

**NAGS HEAD BEACH NOURISHMENT PROJECT  
2011: TOWN OF NAGS HEAD  
DARE COUNTY, NORTH CAROLINA**

**Table of Contents for Technical Specifications**

<u>DOCUMENT</u>	<u>PAGE</u>
01000 Table of Contents (2 pages)	
<b>Division 1</b>	
01060 Regulatory Requirements (11 pages)	
Part 1 General .....	1
1.1 Summary .....	1
1.2 References .....	1
1.3 Submittals .....	1
1.4 Quality Assurance .....	1
1.5 Site Conditions .....	1
1.6 Sequencing and Scheduling .....	2
1.7 Protection of Endangered Species at Sea .....	2
1.8 Protection of Endangered Species on the Beach .....	9
1.9 Compliance with Applicable Permits .....	10
Federal USACE Permit Action ID SAW 2006-40282 (17 pages)	
NCDENR 401 Water Quality Certification GC 3642 (4 pages)	
State of North Carolina Major CAMA Permit 45-10 (6 pages)	
01100 Summary of Work (3 pages)	
Part 1 General .....	1
1.1 Work Covered by Contract Documents .....	1
1.2 Construction Contract .....	1
1.3 Type of Work .....	1
1.4 Owner's Site Representative .....	3
Part 2 Products (see Section 02230 – Part 3)	
Part 3 Execution (see Section 02230 – Part 4)	
<b>Division 2</b>	
02230 Beach Nourishment (9 pages)	
Part 1 General .....	1
1.1 Applicable Publications .....	1
1.2 Description of the Work .....	1
1.3 Criteria for Bidding .....	1
Part 2 Protection .....	1
2.1 Dune Restoration and Protection .....	1
2.2 Environmental Protection .....	2
2.3 Protection and Restoration of Timber Structures .....	2
2.3.1 Timber Repairs .....	2
Part 3 Products .....	2
3.1 Borrow Material .....	2
3.2 Subsurface Investigations .....	3

**NAGS HEAD BEACH NOURISHMENT PROJECT  
2011: TOWN OF NAGS HEAD  
DARE COUNTY, NORTH CAROLINA**

**Table of Contents for Technical Specifications  
(continued)**

<u>DOCUMENT</u>	<u>PAGE</u>
<b>Division 2 (continued)</b>	
02230 Beach Nourishment (9 pages – continued)	
Part 4 Execution	3
4.1 Order of Work	3
4.2 Beach Nourishment	3
4.2.1 Distribution of Borrow Materials	4
4.2.2 Work Area	4
4.2.3 Dikes and Confinement	4
4.2.4 Pipeline Discharge	5
4.2.5 Submerged Pipelines	5
4.2.6 Work Around Existing Structures	5
4.2.7 Protective Dune and Stockpile Construction	6
4.2.8 Monitoring of Beach Fill Operations	6
4.3 Final Grading	6
4.3.1 Tolerances	7
4.4 Tilling of Completed Beach	7
4.5 Measurement and Payments	7
4.5.1 Acceptance and Payment	7
4.5.2 Payment Limits	7
4.5.3 Survey Control and Baseline Reference	8
4.5.4 Survey Limits	8
4.6 Reporting Requirements	8
4.6.1 Surveying Reporting Requirements	8
4.6.2 Progress Surveying Submittal Requirements	8
4.6.3 Construction Photographs	9
4.7 Quality Control	9
4.7.1 Reporting Requirements	9
Contractors Quality Control Report (Dredge QC Report) (for all dredges)	1
Daily Report of Operations–Hopper Dredges	1
Breakdown of Loads Dredged and Hauled (for hopper dredges only)	1
<b>Divisions 3-16 (not used)</b>	

**SECTION 01060**

**REGULATORY REQUIREMENTS**

PART 1 GENERAL

1.1 SUMMARY: This section contains the provisions for compliance with local, state and federal jurisdictional regulations and permit conditions affecting the work. Contractor is not relieved from requirements to comply with regulations, applicable permits, laws, codes, ordinances and regulations not identified in this section. It is the responsibility of the Contractor to comply with all applicable state, federal and local regulations affecting the work.

1.2 REFERENCES:

A. Owner Procured (attached to this specification):

1. U. S. Army Corps of Engineers, Department of the Army Permit Action ID #SAW 2006-40282 issued 12 November 2010.
2. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Approval of 401 Water Quality Certification (GC 3642) with Additional Conditions issued 28 April 2010.
3. Major CAMA permit #45-10 dated 29 April 2010.

B. Contractor Procured (at his expense):

1. Current business license.
2. Building permits, Dare County, North Carolina.
3. Current contractor's license for operations in the State of North Carolina.
4. Permit for hauling and disposal of debris and waste.
5. Permit to exceed load limits on certain bridges if they are on haul routes and have low load limits.
6. U.S. Coast Guard Certifications and licenses.

1.3 SUBMITTALS: Contractor shall provide reports, documents, plans and fees as required for obtaining all contractor procured permits at no additional cost to the Owner.

1.4 QUALITY ASSURANCE: Contractor shall conduct inspections of construction operations to insure compliance and report all violations to the Engineer.

1.5 SITE CONDITIONS:

- A. Contractor shall practice and be fully responsible for good housekeeping activities and procedures to prevent oil spills, hazardous waste contamination and spills, unauthorized environmental pollution and safety violations.
- B. The Contractor is advised that there are cultural resources located in the Project area. Those resources identified by the NC Department of Cultural Resources are shown on the Drawings. Should dredging or

earth-moving operations expose shipwrecks or other cultural resources, work in the area of the discovery shall cease, and the discovery will be reported to the Engineer.

- C. There are no restroom facilities available to the Contractor on the site. Contractor shall make arrangements for restroom facilities for employees at no additional costs to the Owner. Disposal of waste from portable restroom facilities shall be in accordance with applicable local, state and federal regulations.
- D. Contractor shall assure reasonable access to the site for Owner's Site Representative, Engineer, and regulatory agency personnel.

#### 1.6 SEQUENCING AND SCHEDULING:

- A. Contractor shall provide ample notification to regulatory agencies for scheduled construction activities and inspections, if a regulatory inspector is required for observation.
- B. Contractor shall conduct operations in accordance with the sequence of operations indicated in the Contract Documents and as required by the permit conditions. Deviations from the sequence of construction shall be reported to the Engineer.

#### 1.7 PROTECTION OF ENDANGERED SPECIES AT SEA:

(National Marine Fisheries Service requires following the USACE South Atlantic Division Hopper-Dredging Protocol, which is abstracted as follows. **More stringent requirements that have been added to this Project are shown in boldface.**)

Federal and state permits for the project specify detailed measures for protection of endangered species during project operations. The measures are given in Special Conditions in the permits which are incorporated into the Project Manual and made a part of the project specifications herein. Following is an abbreviated list of protection measures and special conditions along with its specific reference paragraph number found in the federal permit (USACE paragraph #) or in the state permit (NC CAMA paragraph #).

##### 1.7a. Endangered Species Protection (USACE Paragraph #2)

- A. Hopper dredging is being approved under the South Atlantic Regional Biological Opinion (RBO) dated 1997, which can be viewed on the ERDC web site at the following link: <http://el.erd.c.usace.army.mil/seaturtles/refs-bo.cfm>. The RBO includes an Incidental Take Statement (ITS) issued to the U.S. Army Corps of Engineers (USACE). Under the RBO/ITS, incidental takes are authorized on a Fiscal Year (FY) (October 1 - September 30) basis to be metered out by the Division Commander, South Atlantic Division, USACE for the southeastern United States for Corps civil and military projects. The Contractor shall avoid any incidental take in that such take may trigger the cessation of hopper dredging for the remainder of that FY. **The Contractor understands and agrees that, even where it is in full compliance with the terms and conditions of the RBO/ITS, an incidental take during the Project may require suspension of the permit by the USACE. The amount of incidental take that will trigger suspension, and the need for any such suspension, shall be determined at the discretion of the Corps. The Contractor understands and agrees on behalf of itself, its agents, subcontractors, and other representatives, that no claim, legal action in equity or for damages, adjustment, or other entitlement against the USACE or the Town of Nags Head (NC) shall arise as a result of such suspension or related action.**
- B. The Contractor shall immediately notify the Project Engineer, Town of Nags Head, and USACE Regulatory Project Manager that an incidental take has occurred. The Regulatory Project Manager responsible for the Project is Mr. Raleigh Bland who may be contacted at the Washington Regulatory Field Office, Post Office

Box 1000, Washington, North Carolina, 27889, by telephone at (910) 251-4564, or by e-mail [raleigh.w.bland@usace.army.mil](mailto:raleigh.w.bland@usace.army.mil). **Dredging operations shall immediately cease upon incidental take of any sea turtle species until the District Commander (or his designee) notifies the Contractor to resume dredging.** The Sea Turtle Mortality Report will be completed by the Observer within six (6) hours of the take event and will be e-mailed in pdf format to [takereport.nmfsser@noaa.gov](mailto:takereport.nmfsser@noaa.gov), the Regulatory Project Manager, the Town of Nags Head, and the Project Engineer. In accordance with the RBO, all hopper dredges shall have an Observer on board who meets the guidelines as established on the website (<http://el.erdc.usace.army.mil/seaturtles/docs/observercriteria.pdf>).

