TO: The Coastal Resources Commission

FROM: Christine A. Goebel, DEQ Assistant General Counsel

DATE: July 12, 2019 (for the July 17, 2019 CRC Meeting)

RE: Variance Request by the N.C. State Ports Authority (CRC-VR-19-07)

Petitioner N.C. Department of Transportation ("NCDOT" or Petitioner) manages the Hatteras Southdock Ferry Terminal facility on the north end of Ocracoke Island in Hyde County. On or about June 13, 2019, NCDOT submitted a request to DCM for an emergency shoreline stabilization project as a temporary measure until a long-term erosion control response could be implemented. On June 21, 2019, DCM issued an Emergency Major Modification to CAMA Major Permit No. 224-87 (the "Permit") authorizing the installation of an approximately 1,000 linear foot sheet pile bulkhead on the Estuarine Shoreline AEC. Conditioned out of the Permit was NCDOT’s proposal to use non-authorized sized sandbags, to construct a sandbag structure adjacent to the bulkhead but within the Inlet Hazard AEC that was at a partially-perpendicular alignment and is proposed to exceed the sandbag size limit rules, contrary to 15A NCAC 7H .0308(a)(2) (A) and (L). NCDOT now seeks a variance to allow the proposed sandbag structure to be authorized. Petitioner sought, and were granted special permission by the Chair to waive the usual variance procedure timeline rules and proceed in an expedited manner at your July meeting.

The following additional information is attached to this memorandum:

Attachment A: Relevant Rules
Attachment B: Stipulated Facts
Attachment C: Petitioner’s Positions and Staff’s Responses to Variance Criteria
Attachment D: Petitioner’s Variance Request Materials
Attachment E: Stipulated Exhibits including powerpoint

cc(w/enc.): NCDOT through counsel Special Deputy AG Scott Slusser & Asst. AG Mollie Cozart, NCDOT-Transportation Section, electronically
Mary Lucasse, Special Deputy AG and CRC Counsel, electronically
Kris Noble, Director, Hyde Co. Office of Planning, electronically
RELEVANT STATUTES OR RULES

SECTION .0300 - OCEAN HAZARD AREAS

15A NCAC 07H .0301 OCEAN HAZARD CATEGORIES

The next broad grouping is composed of those AECs that are considered natural hazard areas along the Atlantic Ocean shoreline where, because of their special vulnerability to erosion or other adverse effects of sand, wind, and water, uncontrolled or incompatible development could unreasonably endanger life or property. Ocean hazard areas include beaches, frontal dunes, inlet lands, and other areas in which geologic, vegetative and soil conditions indicate a substantial possibility of excessive erosion or flood damage.

History Note: Authority G.S. 113A-107(a); 113A-107(b); 113A-113(b)(6a); 113A-113(b)(6b); 113A-113(b)(6d);
113A-124;

15A NCAC 07H .0302 SIGNIFICANCE OF THE OCEAN HAZARD CATEGORY

(a) The primary causes of the hazards peculiar to the Atlantic shoreline are the constant forces exerted by waves, winds, and currents upon the unstable sands that form the shore. During storms, these forces are intensified and can cause significant changes in the bordering landforms and to structures located on them. Ocean hazard area property is in the ownership of a large number of private individuals as well as several public agencies and is used by a vast number of visitors to the coast. Ocean hazard areas are critical, therefore, because of both the severity of the hazards and the intensity of interest in the areas.

(b) The location and form of the various hazard area landforms, in particular the beaches, dunes, and inlets, are in a permanent state of flux, responding to meteorologically induced changes in the wave climate. For this reason, the appropriate location of structures on and near these landforms must be reviewed carefully in order to avoid their loss or damage. As a whole, the same flexible nature of these landforms which presents hazards to development situated immediately on them offers protection to the land, water, and structures located landward of them. The value of each landform lies in the particular role it plays in affording protection to life and property. (The role of each landform is described in detail in Technical Appendix 2 in terms of the physical processes most important to each.) Overall, however, the energy dissipation and sand storage capacities of the landforms are most essential for the maintenance of the landforms' protective function.

