similar shoreline stabilization structures in the vicinity of your project site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If so, describe the type(s) and location(s) of the structure(s): Existing seawalls onsite	
If you are building a groin or jetty, will the channelward end of the structure be marked to show a hazard to navigation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Has your project been reviewed by the Shoreline Erosion Advisory Service (SEAS)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please attach a copy of their comments.

16. BEACH NOURISHMENT	
Source of material and composition (percentage sand, silt, clay): <u>Wallops Island North End</u>	Volume of material: <u>1.3 million cubic yards</u> cubic yards
Area to be covered <u>4,845,675</u> square feet channelward of mean low water <u>5,187,136</u> square feet channelward of mean high water <u>4,824,482</u> square feet landward of mean low water <u>3,930,580</u> square feet <u>Landward</u> channelward of mean high water	
Mode of transportation of material to the project site (truck, pipeline, etc.): Truck	
Describe the type(s) of vegetation proposed for stabilization and the proposed planting plan, including schedule, spacing, monitoring, etc. Attach additional sheets if necessary. American Beach grass will be sprigged @ 18" on center each way (ocew) along the entire dune. The cultivar 'Cape' will be used. Plants will be installed between October 1 and March 31, during the appropriate time of year for dune planting. See permit drawings for a typical profile of the planing area.	

17. DREDGING, MINING, AND EXCAVATING								
FILL OUT THE FOLLOWING TABLE FOR DREDGING PROJECTS								
	NEW dredging				MAINTENANCE dredging			
	Hydraulic		Mechanical (clamshell, dragline, etc.)		Hydraulic		Mechanical (clamshell, dragline, etc.)	
	Cubic yards	Square feet	Cubic yards	Square feet	Cubic yards	Square feet	Cubic yards	Square feet
Vegetated wetlands			0.0	0.0				
Non-vegetated wetlands			37,515	1,350,573				
Subaqueous land			0.0	0.0				
Totals			37,515	1,350,573				
Is this a one-time dredging event? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If "no", how many dredging cycles are anticipated: _____ (____ initial cycle in cu. yds.) (____ subsequent cycles in cu. yds.)								
Composition of material (percentage sand, silt, clay, rock): Provide documentation (i.e., laboratory results or analytical reports) that dredged material from on-site areas is free of toxics. If not free of toxics, provide documentation of proper disposal (i.e., bill of lading from commercial supplier or disposal site). sand								
Please include a dredged material management plan that includes specifics on how the dredged material will be handled and retained to prevent its entry into surface waters or wetlands. If on-site dewatering is proposed, please include plan view and cross-sectional drawings of the dewatering area and associated outfall.								
Will the dredged material be used for any commercial purpose or beneficial use? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, please explain: Beach renourishment								
If this is a maintenance dredging project, what was the date that the dredging was last performed? _____ Permit number of original permit: _____ (It is important that you attach a copy of the original permit.)								
For mining projects: On separate sheets of paper, explain the operation plans, including: 1) the frequency (e.g., every six weeks), duration (i.e., April through September), and volume (in cubic yards) to be removed per operation; 2) the temporary storage and handling methods of mined material, including the dimensions of the containment berm used for upland disposal of dredged material and the need (or no need) for a liner or impermeable material to prevent the leaching of any identified contaminants into ground water; 3) how equipment will access the mine site; and 4) verification that dredging: a) will not occur in water body segments that are currently on the effective Section 303(d) Total Maximum Daily Load (TMDL) priority list (available at http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLDevelopment/TMDLProgramPriorities.aspx) or that have an approved TMDL; b) will not exacerbate any impairment; and c) will be consistent with any waste load allocation/limit/conditions imposed by an approved TMDL (see, "What's in my backyard" or subsequent spatial files at http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx to determine the extent of TMDL watersheds and impairment segments).								
Have you applied for a permit from the Virginia Department of Mines, Minerals and Energy? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes: Existing permit number: _____ Date permit issued: _____								
Contributing drainage area: na square miles					Average stream flow at site (flow rate under normal rainfall conditions): na cfs			

ATTACHMENT 1

PURPOSE AND NEED, ALTERNATIVES CONSIDERED AND DESCRIPTION OF PROJECT

The National Aeronautics and Space Administration (NASA) is proposing to enhance and restore the shoreline on Wallops Island. The Shoreline Enhancement and Restoration Project would reduce the potential for damage to, or loss of, NASA, United States (U.S.) Navy, and Virginia Commercial Spaceflight Authority's Mid-Atlantic Regional Spaceport (MARS) assets on Wallops Island from wave impacts associated with storm events.

Below is a summary of the purpose of and need for the project and the alternative considered for permitting in the project Environmental Assessment (EA). More detailed information is contained in the Final EA.

1.0 PURPOSE AND NEED FOR THE PROJECT

The purpose of the project is to restore the Wallops Island shoreline infrastructure protection area in order to reduce the potential for damage to, or loss of, NASA, U.S. Navy, and MARS assets on Wallops Island from wave impacts associated with storm events. The project is needed because the shoreline's beach berm and dune system, established to protect NASA's Wallops Island launch range infrastructure, has been eroded through storm wind and wave damage; therefore, the existing beach cannot provide the level of storm damage reduction for which it was originally designed. The constructed beach system has served its intended purpose of reducing damage to the range assets. However, a notable portion of subaerial (i.e., on land surface) sand has been relocated by storm winds and waves with a majority of this sand volume transported to the north end of Wallops Island. The effects of storms are most apparent within the southern half of Wallops Island, where many of the most critical launch assets are located. Within this area, referred to as the shoreline infrastructure protection area, the seaward half of the beach berm has been lowered by three feet or more. As such, the beach berm and dune system can no longer protect the area from storm damage reduction as it was originally intended and must be restored to regain full functionality.

2.0 BACKGROUND

Wallops Island has experienced shoreline changes throughout the six decades that NASA has occupied the site. Recent evaluations of the need to restore the Wallops shoreline and the possible impacts resulting therefrom include the Shoreline Restoration and Infrastructure Protection Program Programmatic Environmental Impact Statement (Shoreline Restoration and

Infrastructure Protection Program Programmatic Environmental Impact Statement, 2010) and the Post-Hurricane Sandy Shoreline Repair EA (Post-Hurricane Sandy Shoreline Repair EA, 2013). In 2012 and 2014, the infrastructure protection area was renourished using sand from offshore Unnamed Shoal A, located approximately seven miles east of Wallops Island.

Presently, the existing seawall in the shoreline infrastructure protection area is being undermined because there is little or no protective sand beach remaining and storm waves break directly on the rocks. Currently, the south end of the island is unprotected except for a low revetment around the MARS launch pad and temporary geotextile tubes that extend from the southern end of the existing seawall south to camera stand Z-100.

The potential risks to infrastructure from wave impacts (that will only be exacerbated by sea-level rise) are two-fold: first is the interruption of NASA, U.S. Navy, and MARS missions supported from Wallops Island facilities due to temporary loss of facility functions; and second is the potential for physical damage to or loss of these unique facilities. If no protective measures are taken, the assets on Wallops Island will be increasingly at risk from even moderate storm events.

The U.S. Army Corps of Engineers (USACE) prepared a breakwater analysis, design and modeling report for NASA to assess possible hardscape solutions to address the erosion problems along the shoreline infrastructure protection area of Wallops Island (USACE 2018-attached). The analysis included numerical modeling to determine the appropriate size and placement of a detached offshore breakwater or a series of detached breakwaters. Seven alternatives were evaluated and the recommendation was to construct two, series of three detached breakwaters to reduce the effects of erosion of the Wallops Island beach nourishment effort.

3.0 PROJECT DESCRIPTION

NASA has prepared an EA, which considers a range of alternatives that meet the purpose and need of restoring and enhancing the shoreline in the infrastructure protection area. The following alternatives are being proposed in this permit application and details are provided below.

1. Restoring the beach using sand from the north Wallops Island beach, where sand eroded from the south has accreted. This would involve removing sand using a pan excavator and trucking it to the shoreline infrastructure protection area where it would be spread using heavy equipment.
2. Building a series of six parallel offshore breakwaters.

3.1 Excavation

NASA would place an estimated 1.3 million cubic yards of sand along approximately 19,850 feet of shoreline in the infrastructure protection area. The beachfill material would come from the north Wallops Island beach, an area where sand is accreting due to longshore transport from the south.

A pan excavator would be used to remove sand from approximately 200 acres north Wallops Island beach to the mean low water line. The average excavation depth is 2.35 feet. Sand would be stockpiled and then loaded onto dump trucks for transport on existing roads to the southern end of the island. Bulldozers would be used to spread the fill material once it is placed on the beach. All heavy equipment would access the beach from existing roads and established access points. No new temporary or permanent roads would be constructed to access the beach or to transport the fill material to renourishment areas.

The beach fill would start approximately 1,500 feet north of the Wallops Island-Assawoman Island property boundary and extend north for approximately 3.7 miles. The initial fill would be placed so that there would be a 6-foot-high berm extending a minimum of 70 feet seaward of the existing seawall. The remainder of the fill would slope seaward; the amount of that distance would vary along the length of the beach fill.

3.2 Breakwaters

Six rubble mound breakwaters will be constructed in two sets of three each approximately 200 feet offshore from the mean high water line of the renourished beach in the shoreline infrastructure protection area. Each breakwater would be constructed of Virginia Department of Transportation Type I armor stone for the outer layer (which ranges from 0.75 to 2 tons) and Class II Stone for the core layer (which ranges from 150 to 499 pounds). All stone would be placed parallel to the shore and would measure approximately 130 feet long and 10 feet wide at top crest elevation. The breakwaters would be placed approximately 100 feet apart from each other. Water depths in these areas is approximately 4 to 8 feet. The southernmost set of three breakwaters will be constructed approximated 4000 feet north of the southern extent of beach nourishment. The second set of three breakwaters will be constructed approximately 10,000 feet north of the southern extent of beach nourishment. The rocks for constructing each breakwater would be transported to the Wallops Flight Facility area by rail, offloaded, and then trucked to the handling or placement site on Wallops Island. The stone would then be loaded onto barges and placed using heavy lifting equipment.

The tables below depict the areas impacted from various parts of the project. Table 3-1 provides a summary of impact types from placement of beachfill along the shoreline, Table 3-2 provides a summary of the impacts of the excavation of the sand north Wallops Island beach and Table 3-3 provides a summary of impact types from construction of the breakwaters.

Table 3-1. Areas affected by beach fill placement

Impact Location	Area (acres)	Volume (cubic yards)
Vegetated Wetland	0.0	0.0
Un-vegetated Wetland	0.0	0.0
MHW Seaward	139.4	858,426
MLW Seaward	111.2	742,815
MHW Landward	90.4	441,574
MLW Landward	118.6	557,185

Table 3-2. Areas affected by sand excavation on the north Wallops Island beach

Impact Location	Area (acres)	Volume (cubic yards)
Vegetated Wetland	0.0	0.0
Un-vegetated Wetland	0.0	0.0
MHW Seaward	31.0	37,515
MLW Seaward	0.0	0.0
MHW Landward	90.4	441,574
MLW Landward	405	1,300,000

Table 3-3. Areas affected by breakwater construction

Impact Location	Area (acres)	Volume (cubic yards)
Vegetated Wetland	0.0	0.0
Un-vegetated Wetland	0.0	0.0
MHW Seaward	1.64	23,940
MLW Seaward	1.64	23,940
MHW Landward	0.0	0.0
MLW Landward	0.0	0.0

4.0 SECTION 7 CONSULTATIONS

On March 20, 2013, U.S. Fish and Wildlife Service (USFWS) responded that the impacts resulting from the beach renourishment proposed by the *2013 Post-Hurricane Sandy EA* would be within that already considered in its July 30, 2010 Programmatic Biological Opinion (BO). USFWS also submitted a newer consolidated BO in June 2016 to replace and consolidate

opinions and terms for ongoing operations at Wallops Flight Facility that included a 2-7 year cycle for beach renourishment.

In developing the BOs, National Marine Fisheries Service (NMFS) and USFWS provided mandatory terms and conditions that NASA must follow to reduce potential effects to listed species. As such, NASA and USACE would ensure that their contractors implemented these measures on their behalf. NASA re-initiated informal consultation with NMFS and USFWS in 2018. The results of this informal consultation will be provided, once complete.

5.0 MITIGATION AND MONITORING

Well before NASA's presence on Wallops Island in the mid-1940s, the project site has been in a state of constant change. Accordingly, much of the project site is now open ocean with the normal tidal range falling along the existing seawall. Construction of the project would restore the Wallops Island beach to pre-Hurricane Sandy condition.

NASA is adopting all mitigation and monitoring components identified in Chapter 5 of the Final EA, and additional detail can be found there. Consistent with the overall Shoreline Erosion Restoration Program, it is expected that the mitigation plan will be adjusted based on monitoring results and effectiveness of the measures.

5.1 Water Quality

Onshore, NASA will implement erosion and sediment control Best Management Practices (BMPs) to minimize adverse effects on adjacent water bodies. All BMPs will be designed and installed in accordance with the latest version of the Virginia Erosion and Sediment Control Handbook.

For both onshore and offshore operations, spill prevention BMPs will be implemented to reduce potential impacts on soils and sediments during seawall construction, and all work would be performed in accordance with the most current version of Wallops Flight Facility's Integrated Contingency Plan. Prior to starting work, the contractor will be required to submit an Environmental Protection Plan which will outline all measures that will be employed during onshore and offshore construction activities to minimize adverse environmental impacts.

5.2 Shoreline Change

As funding allows, NASA will initiate a shoreline monitoring program to evaluate the performance of performance of the breakwaters and beach fill and identify the need for future beach renourishment. The monitoring program will consist of subaerial beach cross-section

surveys, subaqueous beach profile surveys, aerial photographs, and storm data summaries, beginning before construction. The program will compare the post-construction data with the pre-construction data and evaluate the performance of the project.

5.3 Revegetation

American beach grass (*Ammophila breviligulata*, cultivar “Cape”) will be planted at 18 inches intervals over the re-established dune. Plants will be installed between October 1 and March 31. The planting area will be approximately 150 feet wide along the entire length of the newly created dune in the beach nourishment area. See permit drawings for a typical profile of the planting area (100% Design Plans and specifications, USACE 2018-attached).

5.4 Munitions and Explosives of Concern

NASA will provide all construction personnel a Munitions and Explosives of Concern (MEC) awareness briefing prior to beginning work. Additionally, informational signs would be posted conspicuously in areas of the jobsite most frequently visited by workers. If any MEC is identified along the Wallops shoreline, it would be reported to the Wallops Flight Facility Security Office and managed in accordance with Wallops Flight Facility’s established program. Any MEC discovered offshore would be immediately reported to the U.S. Coast Guard and Wallops Flight Facility personnel.

To minimize the risk of adverse impacts from MEC in the north Wallops Island beach, MEC Awareness and Avoidance Plans that address the potential hazards will be prepared. Visual and geophysical surveys of the area to locate MEC will be completed, as appropriate, and potential hazards removed prior to excavation.

5.5 Protected Species

Onshore

NASA has initiated consultation with the USFWS regarding potential effects on Endangered Species Act-listed birds and sea turtles that could be affected by the project. NASA and USFWS developed a number of mitigation measures to reduce the probability and intensity of potential effects. These include:

1. No work will be conducted in the borrow area at the north end of the island during the plover or turtle nesting season April to September. NASA would employ a biological monitor to survey the project site on a daily basis should work occur between the months of April and September.

2. NASA will educate all personnel working in the construction area on recognizing protected species and their likely habitat so that appropriate avoidance and minimization measures can be incorporated into activities.
3. Wallops Flight Facility administers a Protected Species Monitoring Program for a number of protected species that are likely to occur at Wallops Island including: seabeach amaranth, red knot, piping plover, American oystercatcher, and sea turtles.
4. Annually between March and September, NASA regularly surveys the Wallops Island beach for piping plover, red knot, and sea turtle activity as a component of its Natural Resources Management Program. Any nests discovered are identified with signage. Program staff provide outreach to beach users, including security staff and recreational users.