1.7b. Pre-Dredging Submittals (USACE Paragraph #3)

- A. **No dredging shall be performed by a hopper dredge without the inclusion of a rigid, sea-turtle deflector device.** The Contractor shall electronically submit drawings showing the proposed device and its attachment to the Project Engineer and the Regulatory Project Manager. These drawings shall include the approach angle for any and all depths to be dredged during the dredging.
- B. The Contractor shall electronically submit detailed drawings showing the proposed drag head grating system(s) and drag head(s), and documentation that supports grate sizing such as dredge pump manufacturer's recommended maximum particle size dimension(s), etc.
- C. The Contractor shall electronically submit an operational plan to achieve protection of sea turtles during the hopper dredging operation. These operational procedures are intended to stress the importance of balancing the suction pipe densities and velocities in order to keep from taking sea turtles.
- D. **During turning operations, the pumps must either be shut off or reduced in speed to the point where no suction velocity or vacuum exists. No dredging work shall be allowed to commence until approval of the turtle deflector device has been granted by the USACE, Wilmington District.** Sample Turtle Deflector Design Details are available on the website: [www.saj.usace.army.mil/Divisions/Engineering/DOCS/CADD/appentit/01355/deflector.pdf](http://www.saj.usace.army.mil/Divisions/Engineering/DOCS/CADD/appentit/01355/deflector.pdf). A copy of the approved drawings and calculations shall be available on the vessel during dredging operations.

1.7c. Pre-Dredging Inspection (USACE Paragraph #4) – A pre-dredging inspection of the hopper dredge shall be performed by the Wilmington District inspector in accordance with the protocol Sea Turtle Compliance Inspection Checklist located on the website (<http://el.erdc.usace.army.mil/seaturtles/docs/deflector-checklist.pdf>).

1.7d. Hopper Dredge Equipment (USACE Paragraph #5) – Hopper dredge drag heads shall be equipped with rigid sea turtle deflectors which are solidly attached. No dredging shall be performed by a hopper dredge without an installed turtle deflector device approved by the District inspector. Sample Turtle Deflector Design Details are on the web site: [www.saj.usace.army.mil/Divisions/Engineering/DOCS/CADD/appentit/01355/deflector.pdf](http://www.saj.usace.army.mil/Divisions/Engineering/DOCS/CADD/appentit/01355/deflector.pdf).

A. Deflector Design

- 1) The leading V-shaped portion of the deflector shall have an included angle of less than 90 degrees. Internal reinforcement shall be installed in the deflector to prevent structural failure of the device. The leading edge of the deflector shall be designed to have a plowing effect of at least 6 inches in depth when the drag head is being operated. Appropriate instrumentation or indicator shall be used and kept in proper calibration to insure the critical "approach angle."

*[Information Only Note: The design "approach angle", or the angle of lower drag head pipe relative to the average sediment plane, is very important to the proper operation of a deflector. If the lower drag head pipe angle in actual dredging conditions varies tremendously from the design angle of*

*approach used in the development of the deflector, the 6-inch plowing effect does not occur. Therefore, every effort should be made to insure this design "approach angle" is maintained with the lower drag pipe.]*

- 2) If adjustable depth deflectors are installed, they shall be solidly attached to the drag head using either a hinged aft attachment point or an aft trunnion attachment point in association with an adjustable pin front attachment point or cable front attachment point with a stop set to obtain the 6-inch plowing effect. This arrangement allows fine-tuning the 6-inch plowing effect for varying depths. After the deflector is properly adjusted there shall be no openings between the deflector and the drag head that are more than 4-inches by 4-inches.

B. In-flow Baskets and Overflow Screening

- 1) The Contractor shall ensure that baskets or screening are installed over the hopper inflow(s) with no greater than 4-inch by 4-inch openings and if possible overflow screening. The method selected shall depend on the construction of the dredge used and shall be approved by the District Commander prior to commencement of dredging. The screening shall provide 100 percent screening of the hopper inflow(s). The screens and/or baskets shall remain in place throughout the performance of the work. The turtle deflector device and inflow screens shall be maintained in operational condition for the entire dredging operation. If during dredging operations, the Contractor cannot meet the requirements of the inflow screening contact the Regulatory Project Manager and the Project Engineer.
- 2) The Contractor shall install and maintain floodlights suitable for illumination of the baskets or screening to allow the Observer to safely monitor the hopper baskets or screening during non-daylight hours or other periods of poor visibility. Safe access shall be provided to the inflow baskets or screens to allow the Observer to inspect for turtles, turtle parts, or damage.

- C. Drag Head Grating – Drag head grating may be used to prevent over-sized objects (relative to respective pump and distribution system designs) from reaching and becoming lodged or damaging, the dredge pump and/or slurry distribution system. **The Contractor may not use a drag head grating system that would prevent turtle remains from entering the hopper inflow screening.** Detailed drawings showing the proposed drag head grating system(s) and drag head(s), and documentation that supports grate sizing (such as dredge pump manufacturer’s recommended maximum particle size dimension(s), etc.) shall be submitted. Exceptions for smaller drag head screens will be considered as necessary (e.g., in areas containing ordnance or excessive debris likely to clog or damage the pumps) with supporting justifications. No dredging shall begin until the District has approved all grating and screening.

1.7e. Hopper Dredge Operation (USACE Paragraph #6)

- A. The Contractor shall operate the hopper dredge(s) to minimize the possibility of taking sea turtles and to comply with the requirements stated in the Incidental Take Statement provided by the NMFS in their RBO.
- B. The turtle deflector device and inflow screens shall be maintained in operational condition for the entire dredging operation.
- C. When initiating dredging, suction through the drag heads shall be allowed just long enough to prime the pumps, and then the drag heads must be placed firmly on the bottom. When lifting the drag heads from the bottom, suction through the drag heads shall be allowed just long enough to clear the lines, and then must cease. Pumping water through the drag heads shall cease while maneuvering or during travel to/from the disposal area. If the required dredging section includes compacted fine sands or stiff clays, a properly configured arrangement of teeth may enhance dredge efficiency, which reduces total dredging hours, and

turtle takes. The operation of a drag head with teeth must be monitored for each dredged section to insure that excessive material is not forced into the suction line. When excess high-density material enters the suction line, suction velocities drop to extremely low levels causing conditions for plugging of the suction pipe. Dredge operators should configure and operate their equipment to eliminate all low-level suction velocities. Pipe plugging in the past was easily corrected, when low suction velocities occurred, by raising the drag head off the bottom until the suction velocities increased to an appropriate level. **Pipe plugging cannot be corrected by raising the drag head off the bottom.** Arrangements of teeth and/or the reconfiguration of teeth should be made during the dredging process to optimize the suction velocities.

- D. **Raising the drag head off the bottom to increase suction velocities is not acceptable.** The primary adjustment for providing additional mixing water to the suction line should be through water ports. To insure that suction velocities do not drop below appropriate levels, the Contractor shall monitor production meters throughout the job and adjust primarily the number and opening sizes of water ports. Water port openings on top of the drag head or on raised standpipes above the drag head shall be screened before they are utilized on the dredging project. If a dredge section includes sandy shoals on one end of a tract line and mud sediments on the other end of the tract line, the equipment shall be adjusted to eliminate drag-head pick-ups to clear the suction line.
- E. **The drag head shall be buried a minimum of six (6) inches in the sediment at all times.** There is no required dredging prism. The Contractor may remove material to a depth not to exceed 8.0 feet below the surface substrate including the minimum burial depth of the drag head.
- F. During turning operations, the pumps must either be shut off or reduced in speed to the point where no suction velocity or vacuum exists.