History Note: Authority G.S. 113A-107(a); 113A-107(b); 113A-113(b)(6a); 113A-113(b)(6b); 113A-113(b)(6d);
113A-124;
Eff. September 9, 1977;

15A NCAC 07H .0303 MANAGEMENT OBJECTIVE OF OCEAN HAZARD AREAS

(a) The CRC recognizes that absolute safety from the destructive forces indigenous to the Atlantic shoreline is an impossibility for development located adjacent to the coast. The loss of life and property to these forces, however, can be greatly reduced by the proper location and design of structures and by care taken in prevention of damage to natural protective features particularly primary and frontal dunes. Therefore, it is the CRC's objective to provide management policies and standards for ocean hazard areas that serve to eliminate unreasonable danger to life and property and achieve a balance between the financial, safety, and social factors that are involved in hazard area development.

(b) The purpose of these Rules shall be to further the goals set out in G.S. 113A-102(b), with particular attention to minimizing losses to life and property resulting from storms and long-term erosion, preventing encroachment of permanent structures on public beach areas, preserving the natural ecological conditions of the barrier dune and beach systems, and reducing the public costs of inappropriately sited development. Furthermore, it is the objective of the
Coastal Resources Commission to protect present common-law and statutory public rights of access to and use of the lands and waters of the coastal area.

History Note:  
Authority G.S. 113A-107(b); 113A-113(b)(6) a.; 113A-113(b)(6) b.;113A-113(b)(6)d.; 113A-124; Eff. September 9, 1977; Amended Eff. October 1, 1992; December 1, 1991; September 1, 1985; February 2, 1981.

15A NCAC 07H .0304  AECS WITHIN OCEAN HAZARD AREAS

The ocean hazard AECs contain all of the following areas:

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(2) Inlet Hazard Area. The inlet hazard areas are natural-hazard areas that are especially vulnerable to erosion, flooding, and other adverse effects of sand, wind, and water because of their proximity to dynamic ocean inlets. This area extends landward from the mean low water line a distance sufficient to encompass that area within which the inlet migrates, based on statistical analysis, and shall consider such factors as previous inlet territory, structurally weak areas near the inlet, and external influences such as jetties and channelization. The areas on the maps identified as suggested Inlet Hazard Areas included in the report entitled INLET HAZARD AREAS, The Final Report and Recommendations to the Coastal Resources Commission, 1978, as amended in 1981, by Loie J. Priddy and Rick Carraway are incorporated by reference and are hereby designated as Inlet Hazard Areas, except for:

(a) the Cape Fear Inlet Hazard Area as shown on the map does not extend northeast of the Bald Head Island marina entrance channel; and

(b) the former location of Mad Inlet, which closed in 1997.

In all cases, the Inlet Hazard Area shall be an extension of the adjacent ocean erodible areas and in no case shall the width of the inlet hazard area be less than the width of the adjacent ocean erodible area. This report is available for inspection at the Department of Environmental Quality, Division of Coastal Management, 400 Commerce Avenue, Morehead City, North Carolina or at the website referenced in Item (1) of this Rule. Photocopies are available at no charge.

15A NCAC 07H .0308  SPECIFIC USE STANDARDS FOR OCEAN HAZARD AREAS

(a) Ocean Shoreline Erosion Control Activities:

(1) Use Standards Applicable to all Erosion Control Activities:

(A) All oceanfront erosion response activities shall be consistent with the general policy statements in 15A NCAC 07M .0200.

(B) Permanent erosion control structures may cause significant adverse impacts on the value and enjoyment of adjacent properties or public access to and use of the ocean beach, and, therefore, unless specifically authorized under the Coastal Area Management Act, are prohibited. Such structures include bulkheads, seawalls, revetments, jetties, groins and breakwaters.

(C) Rules concerning the use of oceanfront erosion response measures apply to all oceanfront properties without regard to the size of the structure on the property or the date of its construction.