Offshore

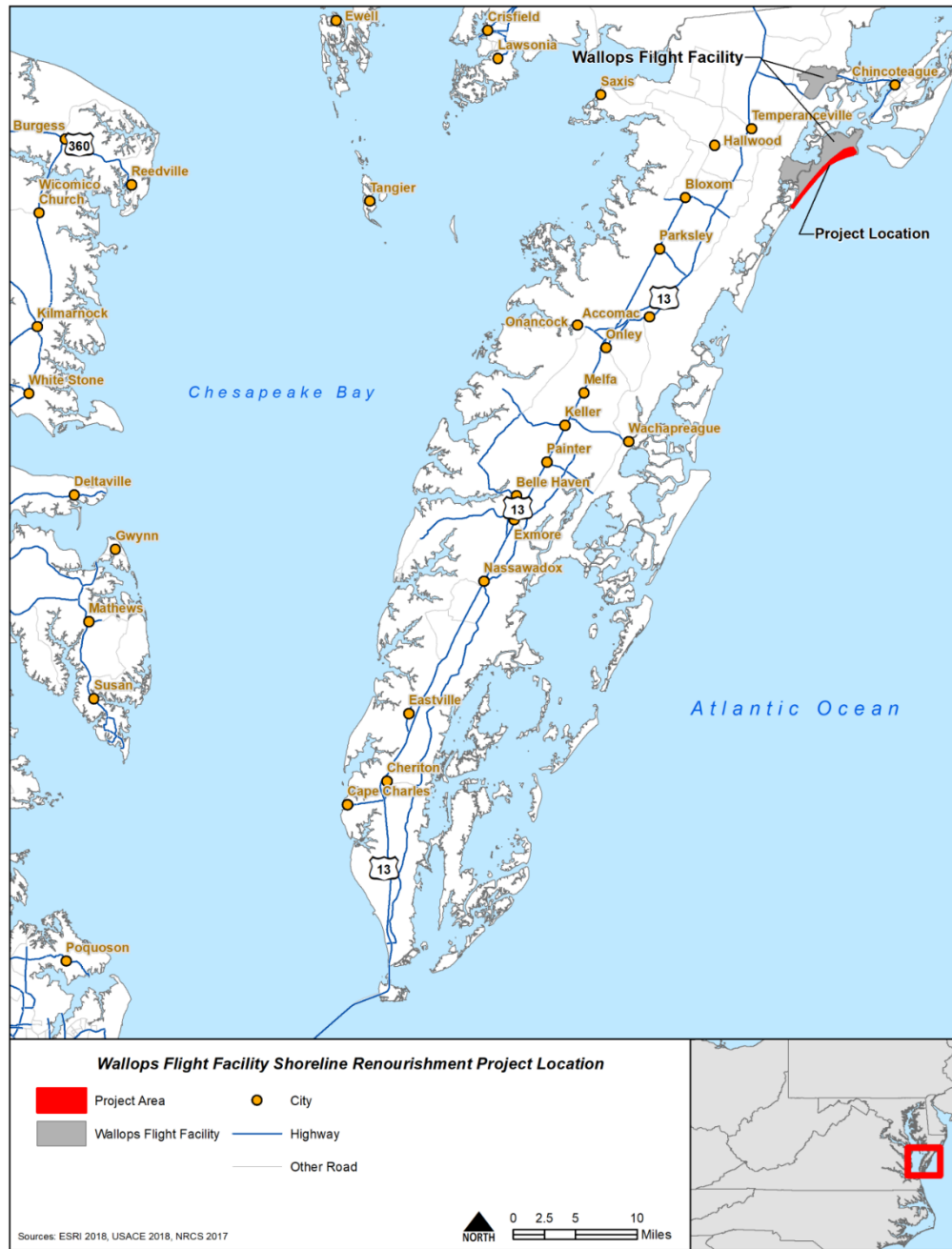
NASA has initiated consultation with NMFS regarding potential effects of the project on listed marine mammals, fish and in-water sea turtles. NASA will implement the any mitigation measures identified during the consultation to minimize impacts to protected species.

5.6 Essential Fish Habitat

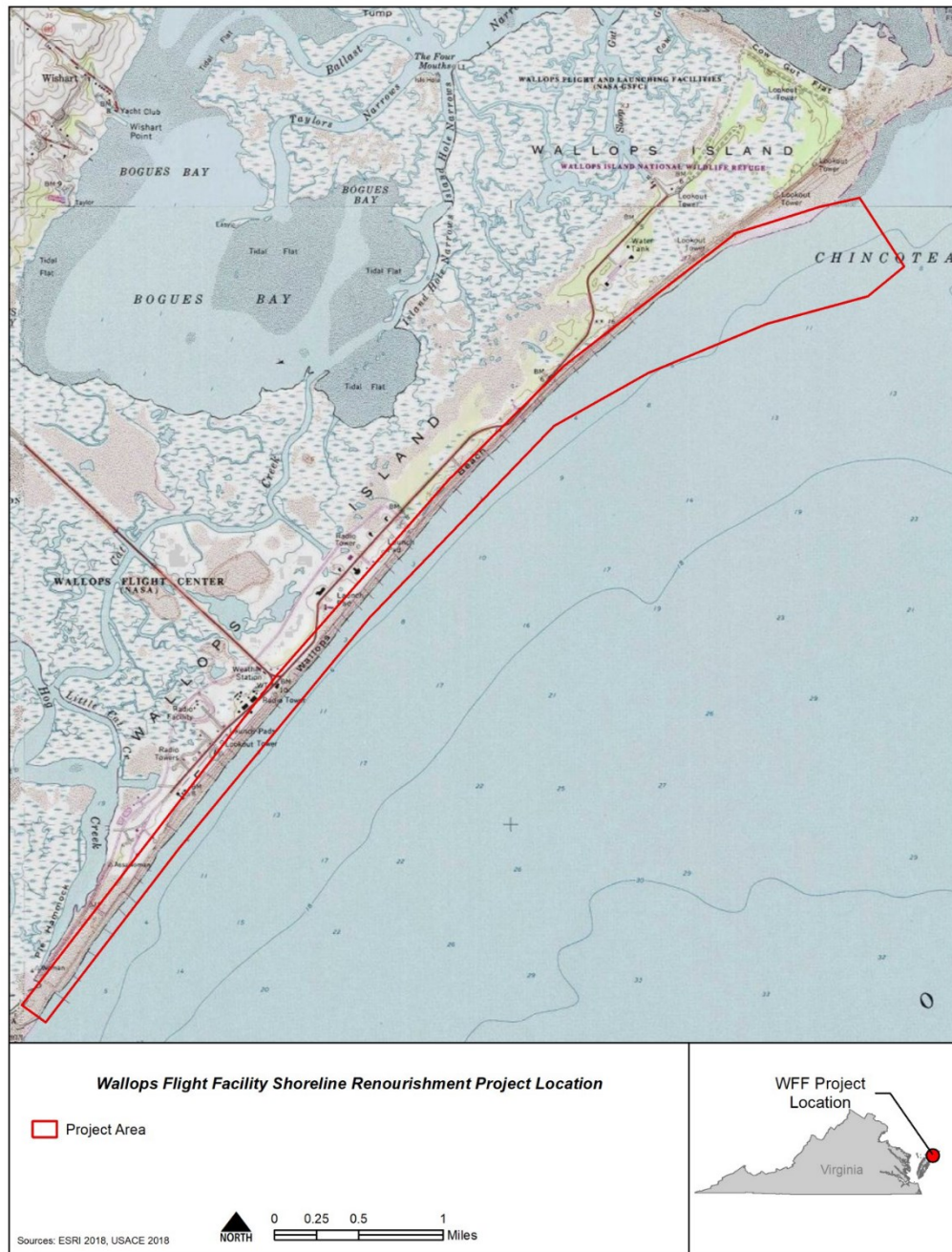
NASA has prepared an Essential Fish Habitat Assessment and is consulting with NMFS Habitat Conservation Division to identify any necessary mitigation measures. Any measures identified will be added as soon as the coordination with the agencies is concluded.

5.7 Cultural Resources

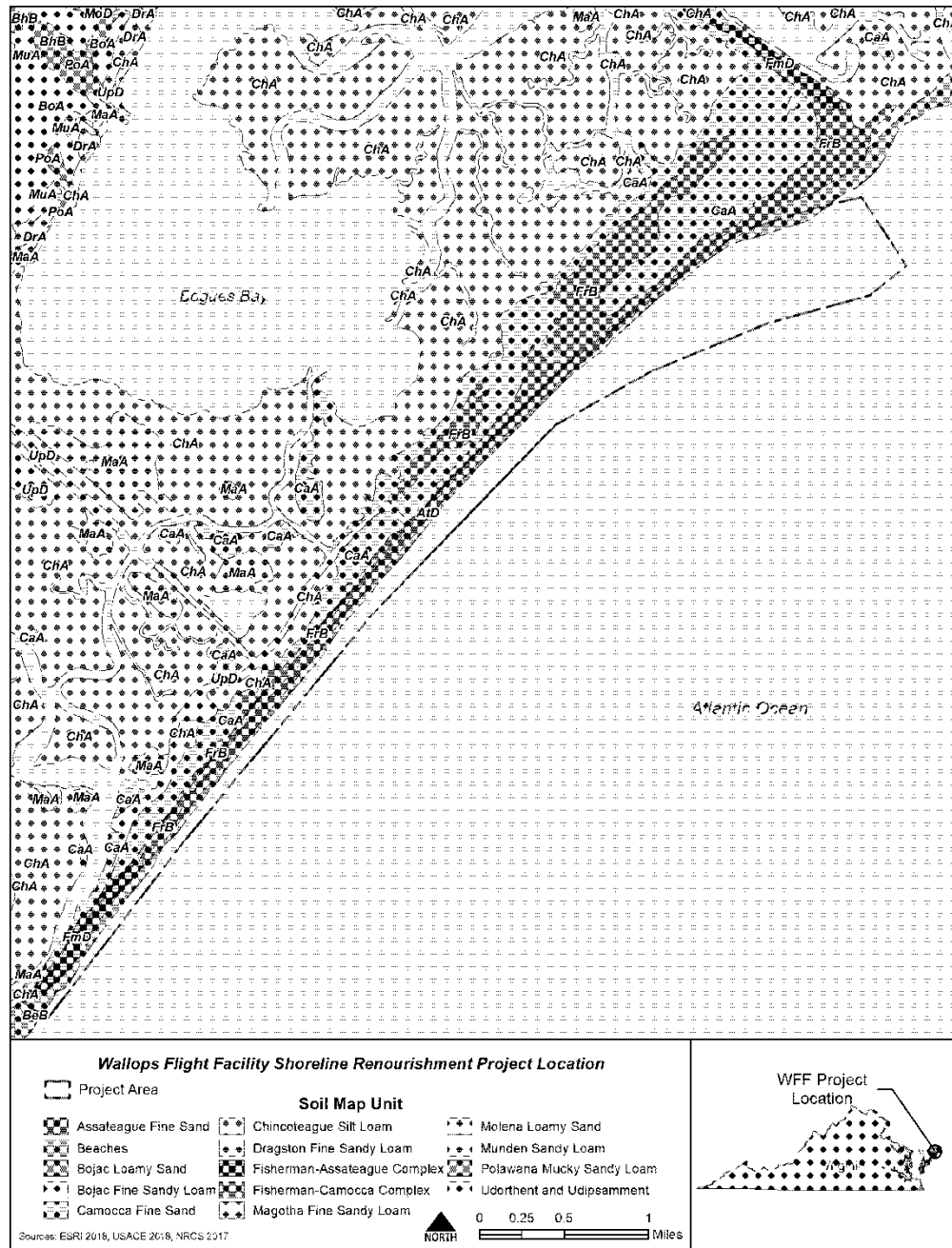
NASA has consulted with Virginia Department of Historic Resources (VDHR) regarding the beach nourishment and the breakwater construction and received a concurrence email dated August 14, 2018 (VDHR Concurrence 2018-attached). The inadvertent discovery of any previously unidentified archaeological resources would result in immediate cessation of work and notification of the Wallops Flight Facility Cultural Resources Manager.



NASA WFF Shoreline Enhancement & Restoration Project 1 of 18



NASA WFF Shoreline Enhancement & Restoration Project 2 of 18



NASA WFF Shoreline Enhancement & Restoration Project 3 of 18



NASA WFF Shoreline Enhancement & Restoration Project 4 of 18



NASA WFF Shoreline Enhancement & Restoration Project 5 of 18



NASA WFF Shoreline Enhancement & Restoration Project 6 of 18



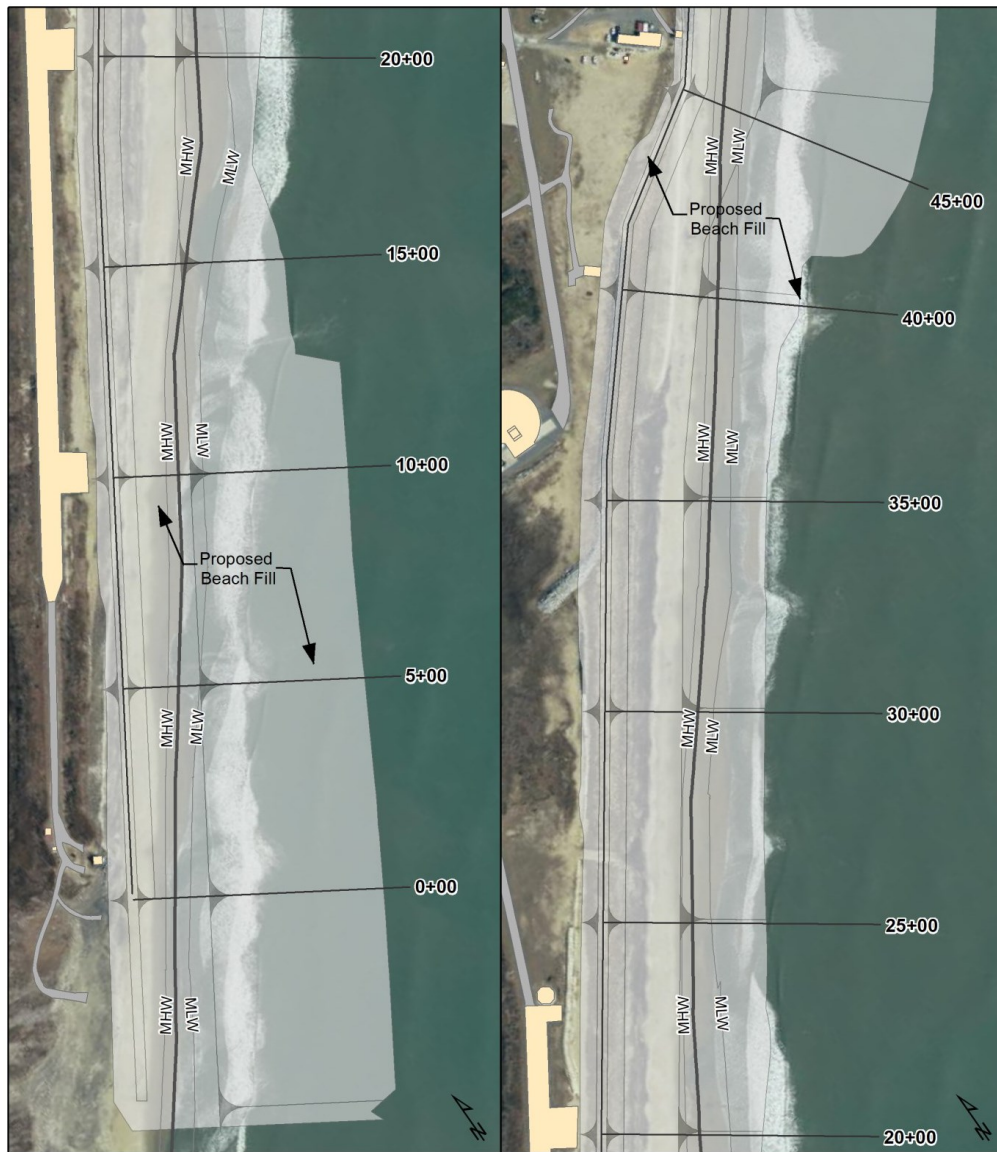
NASA WFF Shoreline Enhancement & Restoration Project 7 of 18