1.7f. Silent Inspector (USACE Paragraph #7) – **All hopper dredges shall be equipped with the Silent Inspector (SI) system for hopper dredge monitoring.** The SI system must have been certified by the Engineer Research and Development Center (ERDC) within the last year. Questions regarding certification should be addressed to the SI support team at 601-634-2923. Information about SI can be found at <http://si.wes.army.mil/index.html>. The data collected by the SI system shall, upon request, be made available to the Wilmington District.

1.7g. Sea Turtle Non-Capture Trawl Sweeping (USACE Paragraph #8)

- A. **To minimize or reduce taking of turtles during dredging, non-capture trawling is required.** This type of trawling is designed to use non-capture type trawling equipment to sweep in the proximity of the dredging operations in order to stimulate sea turtles to move out of the dredge path. No sea turtles will be captured using this trawling technique. **Non-capture trawl sweeping shall be performed 48 hours prior to initiating dredging and shall continue throughout dredging operations.** Conduct non-capture trawl sweeping operations in the vicinity of dredge operations, but maintain a safe distance from the dredge. Trawl equipment used (e.g. trawling nets) and trawl sweeping operations shall be conducted such that no sea turtles or other marine organism by-catch are captured. As much as possible, non-capture trawl sweeping shall be conducted to maximize the amount of time during each 24-hour trawl day that the trawl equipment (e.g. trawling nets) sweeps the bottom sediment in the vicinity of the dredging operation (i.e. maximize the bottom time with the trawling equipment). Such trawling in the vicinity of the dredge shall be conducted continuously, stopping after every 4 to 6 hours to check the condition of the trawl equipment and assure that no turtles have been captured.

- B. Non-capture Trawl Sweeping Period. Non-capture trawl sweeping shall be conducted as described below:
- 1) A day of non-capture trawl sweeping shall be defined as 24 hours of continuous trawling.
  - 2) Non-capture trawl sweeping may be conducted as 24-hours of trawling as a continuous trawl; however, two separate crews must be available on board to work two 12-hour shifts.
- C. Turtle Handling and Endangered Species Permits. No sea turtles are to be intentionally captured during non-capture trawl sweeping operations. No endangered species permits to handle sea turtles are required for non-capture trawl sweeping. Should a sea turtle become entangled in the trawling nets; the nearest marine facility must be notified for arrangements to be made to transfer the animal as needed.
- D. Reporting. A daily log will be kept for each non-capture trawl sweeping operations. The non-capture trawl sweeping log will be submitted to the Regulatory Project Manager and the Project Engineer at the completion of the project. Data to be included with this log daily will include:
- 1) GIS coordinate of trawl locations at the start and end of each sweep.
  - 2) Times recorded for the duration of each trawl sweep.
  - 3) Description of dredge proximity during each sweep.
  - 4) General notes as appropriate (e.g. condition of equipment at the end of each sweep, snags occurring during each sweep, incidental debris, etc.).
  - 5) Water Quality and Physical Measurements: Water temperature measurements shall be taken at the water surface each day using a laboratory thermometer. Weather conditions shall be recorded from visual observations and instruments on the trawler. Weather conditions, air temperature, wind velocity and direction, high and low tides, sea state-wave height, and precipitation shall be recorded on the Trawling Form on the web site (<Http://el.erdc.usace.army.mil/seaturtles/docs/trawlingforms.pdf>).
- E. Non-Capture Trawl Sweeping Equipment: The trawler shall be equipped with two 60-foot flat-style trawling nets with the bag or cod end of the nets removed to create a completely open bag or cod end of each net. As appropriate for the environmental conditions and sediment type, the lead line of each net shall be rigged with weights, mud rollers, tickler chains, and/or trawling cookies to ensure that the lead line and what was previously the mouth of the trawl net maintain contact with the sediment bottom.
- F. Trawler Equipment Breakdown: Should there be a breakdown of trawler equipment that would cause the trawler to leave the area where dredging is underway during any period of time when non-capture trawl sweeping is required, the dredge may continue to operate for up to **48 hours**, as long as no turtles are taken, and subject to the discretion of the Regulatory Project Manager. Should there be dangerously high seas that would cause the trawler to leave the dredging area when non-capture trawl sweeping is required, the dredge may continue to operate, as long as no turtles are taken; subject to the discretion of the Project Manager.
- 1.7h. Endangered Species Observers (USACE Paragraph #9)
- A. **During dredging operations, observers approved by the NMFS sea turtles, sturgeon and whales shall be aboard to monitor for the presence of the species.** Observer coverage shall be 100 percent (24 hr/day) and shall be conducted year round. During transit to and from the disposal area, the observer shall monitor from the bridge during daylight hours for the presence of endangered species, especially the Northern right whale, during the period December through March. During dredging operations, while drag heads are submerged, the observer shall continuously monitor the inflow and/or overflow screening for turtles and/or turtle parts and sturgeon and/or sturgeon parts. Upon completion of each load cycle, drag heads should be monitored as the drag head is lifted from the sea surface and is placed on the saddle to

assure that sea turtles that may be impinged within the drag head are not lost and unaccounted for. Observers shall physically inspect drag heads and inflow and overflow screening/boxes for threatened and endangered species take. Other abiotic and biotic debris found in the screens during their examination for sea turtle or sturgeon parts shall be recorded and then disposed of so as not to impede the functioning of the screens during the next load cycle.

- B. **Monitoring Reports.** The results of the monitoring shall be recorded on the appropriate observation sheets. There is a sheet for each load, a daily summary sheet, and a weekly summary sheet. In addition, there will be a post dredging summary sheet. Observations sheets will be completed regardless of whether any takes of sturgeon (Gulf, shortnose or Atlantic), whales, or sea turtles occur. In the event of any sea turtle or sturgeon (Gulf, Atlantic or shortnose) take by the dredge, appropriate incident reporting forms shall be completed. Additionally, all specimens shall be photographed with a digital camera. These photographs shall be attached to respective reports for documentation. Dredging of subsequent loads shall not commence until all appropriate reports are completed from the previous dredging load to ensure completeness and thoroughness of documentation associated with the incidental take.

Reports shall be submitted to the USACE Regulatory Project Manager and the Project Engineer within 24-hours of the take. Copies of the forms must be legible. Observer forms may be accessed on the web site (<http://el.erdc.usace.army.mil/seaturtles/docs/observerforms.pdf>).

- C. **Endangered Species Observer(s).** A list of endangered species observer-biologists (ESOs) that have been NMFS-approved to monitor threatened/endangered species takes by hopper dredges can be obtained by contacting NOAA Fisheries' Northeast Region, Protected Resources Division. The main contact is Ms. Julie Crocker at [julie.crocker@noaa.gov](mailto:julie.crocker@noaa.gov) or 978-281-9300 ext.6530.
- D. The Contractor shall provide a digital camera (with an image resolution capability of at least 300 dpi) to photographically report all incidental takes, without regard to species, during dredging operations. Immediately following the incidental take of any threatened or endangered species, images shall be provided via email, CD, DVD, or USB (thumb/flash/jump drive) to the Contracting Officer's Representative and the Project Engineer in a .JPG or .TIF format and shall accompany incidental take forms. The nature of findings shall be fully described in the incidental take forms including references to photographs.

1.7i. **Manatee, Sea Turtle, and Whale Sighting Reports (USACE Paragraph #10)** – Any take concerning a manatee, sea turtle, sturgeon, or whale (Atlantic only) or sighting of any injured or incapacitated manatees, sea turtles, or whales shall be reported immediately to the USACE by notifying the personnel indicated in the list in Item 1.7j. below. A copy of the incidental take report shall be provided within 24 hours of the incident. The Contractor shall also immediately report any collision with and/or injury to a manatee to the North Carolina Wildlife Resources Commission. If a sea turtle is taken by the dredge (live or dead), the Contractor shall email a PDF version of the incidental take report to NOAA-Fisheries Southeast Region at the following email address within 24 hours of the take: [takereport.nmfsser@noaa.gov](mailto:takereport.nmfsser@noaa.gov), also providing a copy to the Regulatory Project Manager and the Project Engineer.