(D) Shoreline erosion response projects shall not be constructed in beach or estuarine areas that sustain substantial habitat for fish and wildlife species, as identified by natural resource agencies during project review, unless mitigation measures are incorporated into project design, as set forth in Rule .0306(h) of this Section.

(E) Project construction shall be timed to minimize adverse effects on biological activity.

(F) Prior to completing any erosion response project, all exposed remnants of or debris from failed erosion control structures must be removed by the permittee.
(G) Permanent erosion control structures that would otherwise be prohibited by these standards may be permitted on finding by the Division that:
(i) the erosion control structure is necessary to protect a bridge that provides the only existing road access on a barrier island, that is vital to public safety, and is imminently threatened by erosion as defined in Part (a)(2)(B) of this Rule;
(ii) the erosion response measures of relocation, beach nourishment or temporary stabilization are not adequate to protect public health and safety; and
(iii) the proposed erosion control structure will have no adverse impacts on adjacent properties in private ownership or on public use of the beach.

(H) Structures that would otherwise be prohibited by these standards may also be permitted on finding by the Division that:
(i) the structure is necessary to protect a state or federally registered historic site that is imminently threatened by shoreline erosion as defined in Part (a)(2)(B) of this Rule;
(ii) the erosion response measures of relocation, beach nourishment or temporary stabilization are not adequate and practicable to protect the site;
(iii) the structure is limited in extent and scope to that necessary to protect the site; and
(iv) a permit for a structure under this Part may be issued only to a sponsoring public agency for projects where the public benefits outweigh the significant adverse impacts. Additionally, the permit shall include conditions providing for mitigation or minimization by that agency of significant adverse impacts on adjoining properties and on public access to and use of the beach.

(I) Structures that would otherwise be prohibited by these standards may also be permitted on finding by the Division that:
(i) the structure is necessary to maintain an existing commercial navigation channel of regional significance within federally authorized limits;
(ii) dredging alone is not practicable to maintain safe access to the affected channel;
(iii) the structure is limited in extent and scope to that necessary to maintain the channel;
(iv) the structure shall not have significant adverse impacts on fisheries or other public trust resources; and
(v) a permit for a structure under this Part may be issued only to a sponsoring public agency for projects where the public benefits outweigh the significant adverse impacts. Additionally, the permit shall include conditions providing for mitigation or minimization by that agency of any significant adverse impacts on adjoining properties and on public access to and use of the beach.

(J) The Commission may renew a permit for an erosion control structure issued pursuant to a variance granted by the Commission prior to 1 July 1995. The Commission may authorize the replacement of a permanent erosion control structure that was permitted by the Commission pursuant to a variance granted by the Commission prior to 1 July 1995 if the Commission finds that:
(i) the structure will not be enlarged beyond the dimensions set out in the permit;
(ii) there is no practical alternative to replacing the structure that will provide the same or similar benefits; and
(iii) the replacement structure will comply with all applicable laws and with all rules, other than the rule or rules with respect to which the Commission granted the variance, that are in effect at the time the structure is replaced.

(K) Proposed erosion response measures using innovative technology or design shall be considered as experimental and shall be evaluated on a case-by-case basis to determine consistency with 15A NCAC 07M.0200 and general and specific use standards within this Section.
(2) Temporary Erosion Control Structures:

(A) Permitted temporary erosion control structures shall be limited to sandbags placed landward of mean high water and parallel to the shore.

(B) Temporary erosion control structures as defined in Part (A) of this Subparagraph may be used to protect only imminently threatened roads and associated right of ways, and buildings and their associated septic systems. A structure is considered imminently threatened if its foundation, septic system, or right-of-way in the case of roads, is less than 20 feet away from the erosion scarp. Buildings and roads located more than 20 feet from the erosion scarp or in areas where there is no obvious erosion scarp may also be found to be imminently threatened when site conditions, such as a flat beach profile or accelerated erosion, increase the risk of imminent damage to the structure.

(C) Temporary erosion control structures shall be used to protect only the principal structure and its associated septic system, but not appurtenances such as pools, gazebos, decks or any amenity that is allowed under Rule .0309 of this Section as an exception to the erosion setback requirement.