NASA WFF Shoreline Enhancement & Restoration Project 8 of 18



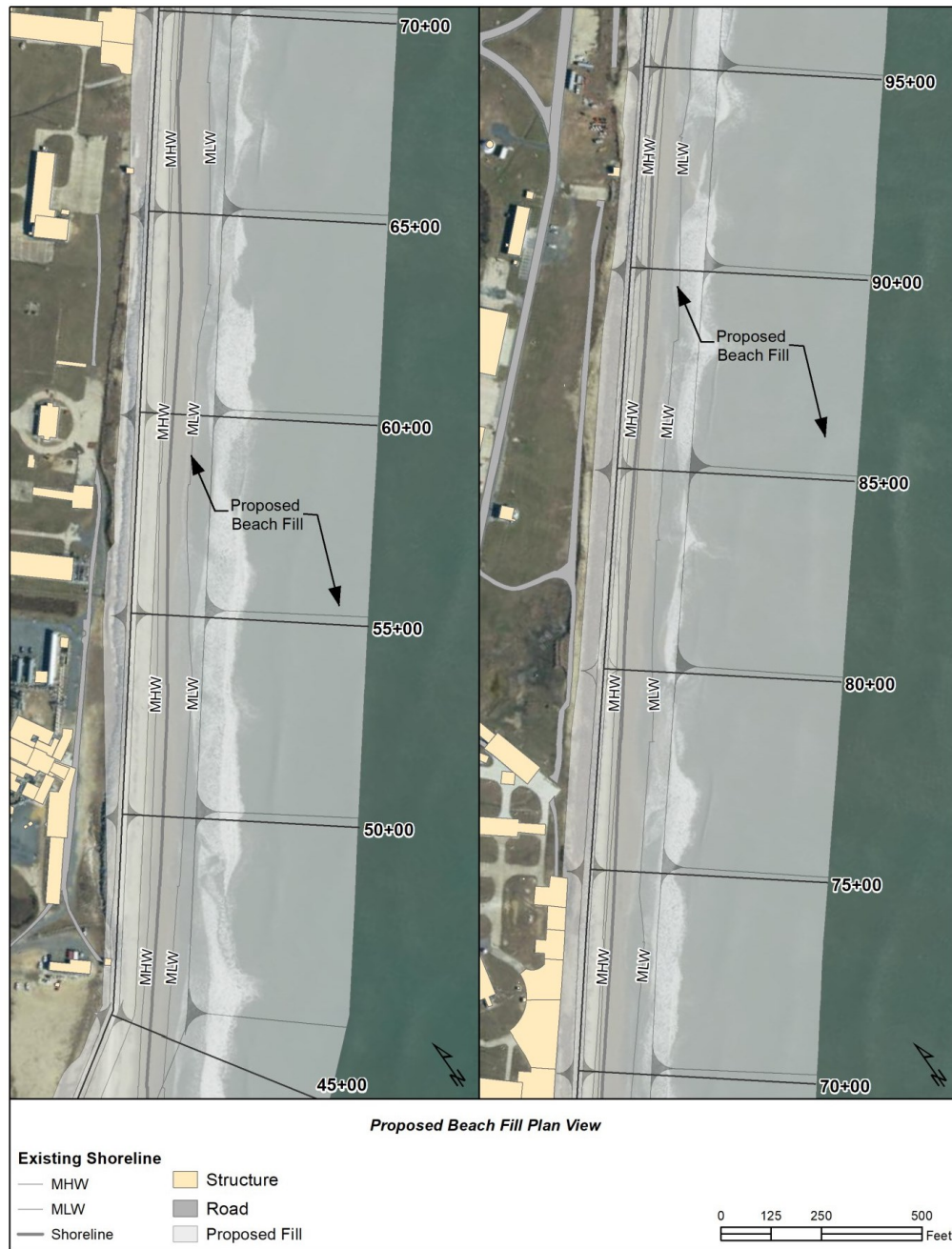
NASA WFF Shoreline Enhancement & Restoration Project 9 of 18



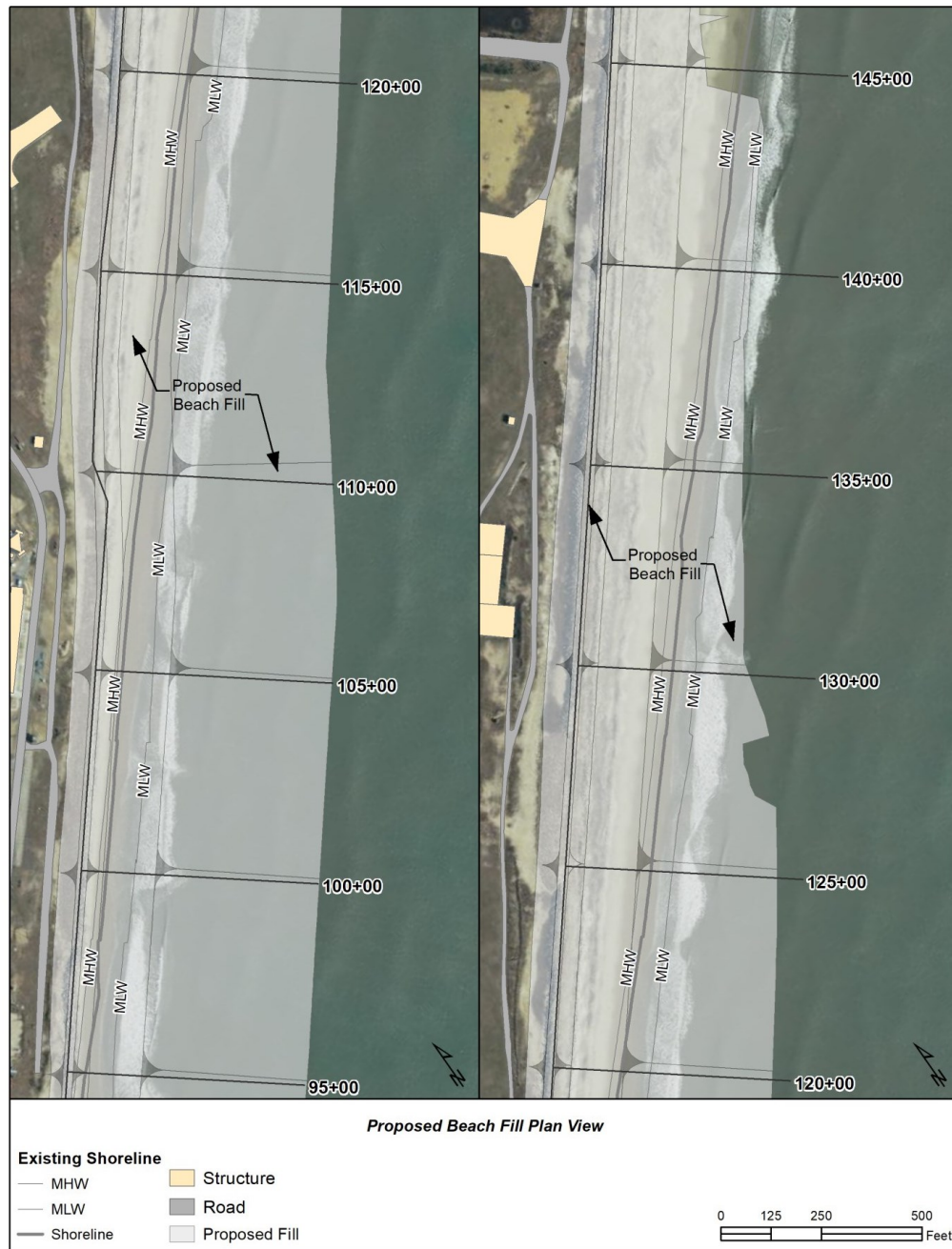
Proposed Beach Fill Plan View

Existing Shoreline
 — MHW
 — MLW
 — Shoreline
 Structure
 Road
 Proposed Fill

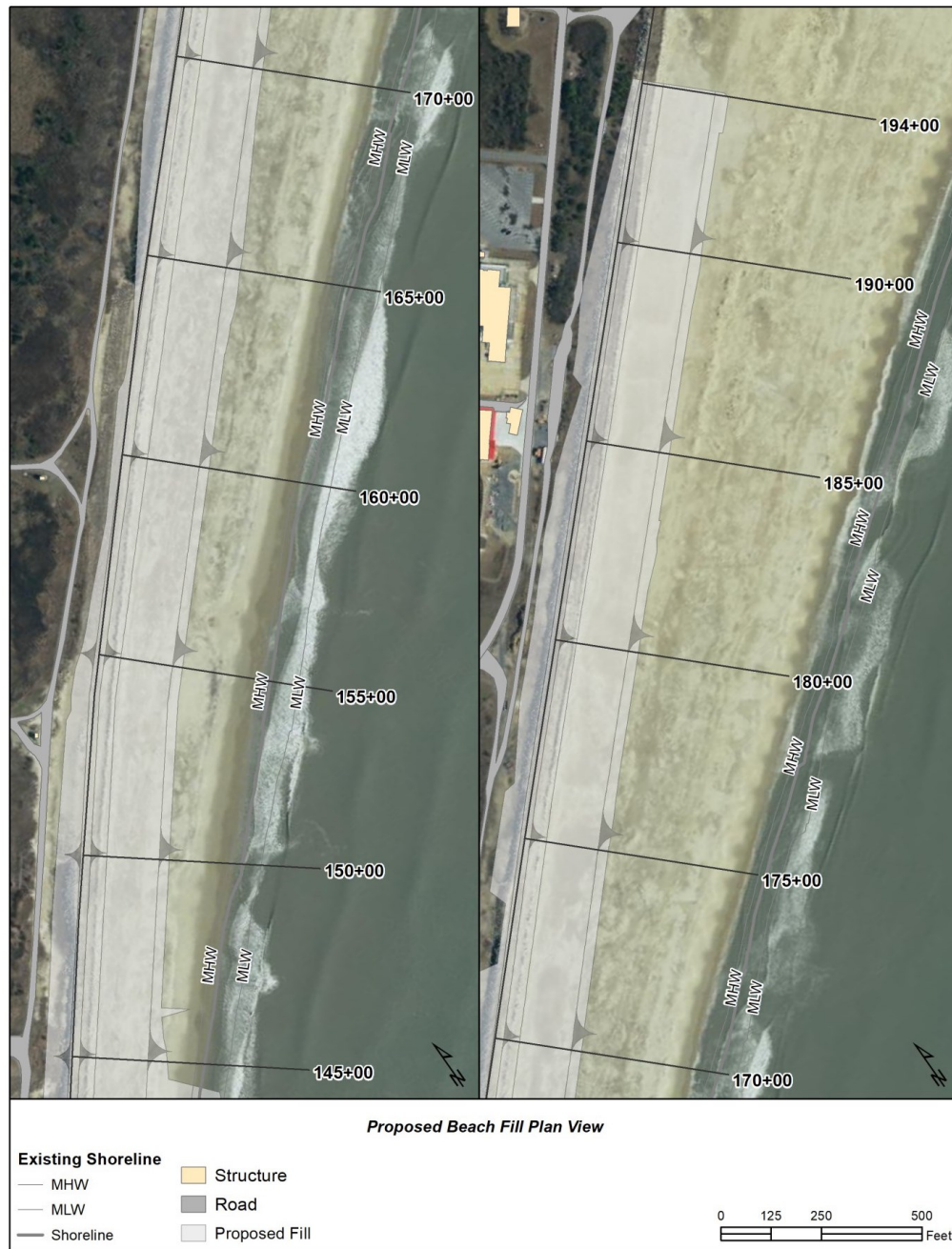
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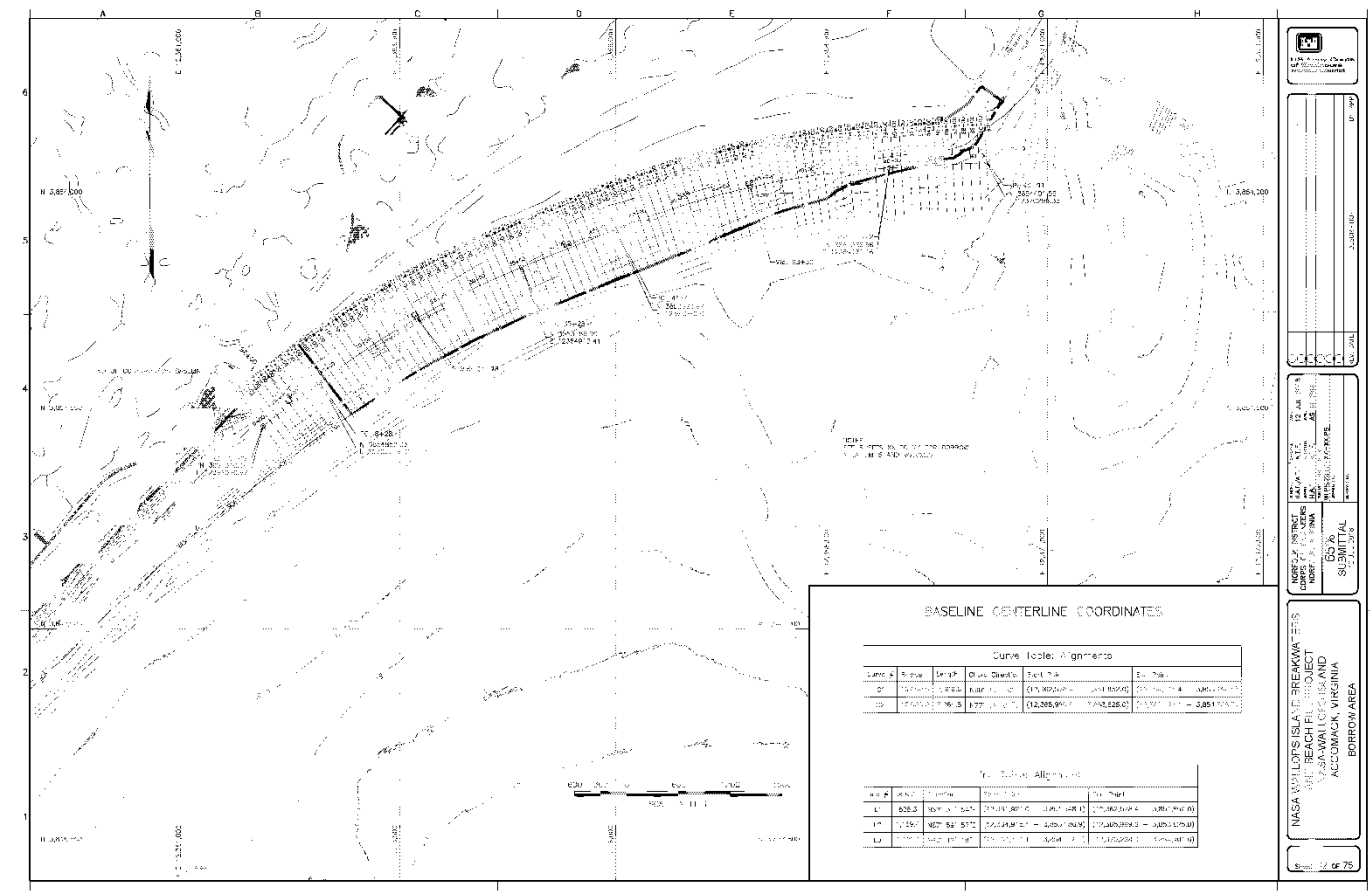
NASA WFF Shoreline Enhancement & Restoration Project 11 of 18