1.7j. **Disposition of Sea Turtles or Turtle Parts (USACE Paragraph #11)** – Turtles taken by hopper dredge:

- A) **Dead Turtles** – Upon removal of sea turtle and/or parts from the drag head or screening, observers shall take photographs to sufficiently document major characteristics of the turtle or turtle parts including but not limited to dorsal, ventral, anterior, and posterior views. For all photographs taken, a backdrop shall be prepared to document the dredge name, observer company name, contract title, time, date, species, load number, location of dredging, and specific location taken (drag head, screening, etc.). Carcass/turtle parts

shall also be scanned for flipper and Passive Integrated Transponder (PIT) tags. Any identified tags shall be recorded on the “Sea Turtle Incidental Take Form” that is included in the “Endangered Species Observer Program Forms” located on the web site (<http://el.erdc.usace.army.mil/seaturtles/docs/observerforms.pdf>).

Turtle parts which cannot be positively identified to species shall be preserved by the observer(s) for later identification. A tissue sample shall be collected from any lethally taken sea turtle and submitted under the process stated in the *Protocol for Collecting Tissue Samples from Turtles for Genetic Analysis* found at the website:

[www.saj.usace.army.mil/Divisions/Engineering/DOCS/CADD/appentit/01355/geneticsampleprotocol.pdf](http://www.saj.usace.army.mil/Divisions/Engineering/DOCS/CADD/appentit/01355/geneticsampleprotocol.pdf).

After all data collection is complete, the sea turtle parts shall be placed in plastic bags, labeled as to the time, date, and dredged reach of collection, kept frozen and transported to the National Marine Fisheries Service Laboratory in Beaufort, North Carolina. If no local facility is capable of receiving the sea turtle/parts, they should be marked (spray paint works well), weighted down and disposed of under the direction of the Regulatory Project Manager.

- B) Live Turtles – Observer(s) shall measure, weigh, scan for Passive Integrated Transponder (PIT) tags, and photograph any live turtle(s) incidentally taken by the dredge. If no tagging was identified, observers shall tag the turtle using Iconnel flipper and PIT tags if they are qualified to do so. Observer(s) or their authorized representative shall coordinate with the Regulatory Project Manager to transport, as soon as possible, the live turtle(s) taken by the dredge to an approved rehabilitation facility in the project area.

1.7k. Report Submission (USACE Paragraph #12)

- A. **The Contractor shall maintain a log detailing all incidents, including sightings, collisions with, injuries, or killing of manatees, sea turtles, sturgeon (Gulf, Shortnose or Atlantic), or whales occurring during the contract period.** The data shall be recorded on forms available on the website (<http://el.erdc.usace.army.mil/seaturtles/docs/observerforms.pdf>). All data in original form shall be forwarded directly to Wilmington District within ten (10) days of collection. Following project completion, a report summarizing the above incidents and sightings shall be submitted to the following:

- 1) Wilmington District Regulatory Contact: [Raleigh.W.Bland@usace.army.mil](mailto:Raleigh.W.Bland@usace.army.mil)
- 2) South Atlantic Dredging Projects: [Terri.L.Jordan@usace.army.mil](mailto:Terri.L.Jordan@usace.army.mil)
- 3) National Marine Fisheries Service, Protected Species Management Branch, 263 13th Avenue South, St. Petersburg, Florida 33701
- 4) North Carolina Wildlife Resources Commission, 943 Washington Square Mall, Washington, North Carolina 27889
- 5) Project Engineer: CSE, PO Box 8056, Columbia, SC 29202 (mailing address)  
(Street Address 160 Gills Creek Parkway 29209)

1.7l. Sea Turtle Non-Capture Trawl Sweeping Requirement Clarification — In the event of contradictory or ambiguous special conditions of the federal or state permits for the project in regard to turtle trawling requirements, **the following requirements shall take precedence:**

- A. Non-capture trawl sweeping is **required at all times hopper dredges are conducting dredging operations**, regardless of time of year.
- B. One operating trawler is required per hopper dredge during dredging operations.
- C. No trawling is required in connection with operations by a cutterhead suction dredge.
- D. Trawling is not required during periods when a hopper dredge is pumping out or otherwise not dredging.

- E. If a trawler breaks down or can otherwise not accomplish non-capture trawling during hopper dredge operations, a backup trawler must be available for immediate deployment to the project site. Dredging operations may continue at the Contractor's risk of a turtle take for no more than 48 hours after a trawler breakdown before a replacement trawler is deployed to the project site, subject to the discretion of the Regulatory Project Manager.
- F. Should there be dangerously high seas that would cause the trawler to leave the dredging area when non-capture trawl sweeping is required, the dredge may continue to operate, as long as no turtles are taken, subject to the discretion of the Regulatory Project Manager.
- G. It is the intent of the regulatory agencies and special conditions of the federal and state permits for the project that no-capture trawling be accomplished at all times that hopper dredges are conducting dredging operations in the project area.

#### 1.8 PROTECTION OF ENDANGERED SPECIES ON THE BEACH:

(The following are required by US Fish and Wildlife Service.)

1.8a. Monitoring of required physical parameters (compaction, mud, escarpments) will be performed by the Engineer. Tilling to bring the fill within USFWS limits for compaction and grading to reduce escarpments will be performed by the Contractor.

1.8b. The filled beach is required to have compaction less than 500 pounds per square inch in the upper 18 inches. If a section is more compacted than this limit, the Contractor will be required to till the fill to a depth of 36 inches. Rakes must have tines at least 42 inches long and less than 36 inches apart.

1.8c. Escarpments within the fill may not exceed 18 inches in height for more than 100 feet in length. The Contractor will be required to grade the fill when this limit is exceeded.

1.8d. **Tilling and grading of the entire placed beach above mean high water must be performed once by the Contractor unless a minimum of 90 percent of the compaction measurements show values <500 psi in the upper 18 inches. Re-tilling of sections in the final 15 days of the Project will be required only if the escarpment and/or compaction limits listed above are exceeded.**

1.8e. Routine Beach Surveillance (USACE Paragraph #17) – The Contractor shall conduct routine beach surveillance during construction to prevent unintentional damage to sea turtles and their nesting areas. If a nest or a turtle crawl is identified in the project area, the Contractor will immediately stop all beach disposal activities and contact the USACE and the Project Engineer to determine appropriate action.

1.8f. Reporting Forms (USACE Paragraph #18) – To avoid use of outdated forms, the Contractor is directed to the following website for forms and attachments required during the Project. Links to these forms are under the heading *Turtle Information*, <http://el.erdc.usace.army.mil/seaturtles>. (List of forms required under permits for the Project include: Sea Turtle/Pre- and Post-Hopper Dredging Project Checklist, Endangered Species Observer Program Forms, Sea Turtle Tagging and Relocation Report, and Sea Turtle Trawling Report.)

1.8g. Authorized Dredging Activities (USACE Paragraph #19) – Dredging activities authorized by the permit for the Project shall not in any way interfere with those operations of the Wilmington District Civil Works dredging and navigation projects, specifically the *Dare County Hurricane Protection and Beach Erosion Control Project* (Dare County Beach 2000 Project).

1.8h. Compliance (USACE Paragraph #20) – All work authorized by the permit for the Project must be performed in strict compliance with the 18 August 2008 U.S. Fish and Wildlife Service (USFWS) Biological Opinion and Incidental Take Statement for the Nags Head Beach Nourishment Project.