(D) Temporary erosion control structures may be placed waterward of a septic system when there is no alternative to relocate it on the same or adjoining lot so that it is landward of or in line with the structure being protected.

(E) Temporary erosion control structures shall not extend more than 20 feet past the sides of the structure to be protected except to align with temporary erosion control structures on adjacent properties, where the Division has determined that gaps between adjacent erosion control structures may result in an increased risk of damage to the structure to be protected. The landward side of such temporary erosion control structures shall not be located more than 20 feet waterward of the structure to be protected, or the right-of-way in the case of roads. If a building or road is found to be imminently threatened and at an increased risk of imminent damage due to site conditions such as a flat beach profile or accelerated erosion, temporary erosion control structures may be located more than 20 feet waterward of the structure being protected. In cases of increased risk of imminent damage, the location of the temporary erosion control structures shall be determined by the Director of the Division of Coastal Management or the Director’s designee in accordance with Part (A) of this Subparagraph.

(F) Temporary erosion control structures may remain in place for up to eight years for a building and its associated system, a bridge or a road. The property owner shall be responsible for removal of any portion of the temporary erosion control structure exposed above grade within 30 days of the end of the allowable time period.

(G) An imminently threatened structure or property may be protected only once, regardless of ownership, unless the threatened structure or property is located in a community that is actively pursuing a beach nourishment project, or an inlet relocation or stabilization project in accordance with Part (H) of this Subparagraph. Existing temporary erosion control structures may be permitted for additional eight-year periods provided that the structure or property being protected is still imminently threatened, the temporary erosion control structure is in compliance with requirements of this Subchapter, and the community in which it is located is actively pursuing a beach nourishment or an inlet relocation or stabilization project in accordance with Part (H) of this Subparagraph. In the case of a building, a temporary erosion control structure may be extended, or new segments constructed, if additional areas of the building become imminently threatened. Where temporary structures are installed or extended incrementally, the time period for removal under Part (F) or (H) of this Subparagraph shall begin at the time the initial erosion control structure was installed. For the purpose of this Rule:

(i) a building and its septic system shall be considered separate structures,

(ii) a road or highway may be incrementally protected as sections become imminently threatened. The time period for removal of each contiguous section of temporary erosion control structure shall begin at the time that the initial section was installed, in accordance with Part (F) of this Subparagraph.
For purposes of this Rule, a community is considered to be actively pursuing a beach nourishment or an inlet relocation or stabilization project in accordance with G.S. 113A-115.1 if it:

(i) has been issued an active CAMA permit, where necessary, approving such project; or

(ii) has been identified by a U.S. Army Corps of Engineers' Beach Nourishment Reconnaissance Study, General Reevaluation Report, Coastal Storm Damage Reduction Study, or an ongoing feasibility study by the U.S. Army Corps of Engineers and a commitment of local or federal money, when necessary; or

(iii) has received a favorable economic evaluation report on a federal project; or

(iv) is in the planning stages of a project designed by the U.S. Army Corps of Engineers or persons meeting applicable State occupational licensing requirements and initiated by a local government or community with a commitment of local or state funds to construct the project or the identification of the financial resources or funding bases necessary to fund the beach nourishment, inlet relocation or stabilization project.

If beach nourishment, inlet relocation or stabilization is rejected by the sponsoring agency or community, or ceases to be actively planned for a section of shoreline, the time extension is void for that section of beach or community and existing sandbags are subject to all applicable time limits set forth in Part (F) of this Subparagraph.

Once a temporary erosion control structure is determined by the Division of Coastal Management to be unnecessary due to relocation or removal of the threatened structure, it shall be removed to the maximum extent practicable by the property owner within 30 days of official notification from the Division of Coastal Management regardless of the time limit placed on the temporary erosion control structure. If the temporary erosion control structure is determined by the Division of Coastal Management to be unnecessary due to the completion of a storm protection project constructed by the U.S. Army Corps of Engineers, a large-scale beach nourishment project, or an inlet relocation or stabilization project, any portion of the temporary erosion control structure exposed above grade shall be removed by the property owner within 30 days of official notification from the Division of Coastal Management regardless of the time limit placed on the temporary erosion control structure.