NASA WFF Shoreline Enhancement & Restoration Project 12 of 18



NASA WFF Shoreline Enhancement & Restoration Project 13 of 18



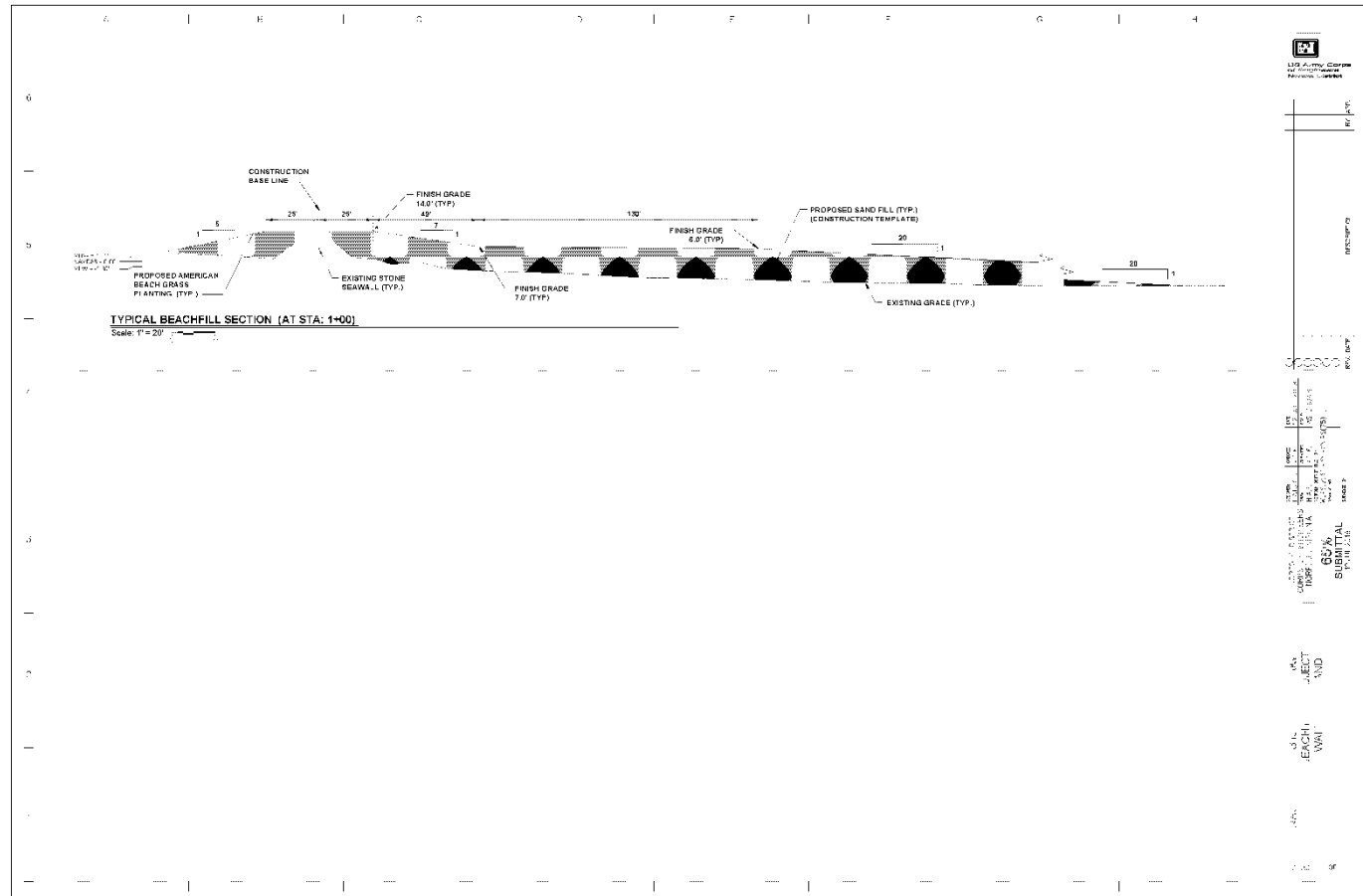
NASA WFF Shoreline Enhancement & Restoration Project 14 of 18



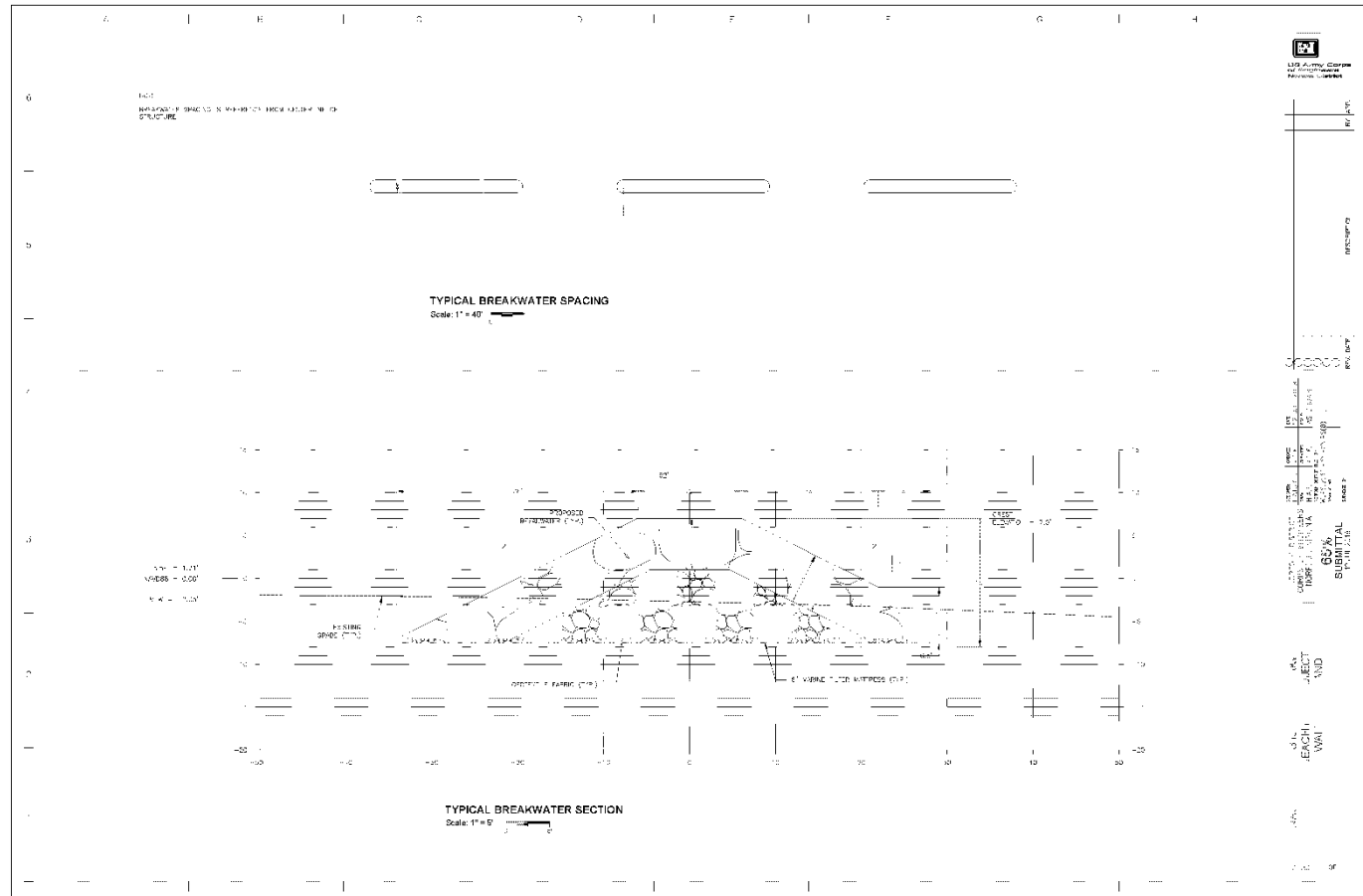
NASA WFF Shoreline Enhancement & Restoration Project 15 of 18



NASA WFF Shoreline Enhancement & Restoration Project 16 of 18



NASA WFF Shoreline Enhancement & Restoration Project 17 of 18



NASA WFF Shoreline Enhancement & Restoration Project 18 of 18



NASA Wallops SERP Joint Permit Application Pre-Application Meeting Summary

1. Meeting Logistics and Materials

- Location: WFF Building F-160 Conference Room and via Telecon (1-844-467-6272; 109753#)
- Date: September 24, 2018
- Time: 10:00 am – 2:00 pm
- Materials: PDF slide presentation

2. Attendees

Shari Miller, NASA Wallops Flight Facility
Joe Mitchell, NASA WFF Environmental
John Saecker, NASA WFF
TJ Meyer, NASA WFF Medical and Environmental Division
Brian Denson, US Army Corps of Engineers, Regulatory (phone)
Alicia Farrow, USACE, Engineering (phone)
Megan Wood, USACE, NEPA (phone)
Doug Platowski, BOEM (phone)
Hank Badger, VMRC
Dave O'Brien, NOAA
Lyle Varnell, VIMS
Chris Guvernater, Accomack County
John Lowenthal, Cardno
Liz Burak, Cardno

3. Meeting Discussion

USACE - Alicia and Brian had to leave the call at 10:30 so the presentation started with giving Brian some background providing input on permit type and processing schedule: Project exceeds the permit parameters (exceeding one acre of fill) for Regional Permit (RP19) and the project would require an individual permit.

- Noted that documentation of completed consultations with VDHR (SHPO), USFWS, NMFS would be required part of the package
- A public notice would be issued 15 days after receipt of the JPA, and agree to issuing a final permit by February 2019.
- Dune grass planting as part of the project design, the project would be self-mitigating and that it's unlikely that additional mitigations would be required.
- Removal of sand below MHW would be considered dredging

VMRC - Hank then provided his comments and questions which included:

- Concerns/Questions: whether removal of the material at the north end would increase erosion at the north end; effect of removing sand from a functioning primary dune
- Project may be exempt from Coastal Zone permitting, depending on whether or not adjacent properties are affected. VIMS will provide advise VMRC.
- The next VMRC meeting where it is possible this project could be presented is in mid-December, next meeting is in January



NASA Wallops SERP Joint Permit Application Pre-Application Meeting Summary

- If project is protested, it will have to go, to the commission, potentially as a “page 1” agenda item (requiring a presentation) or possibly as a “page 2” agenda item, which requires no formal presentation to the commission.

VIMS - Lyle provided comments and questions including:

- request any available data and reporting (NASA/Cardno provide Breakwater Modeling Report, Specifications/Plans, Spring and Fall Monitoring Reports and a summary of modeling on recover and erosion in/around borrow area.)
- Stated that he will not recommend not using breakwaters, his concern is the movement of sand

NOAA/NMFS - Dave asked for a copy of the EFH study and reiterated some of the concerns voiced by Hank and Lyle. Dave also asked for the planting plan to be included in the JPA.

4. Tour of Wallops Island

Shari Miller, John Saeker and Joe Mitchell provided the group a tour of the project area.

5. Action Items/After Action

1. Shari will provide Dave O'Brien the Essential Fish Habitat Assessment
2. Shari will request from Alicia: recovery time for the north Wallops Island beach, impacts downstream to Assawoman Island.
3. John Lowenthal - include planting information in the JPA.
4. The JPA will include:
 - the application and narrative description,
 - agency coordination and consultation documentation (VDHR, USFWS, NMFS),
 - 100% plans/specifications,
 - first and last USACE seasonal monitoring reports,
 - USACE Breakwater Modeling Report provide the design plans,
5. VDEQ and Accomack County will be included in JPA distribution so that they can issue waivers.



COMMONWEALTH of VIRGINIA

Marine Resources Commission

Matthew J. Strickler
Secretary of Natural Resources

Building 96
380 Fenwick Road
Fort Monroe, VA 23651

Steven G. Bowman
Commissioner

May 15, 2019

National Aeronautics and Space Administration
Attn: Mr. Paul Bull
NASA Wallops Flight Facility
Building N-161, Code 228
Wallops Island, VA 23337

Re: VMRC #2018-1590

Dear Mr. Bull:

Enclosed is the Marine Resources Commission permit to install two (2) sets of three (3) approximately 130-foot long stone offshore breakwaters and place approximately 1.3 million cubic yards of sandy beach nourishment material landward of the breakwaters along approximately 19,850 feet of shoreline, situated along the Atlantic Ocean on and adjacent to Wallops Island. The sandy material will be mined from the north end of Wallops Island where the original nourishment has accreted due to longshore transport.

A yellow placard is also enclosed. This placard reflects the authorized activities for inspection purposes and must be conspicuously displayed at the work site throughout the construction phase. Failure to properly post the placard in a prominent location will be considered a violation of your permit conditions.

YOU ARE REMINDED THAT ANY DEVIATION FROM THE PERMIT OR ATTACHED DRAWINGS REQUIRES PRIOR AUTHORIZATION FROM THE MARINE RESOURCES COMMISSION. FAILURE TO OBTAIN THE NECESSARY MODIFICATION WILL BE CONSIDERED A VIOLATION AND COULD SUBJECT YOU TO CIVIL CHARGES IN AMOUNTS NOT TO EXCEED \$10,000 PER VIOLATION.

The work authorized by this permit is to be completed by January 22, 2024. Please note that in conformance with Special Condition 17 of your permit you are to notify the Commission 15 days prior to commencement of your permitted project. The enclosed self-addressed, stamped, postcard is to be used for this purpose. All other conditions of the permit will remain in effect.

An Agency of the Natural Resources Secretariat

www.mrc.virginia.gov

Telephone (757) 247-2200 (757) 247-2292 V/TDD Information and Emergency Hotline 1-800-541-4646 V/TDD

National Aeronautics and Space Administration
Page Two

May 15, 2019
VMRC #2018-1590

Please be advised that you may also require issuance of a U. S. Army Corps of Engineers permit before you begin work on this project. You may wish to contact them directly to verify any permitting requirements.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Tony Watkinson', with a long horizontal flourish extending to the right.

Tony Watkinson
Chief, Habitat Management

TW/ghb:lra
HM
Enclosure
cc: Applicant

MRC 30-317

VMRC# 2018-1590
Applicant: National Aeronautics and Space Administration

**COMMONWEALTH OF VIRGINIA
MARINE RESOURCES COMMISSION
PERMIT**

The Commonwealth of Virginia, Marine Resources Commission, hereinafter referred to as the Commission, on this 22nd day of January 2019 hereby grants unto:

**National Aeronautics and Space Administration
Bldg N-161, Code 228
Wallops Island, VA 23337**

hereinafter referred to as the Permittee, permission to:

- ☒ Encroach in, on, or over State-owned subaqueous bottoms pursuant to Chapter 12, Subtitle III, of Title 28.2 of the Code of Virginia.
- ☐ Use or develop tidal wetlands pursuant to Chapter 13, Subtitle III, of Title 28.2 of the Code of Virginia.
- ☒ Use or develop coastal primary sand dunes and beaches pursuant to Chapter 14, Subtitle III, of Title 28.2. of the Code of Virginia.

Permittee is hereby authorized to install two (2) sets of three (3) approximately 130-foot long stone offshore breakwaters and place approximately 1.3 million cubic yards of sandy beach nourishment material landward of the breakwaters along approximately 19,850 feet of shoreline, situated along the Atlantic Ocean on and adjacent to Wallops Island. The sandy material will be mined from the north end of Wallops Island where the original nourishment has accreted due to longshore transport. All activities authorized herein shall be accomplished in conformance with the plans and drawings dated received October 9, 2018, which are attached and made a part of this permit.

This permit is granted subject to the following conditions:

- (1) The work authorized by this permit is to be completed by **January 22nd, 2024**. The Permittee shall notify the Commission when the project is completed. The completion date may be extended by the Commission in its discretion. Any such application for extension of time shall be in writing prior to the above completion date and shall specify the reason for such extension and the expected date of completion of construction. All other conditions remain in effect until revoked by the Commission or the General Assembly.
- (2) This permit grants no authority to the Permittee to encroach upon the property rights, including riparian rights, of others.
- (3) The duly authorized agents of the Commission shall have the right to enter upon the premises at reasonable times, for the purpose of inspecting the work being done pursuant to this permit.
- (4) The Permittee shall comply with the water quality standards as established by the Department of Environmental Quality, Water Division, and all other applicable laws, ordinances, rules and regulations affecting the conduct of the project. The granting of this permit shall not relieve the Permittee of the responsibility of obtaining any and all other permits or authority for the projects.
- (5) This permit shall not be transferred without written consent of the Commissioner.
- (6) This permit shall not affect or interfere with the right vouchsafed to the people of Virginia concerning fishing, fowling and the catching of and taking of oysters and other shellfish in and from the bottom of acres and waters not included within the terms of this permit.
- (7) The Permittee shall, to the greatest extent practicable, minimize the adverse effects of the project upon adjacent properties and wetlands and upon the natural resources of the Commonwealth.
- (8) This permit may be revoked at any time by the Commission upon the failure of the Permittee to comply with any of the terms and conditions hereof or at the will of the General Assembly of Virginia.
- (9) There is expressly excluded from the permit any portion of the waters within the boundaries of the Baylor Survey.
- (10) This permit is subject to any lease of oyster planting ground in effect on the date of this permit. Nothing in this permit shall be construed as allowing the Permittee to encroach on any lease without the consent of the leaseholder. The Permittee shall be liable for any damages to such lease.
- (11) The issuance of this permit does not confer upon the Permittee any interest or title to the beds of the waters.
- (12) All structures authorized by this permit, which are not maintained in good repair, shall be completely removed from State-owned bottom within three (3) months after notification by the Commission.
- (13) The Permittee agrees to comply with all of the terms and conditions as set forth in this permit and that the project will be accomplished within the boundaries as outlined in the plans attached hereto. Any encroachment beyond the limits of this permit shall constitute a Class 1 misdemeanor.
- (14) This permit authorizes no claim to archaeological artifacts that may be encountered during the course of construction. If, however, archaeological remains are encountered, the Permittee agrees to notify the Commission, who will, in turn notify the Department of Historic Resources. The Permittee further agrees to cooperate with agencies of the Commonwealth in the recovery of archaeological remains if deemed necessary.
- (15) If any loss or damage to the Commonwealth is caused by or contributed to, in whole or in part, by the Permittee arising from the establishment, operation, or maintenance of said project, the liability of the Permittee therefore shall be determined in accordance with the applicable provisions of the Federal Tort Claims Act of August 2, 1946, as amended.