1.8i. Protection of Sea Turtles (NC CAMA page 4) – To ensure protection of sea turtles, the Contractor shall implement the following practices throughout the entire project area from May 1 through November 15 for the duration of the authorized project:

- A. In each case of observation of sea turtles (nesting females, hatchlings or eggs), designated local personnel and the Project Engineer shall immediately be notified.
- B. If a sea turtle is observed in the project area during the project, all work shall immediately be stopped within 500 ft of the turtle. If the turtle successfully places a clutch of eggs on the beach, work in the area shall not resume until the eggs can be relocated to a safe area. If the turtle returns to the water without nesting, work may resume in the affected area.
- C. If recently emerged hatchlings from an unmarked nest are observed, all work shall immediately stop within 100 ft of the hatchlings, and all artificial lighting shall be extinguished within 500 ft of the hatchling to facilitate sea-finding behavior of the hatchlings. Work shall not resume within 100 ft of the emerged nest until authorized sea turtle volunteers can excavate the nest and release any remaining hatchlings into the ocean.
- D. Nests located in areas where beach nourishment material is to be placed prior to nest hatching shall be relocated to typical nesting habitat on the beach outside of the project area. Nesting surveys and egg relocations shall be conducted only by NC Wildlife Resources Commission permitted personnel with prior experience and training. Only nests that will be affected by construction activities may be moved.
- E. If any nests or eggs are discovered during the Project, all project activity shall immediately cease within 50 ft of the location of the eggs or nest. Work in the affected area shall only resume after receiving permission from NC Wildlife Resources Commission staff.
- F. During beach nourishment activities, daily monitoring shall be conducted to determine if escarpments have formed. Any escarpments greater than 18 inches that are present between May 1 and August 30 in the area within 2,000 linear feet of the active beach fill area shall be leveled by the Contractor.
- G. During the sea turtle season (May 1 through November 15), efforts shall be made to minimize impacts to sea turtle access to the beach to the maximum extent possible by storing equipment and materials off of the beach, perpendicular to the beach, or at the landward most area of the beach that does not compromise dune integrity.
- H. During the sea turtle season (May 1 through November 15), night-time lighting associated with nourishment activities shall be minimized. Lighting shall be limited to the immediate construction area and shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excess illumination of the water surface and nesting beach.

1.9 COMPLIANCE WITH APPLICABLE PERMITS: Terms and conditions of the applicable permits and regulations listed in 1.2 A of the Section are incorporated into these Contract Documents by reference. Contractor is responsible for adherence to terms and conditions of permits.

1.9a. Submerged Cultural Resources (USACE Paragraph #33) – If submerged cultural resources are encountered during the operation, the Contractor shall immediately notify the USACE so that coordination can be initiated with the Underwater Archeology Unit (UAU) of the NC Department of Cultural Resources.

1.9b. Excavation, Fill or Mechanized Land-Clearing Activities (USACE Paragraph #35) – Except as authorized by the permit for the Project or any USACE-approved modification to the permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction of the Project within waters or wetlands. Temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area is prohibited. This prohibition applies to all borrow and fill activities connected with the Project.

1.9c. Mechanized Equipment Inspection (USACE Paragraph #36) – The Contractor is required to regularly inspect and maintain all mechanized equipment, and avoid contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the Contractor shall immediately report it to the N.C. Division of Water Quality at (919) 733-5083, extension 526, or (800) 662-7956, and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

1.9d. Sedimentation and Erosion Control Measures (USACE Paragraph #37) – The Contractor shall employ all sedimentation and erosion control measures feasible to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. Additionally, the Contractor must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

1.9e. Public's Right to Navigable Waters (USACE Paragraph #43) – The Contractor must not interfere with the public's right to free navigation on all navigable waters of the United States. No attempt will be made by the Contractor to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work for reason other than safety.

1.9f. Compliance with US Coast Guard Regulations (USACE Paragraph #44) – The Contractor will comply with all U.S. Coast Guard regulations for dredging operations and contact Mr. Tom Flynn, United States Coast Guard, District 5 Waterways at (757) 398-6229, at least thirty (30) days prior to construction. Contact with the U.S. Coast Guard will initiate the Local Notice for Mariners procedures to ensure all safety precautions for aids to navigation are implemented. The Contractor shall notify the USACE and the Project Engineer when this coordination with the U.S. Coast Guard has commenced and shall provide updates as requested.

1.9g. Installation and Maintenance of Signal Lights and Signals (USACE Paragraph #45) – The Contractor must install and maintain, at his expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on authorized facilities. For further information, the Contractor should contact the U.S. Coast Guard Marine Safety Office at (910) 772-2200.

END OF SECTION

*[Federal Permit Action ID SAW 2006-40282,  
NC-DENR DWQ Approval 401 Water Quality Certification,  
and NC Major CAMA Permit 45-10 follow]*

**SECTION 01100**

**SUMMARY OF WORK**

**PART 1 - GENERAL**

**1.1 WORK COVERED BY CONTRACT DOCUMENTS**

Work described in this Project Manual includes the provision of labor, materials, equipment, and services required to complete beach nourishment, Nags Head, Dare County, North Carolina.

**1.2 CONSTRUCTION CONTRACT**

The project construction will be under a single Contract with the Owner let under one contract with the Town of Nags Head (Owner), Nags Head, North Carolina. The Owner expects all awarded portions of this Project to proceed with deliberate speed. Suspension of work on this project, in order to perform work on other projects, will not be allowed, unless otherwise provided for in these specifications due to safety considerations.

**1.3 TYPE OF WORK**

Work consists of the following:

- A. Dredging by ocean-certified hopper dredge and/or cutterhead suction dredge, placement, grading, and environmental protection as specified under federal and state permits of up to 4,600,000 cubic yards on 53,400 linear feet of Nags Head beach in four reaches identified as follows:
  - 1) Reach 1 – Minimum of 1,063,500 cubic yards (Base Bid quantity) up to 1,634,700 cubic yards (Base Bid plus Alternate Bid quantity) over 29,900 linear feet (lines 491+00 to 790+00).
  - 2) Reach 2 – Minimum of 886,000 cubic yards (Base Bid quantity) up to 1,366,500 cubic yards (Base Bid plus Alternate Bid quantity) over 13,000 linear feet (lines 790+00 to 920+00).
  - 3) Reach 3 – Minimum of 974,000 cubic yards (Base Bid quantity) up to 1,480,000 cubic yards (Base Bid plus Alternate Bid quantity) over 9,000 linear feet (lines 920+00 to 1010+00).
  - 4) Reach 4 – Minimum of 76,500 cubic yards (Base Bid quantity) up to 118,800 cubic yards (Base Bid plus Alternate Bid quantity) over 1,500 linear feet (lines 1010+00 to 1025+00).

The sand is to be dredged from two designated offshore borrow areas (#2 and #3 as illustrated on the Drawings) by hopper dredge and/or cutterhead suction dredge, pumped onto the beach, and shaped to the grades and quantities indicated on the Drawings.

- B. Borrow Area #2 encompasses 320.3 acres and Borrow Area #3 encompasses 306.0 acres. The maximum depth of excavation allowed is 8.0 ft including over-dredge. The maximum area of excavation allowed is 575 acres.
- C. There are no seasonal or environmental time restrictions for execution of the Work. However, dredging and placement operations will be subject to certain environmental protection measures as detailed in federal and state permits. Protection measures include open-net trawling for turtles ahead of the dredge(s) during designated periods, use of deflectors and specific equipment modification onboard hopper dredges, specific operations requirements and use of silent inspectors onboard dredges, and use of certified endangered species monitors onboard dredges. Contractor must implement protection measures as specified in federal and state permits for the project (copies of which are included in Technical Specifications 01060 Regulatory Requirements of this Project Manual). **Contractor's price to accomplish all Work is to include the cost of required environmental protection measures unless otherwise indicated in the Bid Forms.**
- D. Reach 3 (lines 920+00 to 1010+00) includes placement of dune/stockpile volume seaward of existing escarpments, emergency sand bags, and/or building foundations occurring within the designated fill template. No fill is to be placed on exposed emergency sand bags or exposed pilings, or under houses, or under exposed walkovers, or along the landward side of houses.
- E. Tilling of the beach in accordance with requirements of the Contract Documents.
- F. Restoration of access and infrastructure to conditions existing before construction.
- G. Notice to Proceed will be issued on or after **12 April 2011**.
- H. Contractor may store/stockpile equipment within Town of Nags Head limits at site(s) designated by the Owner in the event of a hiatus in construction. The cost of multiple mobilizations and demobilizations under Bid A or Bid B, if applicable, are to be included in the Contractor's price.
- I. Substantial Completion of Work under Bid A (including removal of equipment from the beach) will be by 26 November 2011. All equipment must be removed from the beach under Bid A by 12 December 2011.
- J. Partial Completion of Work under Bid B (placement of a minimum of 2,000,000 cubic yards) will be by 12 October 2011. Substantial Completion of Work under Bid B (including removal of equipment from the beach) will be by 26 July 2012. All equipment must be removed from the beach under Bid B by 12 August 2012.
- K. The order of Work is generally to accomplish the central ~32,000 linear feet (approximately lines 600+00

to 920+00) of the project area, then the northernmost ~10,900 linear feet (approximately lines 491+00 to 600+00), then the southernmost ~10,500 linear feet (approximately lines 920+00 to 1025+00). The specific boundaries of initial work will be determined based on the total quantities of fill available under the Contract in consultation with the Owner, the Engineer, and the Contractor.