Removal of temporary erosion control structures is not required if they are covered by sand. Any portion of the temporary erosion control structure that becomes exposed above grade after the expiration of the permitted time period shall be removed by the property owner within 30 days of official notification from the Division of Coastal Management.

The property owner shall be responsible for the removal of remnants of all portions of any damaged temporary erosion control structure.

Sandbags used to construct temporary erosion control structures shall be tan in color and three to five feet wide and seven to 15 feet long when measured flat. Base width of the temporary erosion control structure shall not exceed 20 feet, and the total height shall not exceed six feet, as measured from the bottom of the lowest bag.

Soldier pileings and other types of devices to anchor sandbags shall not be allowed.

Existing sandbag structures may be repaired or replaced within their originally permitted dimensions during the time period allowed under Part (F) or (G) of this Subparagraph.

Beach Nourishment. Sand used for beach nourishment shall be compatible with existing grain size and in accordance with Rule .0312 of this Section.
15A NCAC 07H .0310  USE STANDARDS FOR INLET HAZARD AREAS

(a) Inlet areas as defined by Rule .0304 of this Section are subject to inlet migration, rapid and severe changes in watercourses, flooding and strong tides. Due to this extremely hazardous nature of the Inlet Hazard Areas, all development within these areas shall be permitted in accordance with the following standards:

1. All development in the inlet hazard area shall be set back from the first line of stable natural vegetation a distance equal to the setback required in the adjacent ocean hazard area;
2. Permanent structures shall be permitted at a density of no more than one commercial or residential unit per 15,000 square feet of land area on lots subdivided or created after July 23, 1981;
3. Only residential structures of four units or less or non-residential structures of less than 5,000 square feet total floor area shall be allowed within the inlet hazard area, except that access roads to those areas and maintenance and replacement of existing bridges shall be allowed;
4. Established common-law and statutory public rights of access to the public trust lands and waters in Inlet Hazard Areas shall not be eliminated or restricted. Development shall not encroach upon public accessways nor shall it limit the intended use of the accessways;
5. All other rules in this Subchapter pertaining to development in the ocean hazard areas shall be applied to development within the Inlet Hazard Areas.

(b) The inlet hazard area setback requirements shall not apply to the types of development exempted from the ocean setback rules in 15A NCAC 7H .0309(a), nor, to the types of development listed in 15A NCAC 7H .0309(c).

(c) In addition to the types of development excepted under Rule .0309 of this Section, small scale, non-essential development that does not induce further growth in the Inlet Hazard Area, such as the construction of single-family piers and small scale erosion control measures that do not interfere with natural inlet movement, may be permitted on those portions of shoreline within a designated Inlet Hazard Area that exhibit features characteristic of Estuarine Shoreline. Such features include the presence of wetland vegetation, lower wave energy, and lower erosion rates than in the adjoining Ocean Erodible Area. Such development shall be permitted under the standards set out in Rule .0208 of this Subchapter. For the purpose of this Rule, small scale is defined as those projects which are eligible for authorization under 15A NCAC 7H .1100, .1200 and 7K .0203.

History Note:  Filed as a Temporary Amendment Eff. October 30, 1981, for a period of 70 days to expire on January 8, 1982;
              Filed as an Emergency Rule Eff. September 11, 1981, for a period of 120 days to expire on January 8, 1982;
              Authority G.S. 113A-107; 113A-113(b); 113A-124;
              Eff. December 1, 1981;
              Amended Eff. April 1, 1999; April 1, 1996; December 1, 1992; December 1, 1991; March 1, 1988.
SECTION .0200 - SHORELINE EROSION POLICIES

15A NCAC 07M .0201 DECLARATION OF GENERAL POLICY
It is hereby declared that the general welfare and public interest require that development along the ocean and estuarine shorelines be conducted in a manner that avoids loss of life, property and amenities. It is also declared that protection of the recreational use of the shorelines of the state is in the public interest. In order to accomplish these public purposes, the planning of future land uses, reasonable rules and public expenditures should be created or accomplished in a coordinated manner so as to minimize the likelihood of damage to private and public resources resulting from recognized coastal hazards.