VMRC# 2018-1590

MRC 30-317

VMRC# 2018-1590

Applicant: National Aeronautics and Space

The following special conditions are imposed on this permit:

- (16) The yellow placard accompanying this permit document must be conspicuously displayed at the work site.
- (17) Permittee agrees to notify the Commission a minimum of 15 days prior to the start of the activities authorized by this permit.
- (18) Permittee agrees to notify the Commission of the commencement and conclusion of each phase of project activity and submittal of all post-construction beach profile monitoring surveys.
- (19) Permittee agrees for sand mining and renourishment:
- a. In any given year activities shall not begin until the last piping plover or American oystercatcher chicks have fledged or the last sea turtle nest has hatched or been deemed nonviable by DGIF staff, whichever is later.
 - b. Every effort shall be made to complete activities by March 15 of any year.
 - c. If work must continue past the March 15, deadline, daily monitoring for red knot migrants and nesting piping plovers and American oystercatchers shall begin on March 15 and continue until the last chicks of either species fledge. Daily sea turtle nest patrols shall begin on May 1, and continue until the last nest hatches or is deemed nonviable by VDGIF staff.
 - d. If a piping plover or sea turtle nest is found before sand mining and renourishment activities are completed, all activities must cease until the WFF staff has notified the USFWS and VDGIF and VDGIF has completed an on-site determination about whether or not construction activities may continue.
 - e. If an American oystercatcher nest is found before sand mining and renourishment activities are completed, all activities must cease until the VDGIF staff has completed an on-site determination about whether or not construction activities may continue.
- (20) Permittee agrees predator screens will be placed over sea turtle nests and predator exclosures shall be erected around all piping plover nests.
- (21) Permittee agrees equipment and materials shall be staged in upland areas westward of the beach and outside of sensitive habitats (e.g., marshes, mudflats, dunes).
- (22) Permittee agrees VMRC, VDGIF and the USFWS shall be notified when sand mining and renourishment activities commence and cease.
- (23) A biological monitoring report shall be submitted to the VMRC, VDGIF and the USFWS at the conclusion of the 2020 monitoring period.

VMRC# 2018-1590

-317

VMRC# 2018-1590

Applicant: National Aeronautics and Space

Description of Fees	Amount	Unit of Measure	Rate	Total	Frequency	After-The-Fact
Permit Fee				\$100.00	One-Time	
Total Permit Fees				\$100.00		

This permit consists of 28 Pages

PERMITTEE

Permittee's signature is affixed hereto as evidence of acceptance of all of the terms and conditions herein.

In cases where the Permittee is a corporation, agency or political jurisdiction, please assure that the individual who signs for the Permittee has proper authorization to bind the organization to the financial and performance obligations which result from activity authorized by this permit.

PERMITTEE

Accepted for National Aeronautics and Space Administration

By

Deputy Division Chief, Facilities

(Name)

(Title)

1st day of May, 2019

State of Virginia

City (or County) of Accomack, to-wit:

I, Valerie Paulette Justice a Notary Public in and for said City (or County) and State hereby certify that Paul C. Bull, Permittee, whose name is signed to the foregoing, has acknowledged the same before me in my City (or County) and State aforesaid.

Given under my hand this 1st day of May, 2019

My Commission Expires: 2-28-2023

Notary Public

Valerie Paulette Justice



COMMISSION

IN WITNESS WHEREOF, the Commonwealth of Virginia, Marine Resources Commission has caused these presents to be executed in its behalf by Tony Watkinson, Chief, Habitat Management

(Name)

(Title) Marine Resources Commission

15th day of May, 2019

By

19 Wo

State of Virginia

City of Hampton, to-wit:

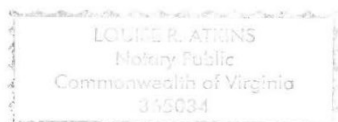
I, Louise R. Atkins, a Notary Public within and for said City, State of Virginia, hereby certify that Tony Watkinson, whose name is signed to the foregoing, bearing the 22nd day of January 2019, has acknowledged the same before me in City aforesaid.

Given under my hand this 15th day of May, 2019

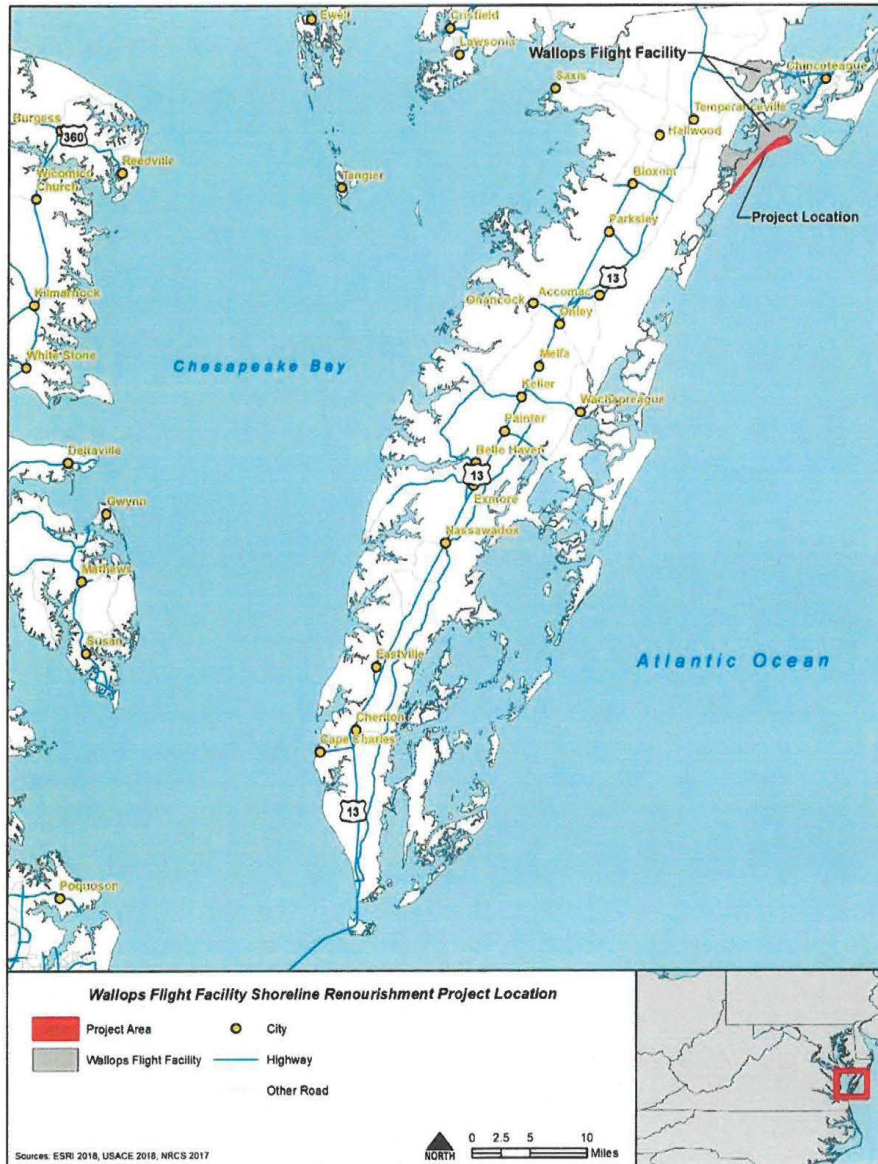
My Commission Expires: January 31, 2021

Notary Public

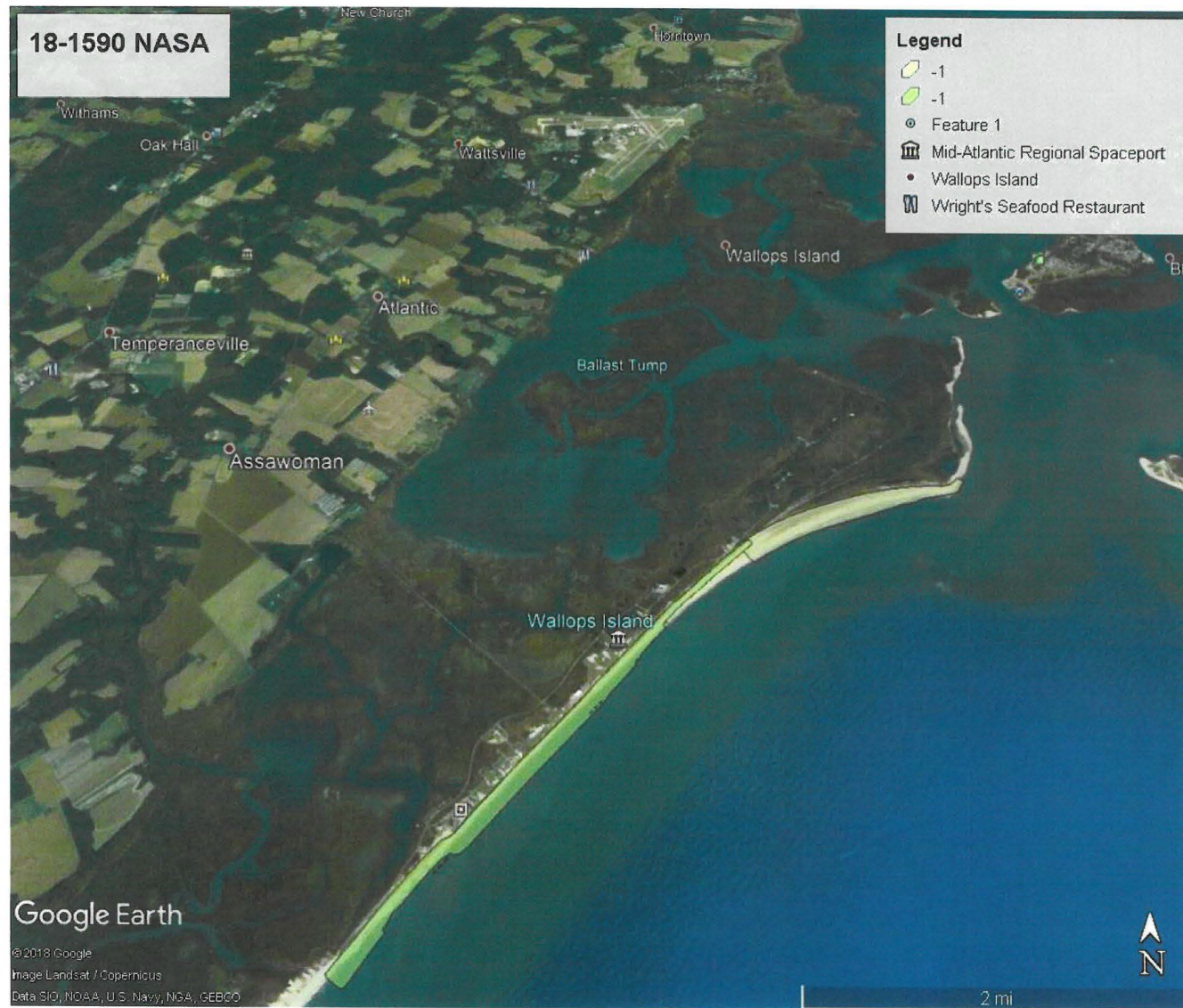
Louise R. Atkins



VMRC# 2018-1590



NASA WFF Shoreline Enhancement & Restoration Project 1 of 18





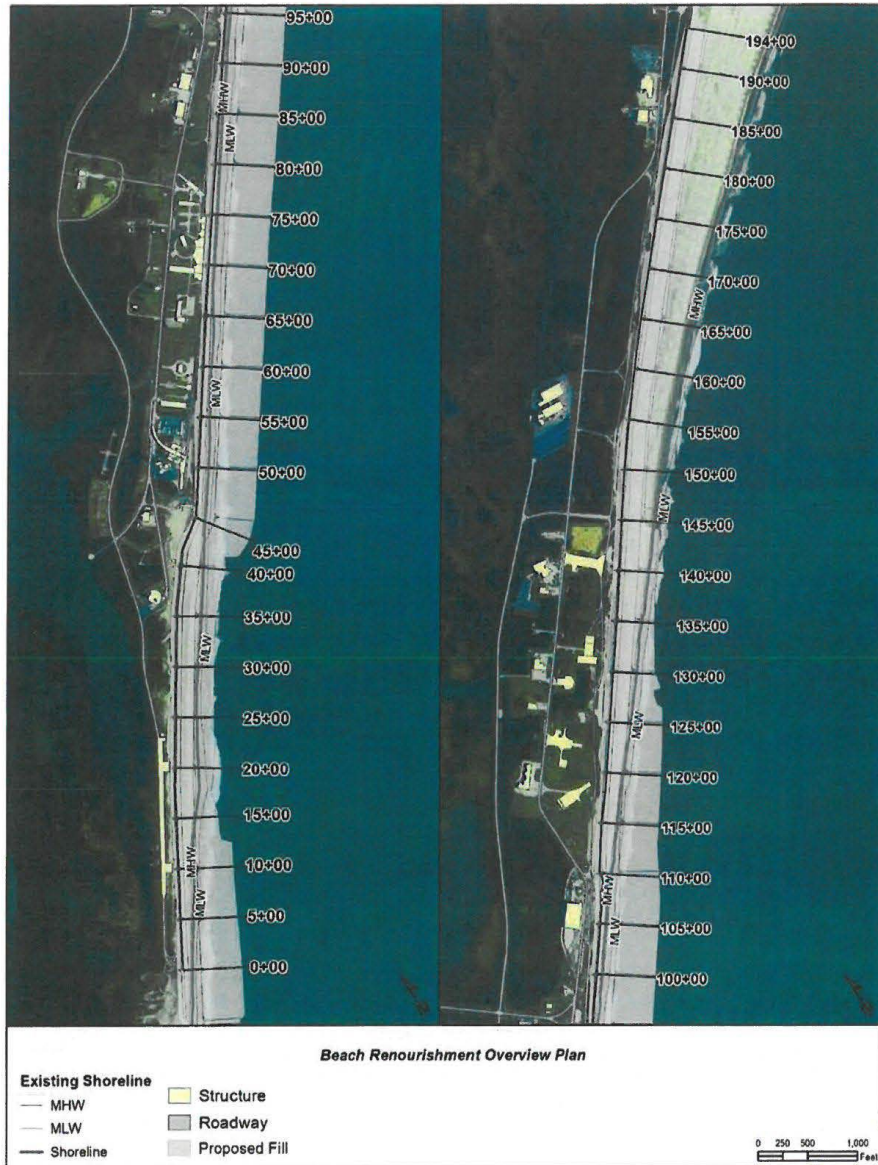
NASA WFF Shoreline Enhancement & Restoration Project 4 of 18