- L. If there is a hiatus in construction greater than 90 days, the Contractor may be required to renourish the ends of completed sections up to 1,500 linear feet of overlap. The Owner reserves the right to revise the fill schedule following a hiatus in construction by up to 25 percent of the remaining volume originally scheduled for the reach at no penalty. Any renourished sections (overlap areas) will be paid based on surveyed volumes in place using an updated condition survey. The maximum overlap will be 3,000 linear feet (ie – 1,500 linear feet at the south end and 1,500 linear feet at the north end) of the Work Area completed prior to a hiatus in construction.

1.4 OWNER'S SITE REPRESENTATIVE

- A. Contractors shall cooperate with Owner's Site Representative to minimize conflict, and to facilitate Owner's operations.
  
- B. Contractor will provide all safety fencing, signage, barricades and other measurers required to ensure protection to public.

**PART 2 - PRODUCTS** – See Section 02230 – Part 3

**PART 3 - EXECUTION** – See Section 02230 – Part 4

END OF SECTION

## **SECTION 02230 – BEACH NOURISHMENT**

### **PART 1 – GENERAL**

The work covered by this section consists of furnishing all necessary plant, equipment, labor and materials, and performing all operations required to dredge beach fill material and to insure placement of the fill material within the lines and grades as required by the Contract documents.

#### 1.1 APPLICABLE PUBLICATIONS:

##### 1.1.1 American Society for Testing and Materials (ASTM) publications:

A123 Zinc (hot galvanized) Coatings on Products Fabricated from Rolled, Presses and Forged Steel Shapes, Plates, Bars and Strip.

A153 Zinc Coating (Hot Dip) on Iron and Steel Hardware

##### 1.1.2 American Wood Preservers Association (AWPA) Publications:

C18 Standard or Softwood Pressure Treated Material in Marine Construction

#### 1.2 DESCRIPTION OF THE WORK: Per Section 01100 (Summary of Work) of these Specifications.

1.3 CRITERIA FOR BIDDING: Bids shall be based on the total quantity of material to be dredged from the borrow area and placed on the beach to the final grades and quantities within the time period indicated in the Contract Documents, and meeting the environmental protection requirements under federal and state permits. Bids shall be based on the material to be dredged having the borrow area sediment characteristics, depth and location indicated in the Contract Documents.

### **PART 2 – PROTECTION**

#### 2.1 DUNE RESTORATION AND PROTECTION:

- A. The Contractor shall exercise extreme care in conducting filling and equipment moving activities on the beach so that existing dunes and dune vegetation are protected to the greatest extent possible. Designated access areas are indicated on the Drawings. These areas include dune crossing routes and paved and unpaved areas behind the dunes for storage of equipment and materials. Restoration is required by the Contractor in the upland areas of any beach access used by equipment.

- B. If the Contractor wishes to place a new access anywhere other than existing accesses or dune escarpments at the designated staging-areas, he must first obtain approval from the Engineer.
  
- C. Any temporary pavement, stone or other temporary road base materials placed in the dunes or on any portion of the beach for the purposes of providing access roads for equipment shall be completely removed and the dune and beach area restored to pre-project grades. Debris from removal shall be the property of the Contractor and shall be disposed of in a manner meeting all local, state and federal regulations. Damage done to dune vegetation and existing elevation contours shall be restored to the pre-project conditions by the Contractor at no additional cost to the Owner. This restoration may include grading and replacement of vegetation including sprigging of beach grasses in the areas as directed by the Engineer.

2.2 ENVIRONMENTAL PROTECTION: The Contractor shall provide all the necessary plant, equipment, labor and materials to provide the protection to environmental resources as required by Section 01060, entitled "Regulatory Requirements."

2.3 PROTECTION AND RESTORATION OF SHORE PROTECTION AND ACCESS STRUCTURES: The Contractor shall be responsible for protecting existing structures located in or contiguous to the beach areas to be filled. Structures in the beach and adjacent areas include but are not limited to ocean outfalls, piers, foundations, emergency sandbags, paved and unpaved roads, viable trees, and vegetation located along the shoreline as shown on the Drawings. The Contractor shall work seaward of existing structures and sufficiently away from each side of the existing outfalls and piers to avoid damaging the structures. This does not preclude placement of discharge pipe under piers necessary to complete the section.

2.3.1 *Timber Repairs.* Repairs shall be made with stress rated, No. 1 structural, S4S, southern yellow pine of the dimensions required for replacement of the damaged structure to its pre-project condition. Treatment shall be 0.8 pounds per cubic foot CCA in accordance with AWPA C18 for timber subject to saltwater splash and 2.5 pound per cubic foot for timber subject to saltwater submersion. Hardware including nuts, bolts, nails, screws, and washers shall conform to ASTM A307 and shall be galvanized in accordance with requirements of ASTM A 123 and/or ASTM A 153, as applicable after fabrication.

### **PART 3 – PRODUCTS**

3.1 BORROW MATERIAL: Only the borrow site indicated in the Contract Documents shall be used for the Project. The Contractor shall endeavor to utilize Borrow Area #2 and Borrow Area #3 within the permitted borrow area as shown on the Drawings unless otherwise directed by the Engineer. The character of the borrow area materials to be used and the location of the borrow areas to be excavated are shown on the

Drawings. If directed by the Engineer, the Contractor shall change the location and/or depth of excavation within the borrow limits when necessary to provide the best fill material available. The materials to be excavated from the borrow area are believed to be predominantly medium, clean sand with a mean grain size of 0.404 millimeters (mm). The Contractor is responsible for monitoring the characteristics of the sand pumped to the beach on a continuous basis. If the Contractor discovers that material being pumped onto the beach contains mud, mud balls, gravel, or organic materials, the Contractor shall stop dredging immediately and relocate dredging to a different part of the borrow area where acceptable material is available. The maximum depth of excavation allowed is 8.0 ft including over-dredge. The maximum area of excavation allowed is 575 acres. The Contractor shall not exceed the cut depth and allowance indicated on the plans for the borrow area. If dredging is stopped by the Engineer or Owner because of unacceptable material being pumped to the beach, the Contractor is responsible for all associated delay costs. The Contractor is advised that geotechnical data in the designated borrow area are limited to the information shown on the plans.

3.2 SUBSURFACE INVESTIGATIONS: The borrow area sediment characteristics shown on the Drawings are classified in accordance with the Wentworth Classification System. The borrow area location and depth of sediments information shown on the Drawings is to be used by the Contractor to maximize the quality of the fill materials and to optimize dredging operations to the benefit of the Contractor and the Owner.

#### **PART 4 – EXECUTION**

4.1 ORDER OF THE WORK: Beach filling operations shall be completed based on the following scheduling restrictions:

- A. The Contractor shall first accomplish the central ~32,000 linear feet of the Project area (approximate lines 600+00 to 920+00), then the northernmost ~10,900 linear feet of the Project area (approximate lines 491+00 to 600+00), then the southernmost ~10,500 linear feet of the Project area (approximate lines 920+00 to 1025+00). The specific boundaries of the initial work will be determine based on the total quantities of fill available under the Contract in consultation with the Owner, the Engineer, and the Contractor.
- B. If there is a hiatus in construction greater than 90 days, the Contractor may be required to renourish the ends of completed sections up to 1,500 linear feet of overlap. The maximum overlap will be 3,000 linear feet (ie – 1,500 linear feet at the south end and 1,500 linear feet at the north end) of the Work Area completed prior to a hiatus in construction,

4.2 BEACH NOURISHMENT: Prior to placement of fill, the Contractor shall remove from the site of the work all snags, driftwood, and similar debris lying within the foundation limits of the beach fill that may

interfere with his execution of the project section. All materials removed shall become the property of the Contractor and shall be disposed of in accordance with all applicable local, state and federal regulations. The excavated fill material shall be placed and brought to rest on the beach approximately to the lines, grades, and cross-sections indicated on the project Drawings, unless otherwise indicated by the Engineer. The beach is subject to changes, and the elevations on the beach at the time the work is performed may vary from the elevations shown on the Drawings. The Engineer reserves the right to vary the width and grade of the beach from the lines and grades shown on the plans in order to establish a uniform beach for the designated lengths of the project reaches. Such alterations of grades by the Engineer will not change the total quantities to be dredged. The Contractor will not be required to grade the fill below the mid tide elevation. Grading and other construction equipment will not be permitted outside the construction limits of the project except for ingress and egress to and from the site.