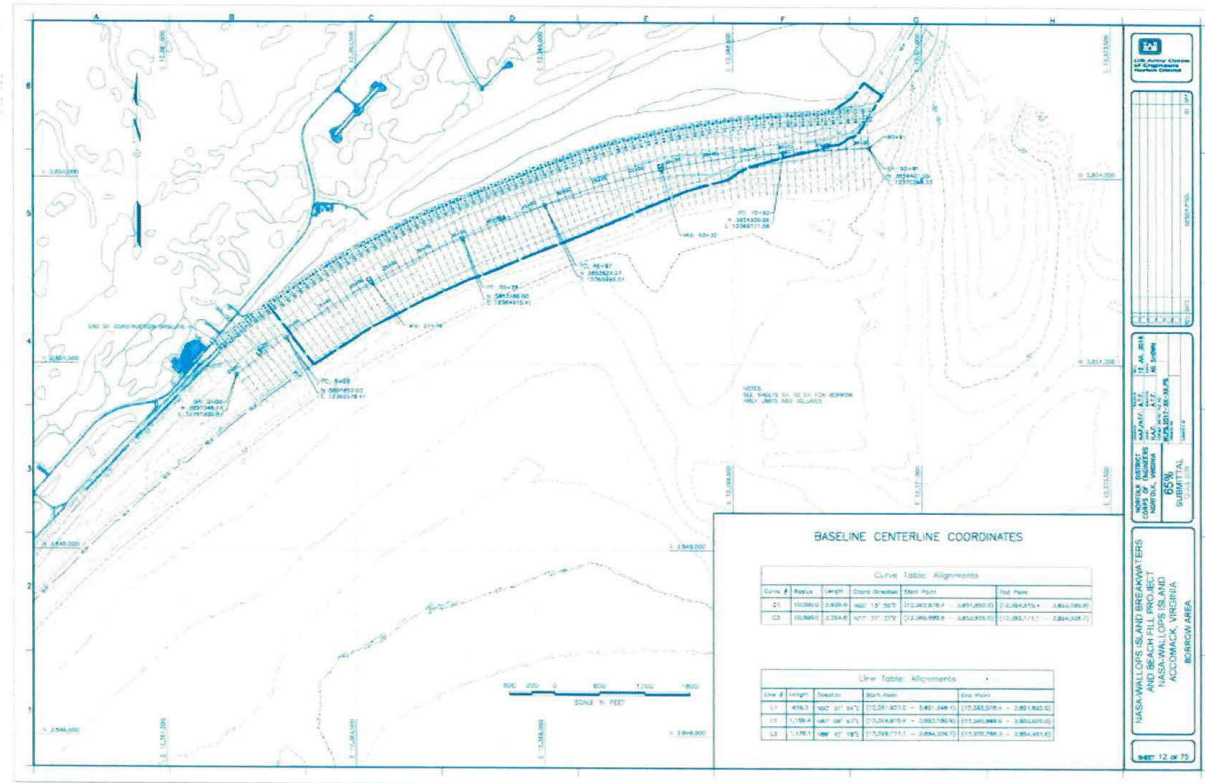
NASA WFF Shoreline Enhancement & Restoration Project 7 of 18



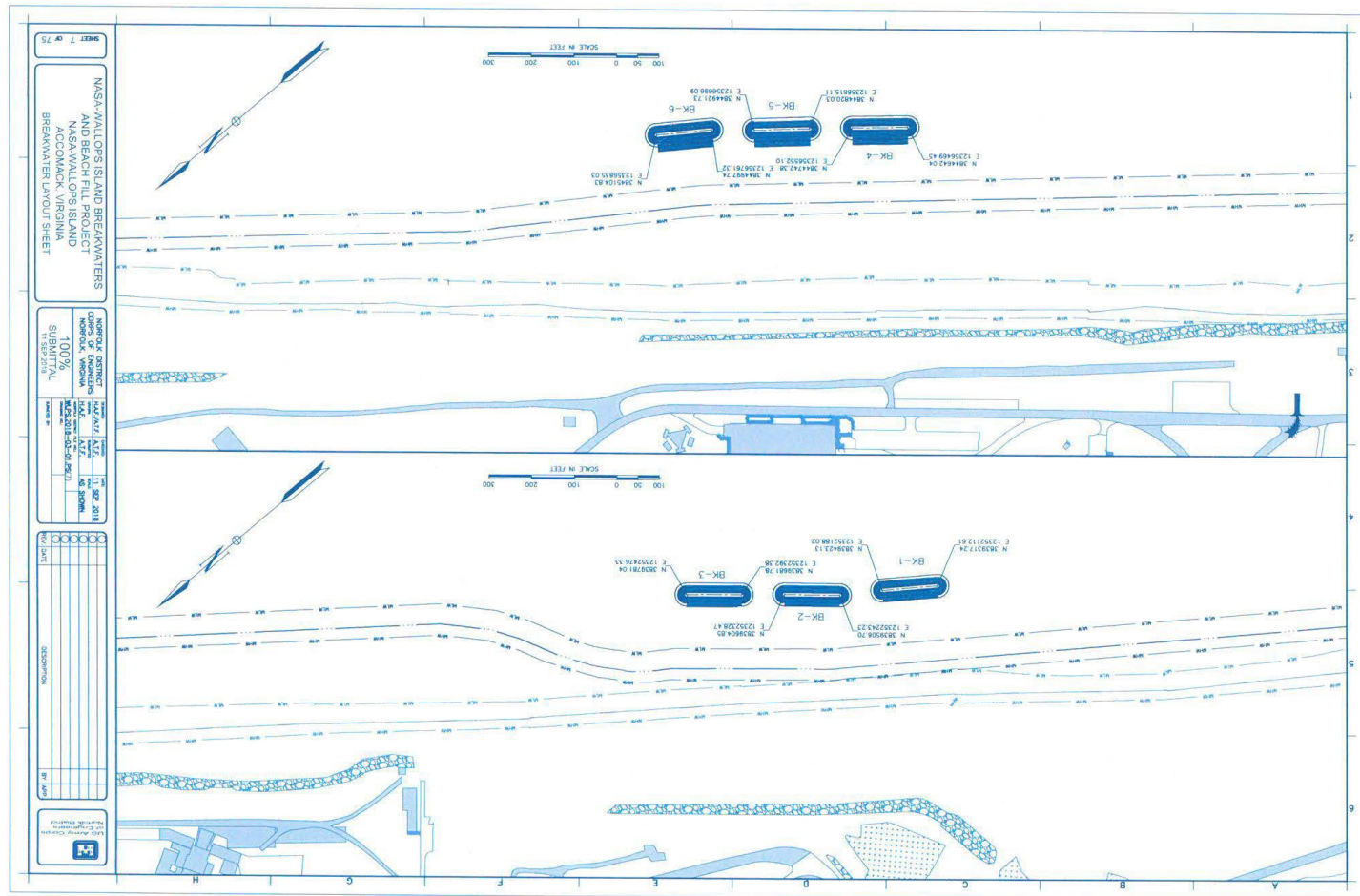
NASA WFF Shoreline Enhancement & Restoration Project 8 of 18

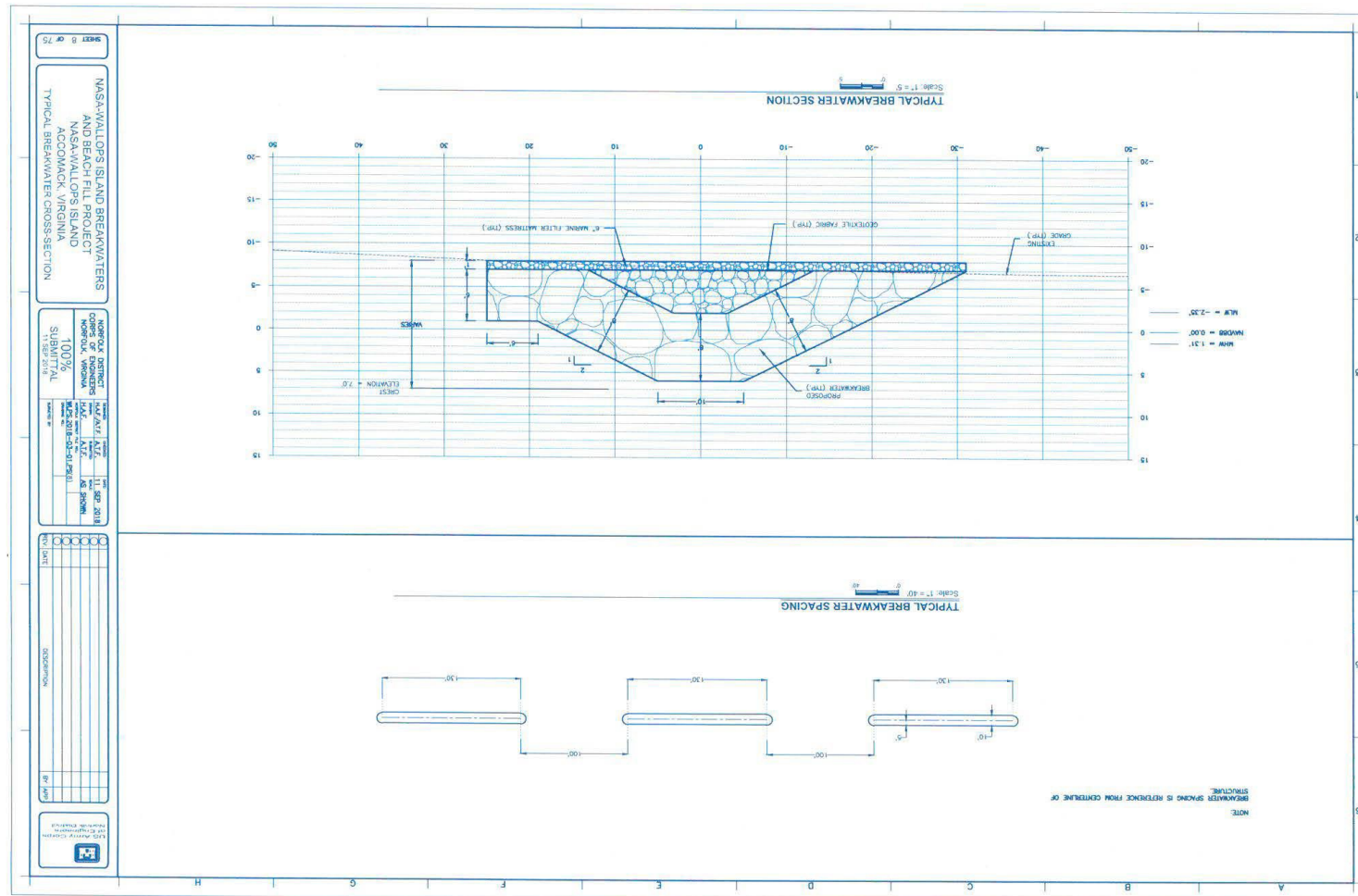


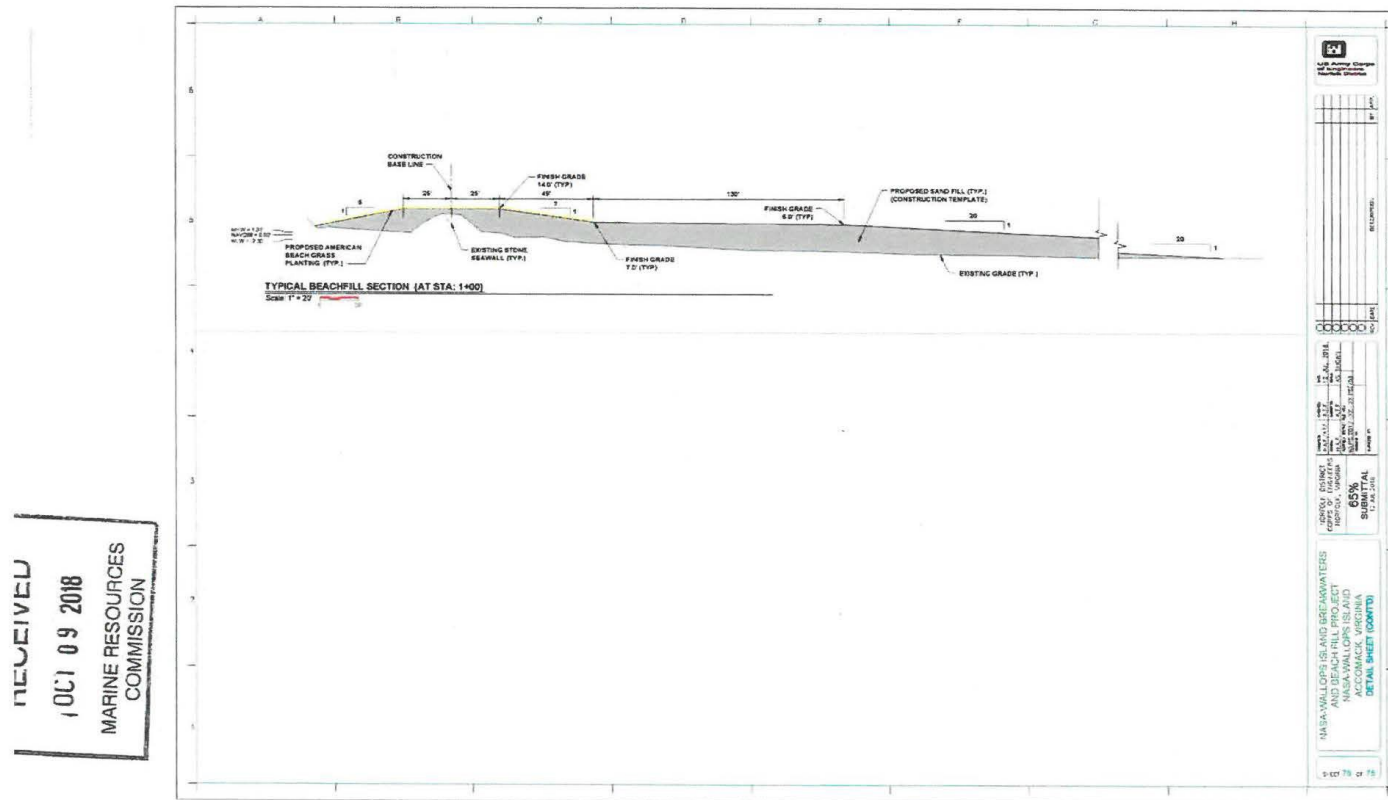
NASA WFF Shoreline Enhancement & Restoration Project 9 of 18



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Mitigation and Monitoring

CHAPTER FIVE: MITIGATION AND MONITORING

Because the SRIPP Proposed Action would take place in a complex and dynamic environment over a 50-year period, NASA would implement and continuously evaluate mitigation measures to ensure they are effective and appropriate. Due to a certain degree of uncertainty inherent in predicting how the Proposed Action activities would affect physical and biological resources, NASA would implement an adaptive management strategy for the SRIPP comprised of the following three elements:

- Base planning on existing and adequate knowledge of the project area, well-defined project goals, and current technology;
- Implement the Proposed Action with the initially planned mitigation measures described below; and
- Monitor and evaluate results.

The cycle would then reinitiate, driven by the monitoring results and project performance. Results could validate existing practices or reveal the need for alterations in project implementation or mitigation techniques. By monitoring and evaluating how measures are working, NASA would ensure that mitigation measures are optimized.

The following sections discuss NASA's proposed mitigation measures and monitoring as they apply to the Proposed Action Alternatives and within the framework of adaptive management.

5.1 MITIGATION

CEQ regulations (40 CFR 1508.20) define mitigation to include: (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the lifetime of the action; and (5) compensating for the impact by replacing or providing substitute resources or environments.

Mitigation measures are either institutional in that they are inherent in project alternative selection, or they are incorporated into the construction, operation, and maintenance of the project.

Mitigation techniques can include operational measures or technology-based methods. They can be short- or long-term and may be designed to avoid, minimize, remediate, or compensate for environmental impact. The following sections describe the mitigation measures that would be implemented for the components of the alternatives: seawall extension, offshore dredging, sand placement, groin or breakwater construction, and north Wallops Island borrow site excavation.

5.1.1 Physical Environment

5.1.1.1 Seawall Extension

The main physical effects of seawall construction activities would be soil and sediment disturbance and potential pollution releases from construction equipment.

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NASA would implement erosion and sediment control BMPs to minimize erosion. Spill prevention BMPs would be implemented to reduce potential impacts on soils and sediments during seawall construction, and all work would be performed in accordance with WFF's ICP.

5.1.1.2 Offshore Dredging

The main physical effects of dredging the proposed offshore shoals would be removal of sand from the shoal, suspended sediment/turbidity, redistribution of sediment outside the dredge footprint, and changes to bathymetry. The dredge contractor would be responsible for proper storage and disposal of any hazardous material such as oils and fuels used during the dredging and beach nourishment operations. The U.S. EPA and USCG regulations require the treatment of waste (e.g., sewage, gray water) from dredge plants and tender/service vessels and prohibit the disposal of debris into the marine environment. The dredge contractor would be required to implement a marine pollution control plan to minimize any direct impacts to water quality from construction activity.

Offshore dredging would result in changes to the bathymetry of the selected offshore borrow site. To minimize impacts on the bathymetry, dredging would be conducted so that a relatively shallow, uniform thickness of material is removed from the borrow area.

5.1.1.3 Beach Construction and Sand Placement

To minimize impacts on sediments, the beach would be restored to a comparable sediment type (a similar percentage of sand, silt and clay), grain size, and color as the existing beach material.

5.1.1.4 Groin and Breakwater Construction

During groin construction, there would be an accumulation of sediment on the updrift side of the groin, and some shoreline erosion would occur on the downdrift side. The extent of the erosion would depend on the direction and rate of longshore sediment transport in the groin area. NASA would renourish the beach to reduce the potential for downdrift erosion by placing sand all along the Wallops Island shoreline. Additionally, the groin would be located within the sediment transport nodal zone along the beach to ensure minimal potential downdrift.

5.1.1.5 North Wallops Island Sediment Removal

The main physical effects of excavation activities on north Wallops Island for beach fill material would be sediment disturbance and potential pollution releases from construction equipment.

NASA would implement erosion and sediment control BMPs to minimize erosion. Spill prevention BMPs would be implemented to reduce potential impacts on soils and sediments during excavation, construction, and beach fill work. All work would be performed in accordance with WFF's ICP.

5.1.1.6 MEC

To minimize the risk of adverse impacts from UXO in the North Wallops Island borrow area, an MEC Avoidance Plan that addresses the potential hazards would be prepared. A visual and magnetic survey of the area to locate MEC would be completed and potential hazards removed prior to excavation.

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5.1.2 Threatened and Endangered Species

5.1.2.1 Onshore

The main biological effects of seawall construction activities would be disturbance of potential beach habitat for shorebirds and sea turtles in the southern portion of the project area. To limit negative impacts on shorebirds during construction activities, NASA would educate all personnel working in the construction area on recognizing protected species and their likely habitat so that appropriate avoidance and minimization measures can be incorporated into activities.

Piping plover and sea turtle nests have not been documented in this portion of the project area; however, they may nest immediately to the south. If a nest or crawl tracks are found, NASA would consult with USFWS to develop site-specific mitigation measures.

Consistent with the 2010 USFWS BO (Appendix D), NASA would implement the following measures to minimize impacts during the initial phase of the project:

1. NASA would conduct routine surveys and monitoring for listed species and implement measures to avoid potential impacts whenever possible;
2. NASA would conduct surveys and monitoring to determine the effects of the proposed action on listed species and their habitat; and
3. NASA would actively manage habitats and human activity on the beaches to avoid and minimize potential impact on listed species.

To fulfill these measures, NASA would also comply with the following terms and conditions.

1. NASA would fully implement the activities related to listed species in Chapter Five of the SRIPP Draft PEIS: Mitigation and Monitoring Plan (NASA, 2010d) for seawall extension, offshore dredging, and sand placement activities. NASA would produce an annual report summarizing the survey and monitoring efforts, the location and status of all occurrences of recorded protected species, and any additional relevant information. Reports would be submitted to USFWS's Virginia Field Office in digital format at the address provided in the SRIPP BO by December 31 of each year.
2. NASA would develop a training and familiarization program for all personnel conducting construction activities and NASA operations in areas where listed species may occur. This training program would include basic biological information about all listed species and be sufficient to allow personnel to tentatively identify the species and its likely habitat and incorporate appropriate avoidance and minimization measures into their activities.
3. Excavation of sand from the north Wallops Island borrow area for future renourishment would be conducted outside of plover and sea turtle nesting season (March 15 through November 30 or the last date of potential sea turtle hatchling emergence based on when the last eggs were laid). Sand would be stockpiled outside of the north Wallops Island borrow area and outside of potential nesting habitat for plovers and sea turtles prior to placement for renourishment.
4. Once the newly constructed beach is in place, NASA would conduct surveys for injured, dead, or impaired birds and wildlife after launches of rockets that produce an expected sound intensity greater than 150 dB seaward of the dune or seawall. These surveys would

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be conducted as soon as possible following launches and within 2 hours of the launch or the first daylight following launch. If surveys cannot be conducted within this period, NASA would place remotely operated video cameras on the beach to document and record responses of plovers and similar birds and any sea turtles. Cameras would be placed a maximum of 100 m (330 ft) apart and extend to the limit of the project area where sound intensity is expected to exceed 150 dB. Surveys for dead, injured, or impaired wildlife would still be conducted as soon as possible following a launch, in addition to the use of cameras. Reports and DVDs would be provided to USFWS within 15 days of each launch event.

5. Concentrations of contaminants (hydrogen chloride, aluminum oxide, and other potentially toxic substances) normally present in rocket exhaust would be measured on the beach closest to the flame trench following launches involving use of solid propellants. Measurements would be taken daily until the levels reach background levels or conservative estimated non-toxic levels of these contaminants for birds, sea turtles, and other wildlife species. This information would be used to determine the typical exposure to contaminants on the beaches over time following a launch. Measurements would be taken, analyzed, and submitted to USFWS for at least the first five launches after the placement of beach and dune adjacent to NASA infrastructure. Reports would be submitted to USFWS's Virginia Field office in digital format within 30 days of each launch event.
6. NASA would report any evidence of potential nesting activity of green sea turtles or leatherback sea turtles on Wallops Island to USFWS's Virginia Field Office within one business day of observing the activity.
7. Care would be taken to preserve biological material of any dead specimens of proposed or listed species found in the best possible state. NASA would also ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. Upon locating a dead specimen, NASA would immediately notify USFWS.

Additionally, the sand fencing that would be installed at the toe of the dune would be perpendicular to the shoreline with regular spacing between sections to allow wildlife passage between the dune area and the ocean.

5.1.2.2 Offshore

As a requirement of the 2010 NMFS BO (Appendix E), NASA would implement the following measures to minimize impacts of incidental take of sea turtles:

1. NASA would contact NMFS within 3 days before dredging and again within 3 days after completion of dredging. NASA would report to NMFS whether:
 - a. During April 1 through November 30, when sea turtles are known to be present in the project area, hopper dredges are outfitted with state-of-the-art sea turtle deflectors on the drag head and operated in a manner that will reduce the risk of interactions with sea turtles;
 - b. An NMFS-approved observer is on board the vessel for any dredging occurring in the April 1 – November 30 time frame;

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- c. All dredges are equipped and operated in a manner that provides endangered/threatened species observers with a reasonable opportunity for detecting interactions with listed species and that provides for handling, collection, and resuscitation of turtles injured during project activities; and
 - d. Measures are taken to protect any turtles that survive entrainment in the dredge.
2. All interactions with listed species would be properly documented and promptly reported to NMFS.

NASA would also ensure that the following terms and conditions are met to minimize and monitor the impact of incidental take:

- 1. NASA would contact NMFS' Section 7 Coordinator to alert NMFS to the commencement and cessation of dredging activities, to give NMFS an opportunity to provide NASA with any updated contact information or reporting forms, and to provide NMFS with information of any incidents with listed species.
- 2. If a sea turtle or its parts are taken in dredging operations, the take would be documented on the form included as Appendix H of the BO and submitted to NMFS along with the final report.
- 3. NASA would contact NMFS within 24 hours of any interactions with sea turtles, including non-lethal and lethal takes. Until alerted otherwise, NASA would contact the Section 7 Coordinator.
- 4. NASA would ensure that any sea turtles observed during project operations are measured and photographed (including sea turtles or body parts observed at the dredge location or on board the dredge, hopper, or scow) and the corresponding form completed and submitted to NMFS within 24 hours by fax.
- 5. In the event of any lethal takes of sea turtles, any dead specimens or body parts would be measured, photographed, and preserved (refrigerated or frozen) until disposal procedures are discussed with NMFS.
- 6. If a dead sea turtle or sea turtle part is taken in dredging operations, a genetic sample would be taken following the procedure outlined in the 2010 NMFS BO.
- 7. If a decomposed turtle or turtle part is entrained during dredging operations, an incident report would be completed and the specimen would be photographed. Any turtle parts that are considered "not fresh" (i.e., obviously dead prior to the dredge take) would be frozen and transported to a nearby stranding or rehabilitation facility for review. NASA would submit an incident report for the decomposed turtle part, as well as photographs, to NMFS within 24 hours of the take and request concurrence that this take should not be attributed to the Incidental Take Statement. NMFS would have the final authority in determining whether the take should count toward the Incidental Take Statement.
- 8. Any time that a take occurs, NASA would immediately contact NMFS to review the situation. At that time, NASA would inform NMFS of the amount of material dredged so far and the amount remaining to be dredged during that cycle. Also at that time, NASA and USACE would discuss with NMFS whether any new management measures could be implemented to prevent the total incidental take level from being exceeded.

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9. NASA would submit a final report summarizing the results of dredging and any takes of listed species to NMFS within 30 working days of the completion of each dredging contract.
10. If the take estimate for any contract is exceeded, NASA and the USACE would work with NMFS to determine whether the additional take represents new information revealing effects of project activities that may not have been previously considered.

In addition to the above measures required by NMFS, NASA would employ the following:

1. As the NMFS-approved observer would be on board the dredge only from April 1 through November 30, a lookout/bridge watch would be present on the dredge at all times from December 1 through March 31 to alert the captain when a listed whale is spotted within 1 kilometer (km) (0.62 mi) of the dredge. The lookout will be knowledgeable in listed species identification. From April 1 through November 30, the NMFS-approved observer would assume this responsibility.
2. If a NMFS-approved observer or the lookout/bridge watch observes a whale within 1 km (0.62 mi) of the dredge, all pumps would be turned off (i.e., dredging will stop) until the whale leaves the area (i.e., is farther than 1 km [0.62 mi] from the dredge).
3. All dredge operators would be required to monitor the right whale sighting reports (i.e., sighting advisory system, dynamic management areas, seasonal management areas) to remain informed on the whereabouts of right whales in the vicinity of the action area.
4. All dredge operators would conform to the regulations prohibiting the approach of right whales closer than 500 yds (1,500 ft) (50 CFR 224.103 (c)). If a dredge vessel comes within the 500-yd (1,500-ft) buffer zone created by a surfacing whale, it would depart the area immediately at a safe, slow speed.
5. For dredging operations at night, the work area would be lit well enough to ensure that the observer/lookout can perform his/her work safely and effectively and that all mitigation measures can be performed to the extent practicable.
6. NASA would require its dredging contractor to provide information regarding whale sightings. This information would be reported to NMFS' Protected Resources Division Section 7 Coordinator.

In accordance with the ESA, NASA would reinitiate formal consultation with USFWS or NMFS when: 1) the amount of extent of incidental take is exceeded; 2) new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not considered in the BO; 3) the action is subsequently modified in a manner that has an effect on the listed species or critical habitat not considered in the BO; or 4) a new species is listed or critical habitat designated that may be affected by the SRIPP. Additionally, in its 2010 BO, USFWS clearly states that any incidental take authorization is only applicable to the initial beach construction and seawall extension. As such, NASA would reinitiate consultation with USFWS for subsequent renourishment cycles. Although the NMFS BO addresses the SRIPP in its 50-year entirety, NASA would continue to coordinate with the agency prior to each renourishment cycle to ensure the BO's validity.

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5.1.3 Essential Fish Habitat

Dredging at the proposed borrow sites would be conducted in a manner generally consistent with the recommendations made in two recent MMS publications examining the dredging of offshore shoals in the mid-Atlantic (CSA International, Inc. et al., 2009 and Dibajnia and Nairn, 2010). These recommendations include targeting depocenters for extraction, avoiding active erosional areas, shallow dredging over large areas rather than deep pits, dredging shoals in less than 30 m (98 ft) of water, and avoiding longitudinal dredging over the entire length of shoal.

More specifically, for initial fill:

- NASA would target Shoal A sub-area A-1 (an accretional area) for initial fill. Shoal A sub-area A-2 would only be used during off-nominal conditions;
- Dredging would be uniform over a large area and would not create deep pits;
- Cut depth would not be excessive at approximately 2-3 m (6.6-9.8 ft); and
- Dredging would not occur over the entire length of the shoal.

To stabilize the dune area and reduce borrow requirements (and potential effects on offshore shoals), NASA would plant the dunes with native vegetation and install sand fencing to trap windblown sand.

More detail on NASA's dredging plan is included in Appendix J. NASA would follow the same general dredging guidelines for planning renourishment fill cycles as for initial fill and would consider use of either Shoal A or Shoal B for offshore borrow material. Because specific details on the use of either offshore shoal would be developed in the future once actual renourishment volume requirements are known, NASA would continue to coordinate and consult with NMFS throughout the 50-year life of the SRIPP to avoid and minimize impacts on EFH.

5.1.4 Cultural Resources

It is unknown at this time what methods and exact locations a contractor may use to pump sand from dredge barges to Wallops Island. Because these methods may affect unidentified cultural resources, NASA would consult with VDHR prior to pump-out operations. NASA's contractor would supply NASA with a dredge plan prior to implementation, which NASA would review with VDHR and jointly decide whether further investigation is required and, if warranted, agree on a survey method. If underwater resources are discovered during the survey, they would be reported to VDHR along with a proposed avoidance buffer. VDHR's concurrence with the survey report would conclude the Section 106 process. In the event that previously unrecorded historic properties are discovered during project activities, NASA would stop work in the area and contact VDHR immediately.

If an unanticipated discovery of archaeological resources would occur at either of the offshore shoals within BOEMRE's jurisdiction, the dredge would immediately halt operations within 305 m (1,000 ft) of the area of the discovery. NASA would report the discovery to the Regional Supervisor, Leasing and Environment, Gulf of Mexico Region within 72 hours of discovery. The Regional Supervisor would then inform NASA as to how to proceed.

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5.2 MONITORING

NASA would implement a monitoring program that focuses on three areas of the SRIPP; threatened and endangered species, the beach profile, and offshore shoals. The purpose of the monitoring program is to; (1) determine potential impacts to threatened and endangered species from the various components of the program, (2) evaluate the post-construction performance of the seawall extension and beach fill, (3) identify the need for beach renourishment and the quantity of material needed, and (4) assess the bathymetric changes to the sand shoal(s) after dredging.

NASA would ensure that the monitoring program is implemented by appropriately qualified, experienced personnel.

5.2.1 Threatened and Endangered Species

5.2.1.1 Seawall Extension and Sand Placement

In addition to complying with USFWS' required mitigation measures, NASA would employ a trained observer to monitor the area daily during when sand placement activities are within Piping Plover or sea turtle nesting season to ensure that impacts are avoided or minimized. When work on the beach overlaps sea turtle or Piping Plover nesting season, daily monitoring would be conducted within the first several hours of sunrise by an observer trained in accordance with NASA's Protected Species Monitoring Plan (NASA, 2010c). Monitoring would occur at least within a 300 m (984 ft) buffer of construction activities during Piping Plover and sea turtle nesting season to ensure Piping Plovers and sea turtles are not directly affected by construction activities. If any Piping Plover or sea turtle nests are detected within the proposed work area, NASA would avoid the area until it has coordinated with USFWS to employ site-specific measures to minimize potential effects.

Potential habitat areas for seabeach amaranth would be surveyed immediately prior to renourishment or sand removal activities at the north end of Wallops Island to ensure that the species is not present. In the event that the seabeach amaranth is encountered during project activities, NASA would work with USFWS to ensure appropriate measures are taken to protect the species and its habitat.

5.2.1.2 Dredging Operations

An NMFS-approved observer would be on board the dredging vessel for any dredging occurring between April 1 and November 30. This experienced endangered species observer would monitor dredging operations for evidence of sea turtle takes and would advise the vessel operator to slow the vessel or maneuver safely when sea turtles or marine mammals are spotted to further reduce the potential for interaction with vessels. A lookout/bridge watch would be present on the dredge at all times from December 1 through March 31 to alert the captain when a listed whale is spotted within 1 kilometer (km) (0.62 mi) of the dredge.