4.2.1 *Distribution of Borrow Materials.* The Contractor is to utilize Borrow Area #2 and Borrow Area #3 within the permitted borrow area as shown on the Drawings. The Contractor shall dredge only within the boundaries of the designated offshore borrow area unless otherwise directed by the Engineer. Relocation of dredging within the confines of the designated borrow area may be required as indicated in section 3.1 of this specification. Maximum allowable depth of dredge cut is 8 ft below grade, as shown on the Drawings.

4.2.2 *Work Area.* The beach areas where the beach nourishment is to be accomplished are shown on the Drawings. The Contractor shall accomplish the work in such a manner as to minimize disruption to beach activity. The Contractor will be permitted to exclude the public for safety purposes from the work areas in the immediate vicinity of his fill placement operations. Construction access is provided as shown on the Drawings. Procurement of additional access routes for ingress and egress to the construction area and/or temporary stockpiling of material shall be obtained by and at the expense of the Contractor and with consent of the Engineer and the Owner.

4.2.3 *Dikes and Confinement.* The Contractor may, at his discretion, construct temporary dikes, spillways and channelization on the beach as necessary to construct beach fill. All such diking shall be constructed above the mean low water elevation. Such diking as may be required to aid in controlling the seaward flow of material at discharge points shall also be provided when the material is discharged directly into the fill section. At the end of the beach fill placement operation, any back diking or embankments that are not incorporated in the work shall be graded to the existing surrounding elevations. If any material is deposited elsewhere than in places indicated on the Drawings, the Contractor may be required to remove such misplaced material and redeposit it where directed at his expense.

4.2.4 *Pipeline Discharge.* If the beach fill material is placed by discharging the material directly into the fill section, the dredge discharge points shall be manipulated and controlled by the Contractor in such a manner to minimize the direct discharge of material into the surf zone. The discharge shall be controlled by temporary diking, embankments, channeling, or other methods required to prevent damage to or erosion of the existing beach berm and dune.

4.2.5 *Submerged Pipelines.* In the event the Contractor elects to submerge his pipeline, the location of the submerged pipeline shall be marked with signs, buoys, and flags to comply with U. S. Coast Guard regulations. The planned submerged pipeline corridor(s) shall not go through the archaeological shipwreck preserve area shown on the Drawings. It shall be reviewed with the Engineer prior to placement of pipe.

4.2.5.1 Pipeline leakage. A tight dredge discharge pipeline shall be maintained along all sections of the pipeline to prevent spilling of dredged effluent outside of the beach fill section or stockpiling area. The Contractor shall insure that the pipeline remains free of leaks. Should leaks in the pipeline occur, the Contractor shall immediately cease pumping operations until the pipeline leak is repaired.

4.2.5.2 Booster pumps. In the event booster pumps are required along the dredge pipeline, they shall be located so as to minimize the disturbance of beach residents.

4.2.6 *Work Around Existing Structures (Piers, Outfalls, House Foundations, Sandbags and Beach Access Structures).* The Contractor shall exercise extreme caution around existing structures.

4.2.6.1 Piers. Pipeline may be placed under piers. Equipment ingress and egress is allowed where feasible under piers. The Contractor shall fill under piers to the extent practicable, without risking damage to the structures.

4.2.6.2 Outfalls. There are three outfalls at Reach 1 of Nags Head (lines 531+45, 554+67, 580+90) and one outfall at the sound end of Reach 4 near line 1025+00 as shown on the Drawings. Appropriate bridging or sand-layer protection shall be used when heavy equipment has to run over these outfalls in order to avoid any damage to the structures. No fill is to be placed over the seaward end of any outfall. Outfall extension is not part of the Project. The Contractor is required to mark azimuth of outfall and its seaward end via standing berm range stakes (minimum of 2 with flagging).

4.2.6.3 House Foundations. No fill shall be placed directly under houses or landward of houses within the fill limits. In the event some houses do not exist at time of construction, the Contractor shall fill to designed berm height subject to the Engineer's direction.

4.2.6.4 Sandbags. No sand shall be placed on any exposed sandbags.

4.2.6.5 Beach Access Structures. The Owner has identified public beach accesses and staging areas as shown on the Drawings. After completing the nourishment work, the Contractor is responsible for restoring the beach accesses, staging area(s), and any other disturbed infrastructure to original or better-than-original condition.

4.2.7 *Protective Dune and Stockpile Construction.* The Contractor will be required to construct a protective dune and/or stockpile sand above the normal fill berm elevation along all or a portion of Reach 3 (stations 920+00 to 1010+00). The maximum elevation of the protective dune will be +12 feet (ft) above NAVD. The maximum crest width of the protective dune will be 15 ft. The typical seaward slope of the protective dune will be ~1 on 5, and the maximum will be ~1 on 3. The protective dune will tie into the existing profile but in no circumstance encroach on existing vegetation. When existing buildings occur in the beach fill area, the Owner may require the Contractor to stockpile sand seaward of the structures to practicable elevations greater than +6 ft above NAVD so as to provide material for future redistribution by the Owner. The average dune section volume will be ~5 cubic yards per foot. Volumes of fill utilized in the dune and/or stockpiles in Reach 3 will be pay volumes without penalty subject to the Contractor by before and after dredging surveys.

4.2.8 *Monitoring of Beach Fill Operations.* The Contractor shall provide full-time monitoring of the placement of the beach fill material to assure work is in accordance with the Contract Documents. Monitoring shall be provided until all work has been accomplished and clean-up of the premises has been completed. Full-time monitoring shall be defined as having a minimum of one Contractor representative in the area of the pipe discharge at all times during construction. This monitor shall have a portable radio with them at all times while monitoring the site. This radio will be used to issue instructions to the dredge(s) which are working within the borrow area.

4.3 FINAL GRADING: Upon completion of all filling operations, the beach fill shall be graded the lines and grades indicated and finish grades to eliminate any undrained pockets and abrupt humps and depressions in the beach fill surfaces. Any bank or escarpment caused by ocean wave erosion of the fill berm shall be graded down to a smooth slope as directed by the Engineer.

4.3.1 *Tolerances.* A tolerance of five-tenths (0.5) of one foot is provided for the berm elevations indicated on the Drawings. These tolerances are not applicable for payment. The Contractor will be responsible for final grading of material above the mean tide elevation. The Contractor may, at his discretion, place beach fill initially at higher berm elevations to facilitate handling and control of volumes. However, final berm elevations shall be as indicated on the Drawings.

*Note: Project beach is subject to high wave energy during certain periods of the year. The Engineer may modify the design berm elevation for any portion of the project if it results in greater efficiency of project execution. The Contractor is to complete the fill berm at elevations shown on the Plans unless otherwise instructed by the Engineer.*

4.4 **TILLING OF COMPLETED BEACH:** The completed beach shall be tilled from the high water mark to the landward extent of the beach fill, or, in the event the existing beach has been disturbed by construction equipment moving along the beach, to the landward extent of that disturbance. Tilling shall be to a depth of thirty-six (36) inches and the beach shall be raked smooth prior to final acceptance.

4.5 **MEASUREMENT AND PAYMENTS:** The Contractor will survey beach fill volume changes between Before-Dredging (BD) conditions and After-Dredging (AD) profiles on the nourished beach. A preconstruction survey (BD) at the scheduled fill area shall be performed prior to construction but no more than one month prior to construction, to be paid for by the Contractor. Such survey may be performed as soon as possible after Notice to Proceed. No fill may be placed between any two stations until after those stations have a preconstruction survey performed and the survey is presented to and approved by the Engineer. Surveying shall be completed by a surveyor licensed to practice in the State of North Carolina and shall meet the requirements of this specification. The Engineer will perform spot-check surveys for verification.

4.5.1 *Acceptance and Payment.* Monthly and final applications for payment shall be accompanied with results of a beach survey, sealed and signed by a registered North Carolina Professional Land Surveyor.