5.2.1.3 North Wallops Island Excavation

As there is currently a bald eagle nest on north Wallops Island, NASA would survey an area 200 m (660 ft) around the proposed work site to determine the presence of additional nests. If nests are identified, NASA would consult with USFWS and VDGIF to minimize effects. Additionally, when more specific plans for excavation at the north end of Wallops Island are

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known in the future (based on monitoring of the shoreline as described in Chapter 5 of this PEIS), NASA would conduct surveys for other protected species, consult with NMFS, USFWS, and VDGIF, and prepare the appropriate level of NEPA documentation prior to excavation.

5.2.2 Beach Profile

As funding allows, NASA would conduct pre- and semi-annual post-construction monitoring in the designated shoreline monitoring area following the initial beach fill. NASA would conduct combined subaerial (above water) and subaqueous (below water) monitoring surveys along the Wallops Island shoreline.

The objective of the annual beach profile post-construction monitoring program would be to evaluate the post-construction performance of the seawall extension and beach fill project. This evaluation would also be used to identify the need for beach renourishment.

The monitoring program would consist of data collection, including subaerial beach cross-section surveys, subaqueous beach profile surveys, aerial photographs, and storm data summaries. The monitoring program would also compare the post-construction data with the pre-construction data and evaluate the performance of the project.

The horizontal and vertical survey datums would adhere to Virginia State Plane Coordinate System, South Zone, North American Datum 1983/1993 (High Accuracy Reference Network) U.S. Survey Feet and North American Vertical Datum 1988, U.S. Survey Feet, respectively. The vertical accuracy for the survey would be International Hydrographic Organization Order 1 (standards of accuracy recommended for coastal areas with depths up to 100 m [330 ft] and sand or silt bottoms).

Consistent with the SRIPP adaptive management framework, beach profile monitoring protocol could be modified in the future based upon such factors as project performance or changes in technology. Additionally, more specific details regarding the monitoring protocol outlined in this section would be developed by the survey team prior to commencing work.

5.2.2.1 Pre-Construction

NASA would conduct a survey of the pre-construction profile baseline of the expanded project monitoring area. The expanded project monitoring area would be along the lengths of Wallops and Assawoman Islands, starting 0.8 km (0.5 mi) north of Chincoteague Inlet at the north to Gargathy Inlet at the south, a distance of approximately 29 km (18 mi). In the cross-shore direction, the survey elevation data would extend from behind the proposed dune line to seaward of the depth of closure (estimated to be at approximately -4.5 to -6 m (-15 to -20 ft) MLW). Near Chincoteague Inlet the ebb shoal complex creates a large shallow offshore area; therefore, surveys in this area would extend a maximum of 3.2 km (2 mi) offshore if the depth of closure is not reached.

Sufficient control points would be established to cover the entire expanded monitoring area and be able to support future long-term post-construction monitoring program needs. The control points would consist of 72 pipe benchmarks at intervals of 457 m (1,500 ft) along the monitoring baseline. The baseline would be located to maximize the survival of the pipe benchmarks during severe storm events. The benchmarks would be 3.8 cm (1.5 in) galvanized pipes driven into the beach to a depth of about 1.8 m (6 ft) and extending upward above the sand level approximately 0.6 m (2 ft) with a threaded cap on top. Vertical elevation of the tops of the pipes and horizontal

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coordinates would be required for the pipe benchmarks. Control point number, elevation data, and horizontal coordinates would be engraved on the threaded cap.

NASA would perform beach cross-section surveys along new and/or previously established baselines on set stations every 152 m (500 ft) from Chincoteague Inlet to Assawoman Inlet and every 305 m (1,000 ft) from Assawoman Inlet to Gargathy Inlet and from Chincoteague Inlet to 0.8 km (0.5 mi) north of Chincoteague Inlet. The beach survey would extend from the baseline, offshore to a depth of -1.5 m (-5 ft) MLW, except in the seawall area where the beach survey would extend from the baseline to the seaward edge of the existing seawall crest. The profile surveys would locate the Mean High Water Level (MHWL) at each profile. Additional "spot shots" would be taken between profiles to locate the MHWL between profiles.

Beach survey data would be processed in Computer-Assisted Design (CAD), Beach Morphology Analysis Package (BMAP), and xyz formats.

To compare the accuracy of LiDAR data to that collected by the more traditional survey methods, NASA would obtain pre-construction LiDAR topographic survey data (subaerial only) provided by a qualified LiDAR survey contractor over the full extended monitoring area. The LiDAR topographic survey would be conducted concurrently with the pre-construction beach profile survey and would encompass the land area from the profile baseline and seaward to include the beach and the seawall. The vertical accuracy for the survey would be International Hydrographic Organization Order 1. The LiDAR survey data would be processed in CAD and xyz formats such that profiles and MHWL location could be established and compared with those established by the land-based survey. Decisions regarding the need for additional LiDAR surveys would be based on this evaluation.

NASA would obtain an initial set of digital geographically referenced color orthophotographs over the full extended monitoring area (29 km [18 mi] +/-). The intent of the orthophotographs would be to supplement the shoreline location between the beach profile survey points and to visually identify changes in the shoreline and beach area. The photographs would be taken at the same time of year that beach profile data would be collected. Aerial targets would be set by NASA at each baseline point prior to the aerial photography flight. The aerial photography flight and data collection would be conducted during mean lower low water as determined by the tidal gauge located at the Chincoteague USCG Station. The scale of the digital photographs would be 1:24,000. Rectified orthophotograph files would be combined with the beach profile files and the hydrographic survey files to create a single survey data file and shoreline change analysis of the entire area. Monitoring program shorelines and shoreline data available from other sources (e.g., NPS, NOAA, and USACE) would be directly imported into a shoreline change program (e.g., U.S. Geological Survey's Digital Shoreline Analysis System, BMAP, and others) for analysis of patterns and trends.

Profile Comparisons

The USACE's BMAP within Coastal Engineering and Design Analysis System (CEDAS) would be used for initial profile comparisons and analyses. Once the surveying data are compiled, the new survey profiles developed by combining the beach cross-sections, the offshore hydrographic survey, and the new profiles developed from the LiDAR survey would be overlaid on previous survey profiles, and the proposed authorized template profile to evaluate relative differences. Using BMAP, the following shoreline position and volumetric calculations would be performed:

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- Shoreline change at mean high water;
- Shoreline change at the design berm elevation;
- Volume change between overlapping extents of new and previous survey profiles; and
- Volume surplus/deficit between the new survey profiles and the proposed authorized beach fill template.

5.2.2.2 Post-Construction

NASA would perform a combined subaerial and subaqueous monitoring survey in the project monitoring area along the lengths of Wallops and Assawoman Islands, starting 0.8 km (0.5 mi) north of Chincoteague Inlet at the north to Gargathy Inlet at the south, a distance of approximately 29 km (18 mi). In the cross-shore direction, the survey elevation data would extend from behind the dune line to seaward of the depth of closure, estimated to be at approximately -4.5 to -6 m (-15 to -20 ft) MLW. Near Chincoteague Inlet, the ebb shoal complex creates a large, shallow, offshore area; therefore, surveys in this area would extend a maximum of 3.2 km (2 mi) offshore if the depth of closure is not reached.

NASA would perform two beach cross-section surveys each year of the post-construction monitoring program. The first survey would likely be a Pre-Winter Survey (i.e., October) and would include beach cross-sections along the previously established baseline on set stations every 152 m (500 ft) from Chincoteague Inlet to Assawoman Inlet and every 305 m (1,000 ft) from Assawoman Inlet to Gargathy Inlet, and from Chincoteague Inlet to 0.8 km (0.5 mi) north of Chincoteague Inlet. This survey would be completed as soon as practicable following completion of the initial beach fill. The second survey would be a Post-Winter Survey (i.e., April) and would include beach cross-sections along the previously established baseline on set stations every 152 m (500 ft) from 0.8 km (0.5 mi) south of the south end of the beach fill placement to 0.8 km (0.5 mi) north of the north end of the beach fill placement. The profile surveys would locate the MHWL at each profile. Additional "spot shots" would be taken between profiles to locate the MHWL between profiles. The beach cross-section surveys would extend from the baseline and offshore to a depth of -1.5 m (-5 ft) MLW. Beach survey data would be processed in CAD, BMAP, and xyz formats.

NASA would perform two offshore hydrographic surveys each year of the monitoring program. The first survey would be a Pre-Winter Survey (i.e., October) and would include hydrographic survey profiles along the previously established baseline on set stations every 152 m (500 ft) from Chincoteague Inlet to Assawoman Inlet and every 305 m (1,000 ft) from Assawoman Inlet to Gargathy Inlet, and from Chincoteague Inlet to 0.8 km (0.5 mi) north of Chincoteague Inlet. The survey would be conducted as soon as practicable following completion of the initial beach fill. The second survey would be a Post-Winter Survey (i.e., April) and would include hydrographic survey profiles along the previously established baseline on set stations every 152 m (500 ft) from 0.8 km (0.5 mi) south of the south end of the beach fill placement to 0.8 km (0.5 mi) north of the north end of the beach fill placement. The hydrographic survey would be conducted using a single-beam echosounder collecting data along transect lines as described above. The offshore survey would extend from -1.2 m (-4 ft) MLW to the depth of closure -4.5 to -6 m (-15 to -20 ft) MLW. If possible (weather permitting), the hydrographic survey would be conducted within 2 weeks of the beach survey. Bathymetric survey data would be processed in CAD, BMAP, and xyz formats.

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NASA would obtain two sets of geographically referenced digital color orthophotographs each year of the monitoring program. The first set of photographs would be Pre-Winter photographs (i.e., October) over the full extended monitoring area (0.8 km [0.5 mi] north of Chincoteague Inlet and south to Gargathy Inlet). The second set of photographs obtained would be Post-Winter photographs (i.e., April) over the full extended monitoring area. The photographs would be taken at the same time of year that beach profile data would be collected. Aerial targets would be set at selected baseline points prior to the aerial photography flight. The aerial photography flight and data collection would be conducted during MLW as determined by the tidal gauge located at the Chincoteague USCG Station. The scale of the digital photographs would be 1:24,000. The rectified orthophotograph files would be combined with the beach profile files and the hydrographic survey files to create a single survey data file and shoreline change analysis of the entire area. Monitoring program shorelines and shoreline data available from other sources (e.g., NPS, NOAA, and USACE) would be directly imported into a shoreline change program (e.g., U.S. Geological Survey's Digital Shoreline Analysis System, BMAP, and others) for analysis of patterns and trends.

Profile Comparisons

The BMAP tool of USACE's CEDAS would be used for initial profile comparisons and analyses. Once the surveying data are compiled, the new survey profiles would be overlaid on previous survey profiles and the authorized template profile to show relative differences. Using BMAP, the following shoreline position and volumetric calculations would be performed:

- Shoreline change at mean high water;
- Shoreline change at the design berm elevation;
- Volume change between overlapping extents of new and post-fill survey profiles; and
- Volume surplus/deficit between the new survey profile and the assumed authorized beach fill template.

Storm Data Collection

NASA would collect storm data for each moderate to severe storm event affecting the project. The data would include type of storm, date and duration, wind data from the National Climatic Data Center, tide and surge data, wave data, air temperature and pressure, wind speed and direction, wind gust, and sea surface temperature from the National Data Buoy Center. This data would be collected for all monitoring years and included in an annual summary report and related mapping. Field visits to the project area would also be conducted to evaluate the storm impacts on the project area. Formal subaerial and subaqueous post-storm surveys (comparable to those described above under pre-and post-construction monitoring) would be conducted as practicable.

Shoreline and Volumetric Change

In addition to relative profile comparisons, the shoreline and volumetric change based on three-dimensional surfaces of the study area within a GIS environment would be evaluated. These types of analyses expand on the two-dimensional profile comparisons and are recommended for identifying areas of concern along the shoreline and evaluating sediment transport trends. New

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survey data would be incorporated into GIS to allow mapping and further analysis of shoreline and volumetric change. This includes developing a digital terrain model from the new survey data. Shoreline positions would be extracted from the digital terrain model and plotted in GIS for comparison with historical shoreline positions. Additionally, volume change grids would be calculated to plot the morphologic changes in relative survey periods. Color-shaded grids showing areas of erosion and accretion within the nearshore study area would be developed from the three-dimensional comparisons. The pre-construction LiDAR data would be processed and included as part of the analysis.

5.2.2.3 Project Design Life Analysis

Based on results of shoreline change and volume analyses, areas of concern in the study area would be identified. The results of the analyses would be used to evaluate performance of the beach nourishment project and to determine maintenance areas for future renourishment.

5.2.2.4 Monitoring Summary and Mapping

A report summarizing the data collection, coastal engineering analyses, observed trends from the shoreline change and volumetric change analyses, project design life estimates, identified areas of concern, statement of overall quantity needed to bring the entire beach up to the template, and recommended future work would be prepared semi-annually. The following items would also be included in the summary report:

- Profile comparison plots with summarized results (e.g., shoreline change, volume change)
- Large-scale map(s) showing relative shoreline positions and corresponding shoreline change rates for the reporting period
- Large-scale map(s) showing volumetric change over the study area extent

NASA would share all monitoring results and reporting with resource agencies and any other interested parties. This report would be used to assess the project performance with respect to storm damage protection and sand loss. Replenishment of the sand fill would be needed at intervals that would be determined by the monitoring measurements. When the trends in the volume changes indicate that a minimum fill volume is being approached it would be necessary to plan for such a renourishment operation.

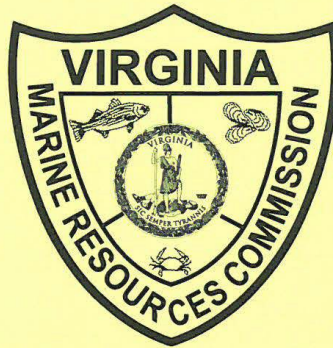
It is expected that the sand placed on the beach would disperse over time to the south, to the north, and offshore. The relative rates of these losses would also be determined from interpretation of the monitoring data. These results would be reviewed in each of the monitoring reports to determine whether project modifications could be developed to reduce the rates of loss or to likewise lower maintenance costs. For example, it may be shown that the dominant net sand transport accounting for the overall fill volume loss is in a longshore direction. Based on the present understanding of the coastal system, once the fill is placed, this net direction could be to either the north or the south. It may be shown that a sand retention structure could be located adjacent to, or nearby, the placement area to help retain the sand or to capture the escaping sand so that it could be episodically returned with appropriate equipment. The monitoring would be used to determine whether such a structure would be effective to the north or south of the fill. If a comparison with the existing project maintenance practice shows that such a structure would be

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cost-effective in reducing the need for renourishment sand from the offshore shoals then a modification to the preferred option may be considered. Such a development would require additional NEPA analysis, agency consultation, and permitting.

5.2.3 Offshore Shoals

NASA would provide NMFS pre- and post-borrow bathymetric maps of the dredged areas. The post-borrow survey would be performed soon after dredging was completed, likely not more than 2 weeks after completion of the initial fill phase of the project. NASA would follow standard USACE bathymetric survey procedures as stated in USACE survey manual publication number EM 1110-2-1003 (USACE, 2002). Survey data would be provided to interested resource agencies as soon as practicable thereafter. Future plans for dredging would be based on an assessment of bathymetric changes of the shoals between dredging cycles.



Permit # 18-1590

Commonwealth of Virginia Marine Resources Commission Authorization

A Permit has been issued to:

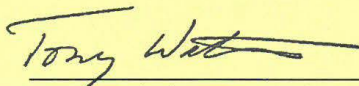
NASA - Wallops Flight Facility
Attn: Mr. Paul Bull
Building N-161, Code 228
Wallops Island, VA 23337

The Permittee is hereby authorized to:

install two (2) sets of three (3) approximately 130-foot long stone offshore breakwaters and place approximately 1.3 million cubic yards of sandy beach nourishment material landward of the breakwaters along approximately 19,850 feet of shoreline, situated along the Atlantic Ocean on and adjacent to Wallops Island. The sandy material will be mined from the north end of Wallops Island where the original nourishment has accreted due to longshore transport.

Issuance Date: April 25, 2019

Expiration Date: January 22, 2024



Commissioner or Designee

This Notice Must Be Conspicuously Displayed At Site Of Work