4.5.2 *Payment Limits.* Placed volumes are shown in the Drawings at each station. If the cubic yards per foot placed falls more than 10 percent below the design volume at any station, the Contractor may be required to return to that station and place additional material. If the placed cubic yards per foot exceed the design volume in the Drawings, the Contractor will not be paid for more than 10 percent overage. In addition to this restriction, Final Payment may not exceed the total Awarded volume including the Base Bid and Alternates awarded. The Contractor may include in volume calculations for designated reaches of beach, documented volumes of fill material on the beach beyond the ends of the taper sections in each designated

reach to a maximum of 1,000 linear feet in either direction. Survey of extended reaches shall meet the specifications for survey of the designated project fill areas. Such volumes will be made part of, but not additional to, the indicated reach volume.

4.5.3 *Survey Control and Baseline Reference:* All surveying by the Contractor and survey data provided to the Engineer shall be referenced to the project baseline shown on the Drawings. Beach transect stations shall be referenced to the baseline by baseline station and offsets based on the baseline as the zero (0.0) offset point. Elevations in all data sets shall be in feet relative to National American Vertical Datum of 1988 (NAVD'88). Data provided to the Engineer not in accordance with these requirements shall be rejected. If professional time is required by the Engineer to reconcile data provided not meeting these requirements, fees for that time shall be billed to the Contractor. Progress and final payments will not be approved until survey data and computed volumes have been received and approved by the Engineer.

4.5.4 *Survey Limits:* Survey beach transects shall be at minimum 100-ft spacing between transects. In the cross-shore direction, surveys shall extend backshore to at least the dune crest at the time of construction or to a point a minimum of 50 ft beyond the landward extent of the fill section. In the offshore direction, no payment will be made for fill claimed (1) seaward of the Contractor's AD survey limit on that station or (2) deeper than 16 ft below NAVD.

#### 4.6 REPORTING REQUIREMENTS:

4.6.1 *Surveying Reporting Requirements.* Submitted survey documentation shall be submitted with each pay request and shall consist of the following:

- a. Before- and After-Dredging electronic data files for each line containing station number, survey date, and ordered distance/elevation pairs. Elevations will be in feet relative to the datum shown on the Drawings.
- b. Survey records and volume computation sheets,
- c. A sheet listing volume changes at each Station,

4.6.2 *Progress Surveying Submittal Requirements.* The Contractor shall submit draft electronic Excel-spreadsheet data files by noon after each day of dredging, in the form of 4.6.1.a above. The Engineer will provide email addresses for transmission. This file will contain Before- and After-Dredging profiles for each 100-ft section completed the previous day. These draft data files need not necessarily have been checked by a licensed surveyor, but are the Contractor's best available information for determining volumes placed during the previous day's work. The purpose of this

immediate reporting requirement is to allow for monitoring of placement volumes and adjustments in the placement rate (cy/lf of beach) by the Engineer when significant under or over filling is discovered.

4.6.3 *Construction Photographs.* Provide periodic construction photographs in a digital format of the project area showing the specific reach of beach filled before and after filling operations are completed. Provide prints and digital files of photographs with print labeled to identify date and the work area by station and reach corresponding to the stations and reaches defined in the Drawings. Deliver prints and digital files to the Engineer.

4.7 QUALITY CONTROL:

4.7.1 *Reporting Requirements:* The Contractor shall maintain records of daily estimated production, both pumping and surveyed in-place (may be unofficial based on non-certified BD and AD surveys), delays, and other interruptions in the work. A record of each day (24-hour period) shall be submitted to the Engineer on the Quality Control form attached to this specification or on a form utilized by the Contractor that provides the same information.

END OF SECTION

<b>Contractors Quality Control Report</b> * Dredge QC Report		Report Number <b>1</b>	
Project NAGS HEAD BEACH NOURISHMENT 2011		Date *	
Contract Admin. CSE	Contractor *	<i>Weather</i>	Wind Direction: *
			Wind Speed: *
			Wave Height: *
<p><b>QC Narrative:</b> <i>Include Definable Features of Work, Control Phase, Submittal Status.</i></p> <p style="text-align: center;">*</p>			
<p><b>Tires Encountered and Delays:</b> <b>Description of Sediment:</b></p>			
<p><b>Testing:</b> Spec. Section: Description of Tests Performed:</p>			
<p>Passed/Failed:</p>			
<p><b>Instructions Given By Client:</b> <i>Include Number Reference.</i></p>			
<p><b>Safety Inspection/Meeting:</b> <i>Indicate inspections made, items inspected, deficiencies noted and corrective action taken.</i></p>			
<p><i>Follow-up Inspection: Note any deficiencies/corrections.</i></p>			
<p>Were there any lost time accidents this date?      No____ Yes____ <i>If yes, attach accident report.</i></p>			
<p><b>QA/QC Comments:</b></p>			
<p><b>Subcontractors on site:</b></p>			
<p><b>General Comments:</b></p> <div style="border: 1px solid black; height: 100px; width: 100%;"></div>			
<p><b>Contractor Certification:</b>      On behalf of the contractor, I certify that this report is complete and correct and all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.</p>			
QC Representative's Signature	Date *	Superintendent's Initials	Date *

DAILY REPORT OF OPERATIONS - HOPPER DREDGES					REPORT # 1		
NAGS HEAD BEACH NOURISHMENT 2011					DREDGE		
EXACT LOCATION OF WORK NAGS HEAD BEACH - REACH #					<input type="checkbox"/> CAPPING <input checked="" type="checkbox"/> NEW WORK	DATE	
						NUMBER OF PERSONS IN CREW	
	Borrow Area #2	Borrow Area #3			HOPPER CAPACITY	*	CYD
Length of Cut	* ft	* ft			AV. VOL. BIN WATER	*	CYD
Width of Cut	* ft	* ft			AV. UNFILLED CAP.	*	CYD
RT to dump	* mi	* mi					
NAVIGATION AND OTHER DREDGING AIDS (Describe and include statement on adequacy and recommendations)							
*							
WORK PERFORMED					DRAFT FOR LOAD NO. (for one load only)		
DREDGING AND HAULING					TOTAL	LIGHT	LOADED
# OF LOADS A	TOT. CYD A	# OF LOADS B	TOT. CYD B	TOTAL CYD	FORWARD	*	*
*	*	*	*	0	AFT	*	*
					DRAG DEPTH	*	
Cumulative					INDICATORS LAST CHECKED C	*	
					GAS EJECTORS USED	0 % OF PUMPING TIME	
DISTRIBUTION OF TIME AND MILES RUN							
EFFECTIVE WORKING TIME				AGITATING	DREDGING & HAULING		MILES RUN
					MINUTES	HOURS	
PUMPING						0.00	
TURNING						0.00	
SAILING						0.00	
CONNECT/DISCONNECT						0.00	
DISCHARGE						0.00	
TOTALS					0	0.00	
NON-EFFECTIVE WORKING TIME							
TAKING ON FUEL AND SUPPLIES							
TO AND FROM WHARF OR ANCHORAGE							
LOSS DUE NATURAL ELEMENTS					*		
STAND BY FOR OTHER DREDGE (PUMPOUT)							
MINOR OPERATING REPAIRS					*		
CLEARING DRAGHEADS							
CONNECT/DISCONNECT - PUMPOUT					*		
FIRE AND BOAT DRILLS							
MISCELLANEOUS							
TOTALS				0	0		
LOST TIME							
MAJOR REPAIRS AND ALTERATIONS							
CESSATION							
COLLISIONS							
TOTAL LOST TIME					0		
TOTAL TIME IN PERIOD				0			
AVERAGE SPEED OF DREDGE				MINUTES RADAR IN USE	CONTINUOUSLY		
LOADING * to * Knots				FEET/MINUTE	TIDE DATA FROM *		
AGITATING TODAY				TO DATE	WEATHER Wind Direction: *		
GALS. OF FUEL OIL CONSUMED *					NUMBER OF INSPECTIONS BY SUPERVISORY PERSONNEL		
GALS. OF WATER CONSUMED *					FIELD	OFFICE	
REMARKS							
LOCATION OF WORK: *							
CONTR. REP.				PROJ. INSP.			
ENG. FORM 27A				DATE: *			

**BREAKDOWN OF LOADS DREDGED AND HAULED**

Date:	*	TIME PUMPING (24 hrs)		MINUTES						
LOAD NO.	BORROW AREA	STARTED	STOPPED	PUMPING	TURNING	SAILING	WAITING TO CONNECT	CONNECTING	DISCHARGING	TOTAL
AVERAGE				#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		