History Note: Authority G.S. 113A-102(b); 113A-107; 113A-124; 16 U.S.C. Sec. 1453 (12);
Eff. March 1, 1979;
RRC Objection due to lack of necessity Eff. October 17, 1991;

15A NCAC 07M .0202 POLICY STATEMENTS
(a) Pursuant to Section 5, Article 14 of the North Carolina Constitution, proposals for shoreline erosion response projects shall avoid losses to North Carolina’s natural heritage. All means should be taken to identify and develop response measures that will not adversely affect estuarine and marine productivity. The public right to use and enjoy the ocean beaches must be protected. The protected uses include traditional recreational uses (such as walking, swimming, surf-fishing, and sunbathing) as well as commercial fishing and emergency access for beach rescue services. Private property rights to oceanfront properties including the right to protect that property in ways that are consistent with public rights should be protected.
(b) Erosion response measures designed to minimize the loss of private and public resources to erosion should be economically, socially, and environmentally justified. Preferred response measures for shoreline erosion shall include but not be limited to AEC rules, land use planning and land classification, establishment of building setback lines, building relocation, subdivision regulations and management of vegetation.
(c) The replenishment of sand on ocean beaches can provide storm protection and a viable alternative to allowing the ocean shoreline to migrate landward threatening to degrade public beaches and cause the loss of public facilities and private property. Experience in North Carolina and other states has shown that beach restoration projects can present a feasible alternative to the loss or massive relocation of oceanfront development. In light of this experience, beach restoration and sand renourishment and disposal projects may be allowed when:

1. Erosion threatens to degrade public beaches and to damage public and private properties;
2. Beach restoration, renourishment or sand disposal projects are determined to be socially and economically feasible and cause no significant adverse environmental impacts;
3. The project is determined to be consistent with state policies for shoreline erosion response and state use standards for Ocean hazard and Public Trust Waters Areas of Environmental Concern and the relevant rules and guidelines of state and federal review agencies.

When the conditions set forth in this Paragraph can be met, the Coastal Resources Commission supports, within overall budgetary constraints, state financial participation in Beach Erosion Control and Hurricane Wave Protection projects that are cost-shared with the federal government and affected local governments pursuant to the federal Water Resources Development Act of 1986 and the North Carolina Water Resources Development Program (G.S. 143-215.70-73).
(d) The following are required with state involvement (funding or sponsorship) in beach restoration and sand renourishment projects:

(1) The entire restored portion of the beach shall be in permanent public ownership;
(2) It shall be a local government responsibility to provide adequate parking, public access, and services for public recreational use of the restored beach.

(e) Temporary measures to counteract erosion, such as the use of sandbags and beach pushing, should be allowed, but only to the extent necessary to protect property for a short period of time until threatened structures may be relocated or until the effects of a short-term erosion event are reversed. In all cases, temporary stabilization measures must be compatible with public use and enjoyment of the beach.

(f) Efforts to permanently stabilize the location of the ocean shoreline with seawalls, groins, shoreline hardening, sand trapping or similar protection devices shall not be allowed except when the project meets one of the specific exceptions set out in 15A NCAC 7H .0308.

(g) The State of North Carolina will consider innovative institutional programs and scientific research that will provide for effective management of coastal shorelines. The development of innovative measures that will lessen or slow the effects of erosion while minimizing the adverse impacts on the public beach and on nearby properties is encouraged.

(h) The planning, development, and implementation of erosion control projects will be coordinated with appropriate planning agencies, affected governments and the interested public. Maximum efforts will be made by the state to accommodate the interest of each interested party consistent with the project's objectives. Local, state, and federal government activity in the coastal area should reflect an awareness of the natural dynamics of the ocean front. Government policies should not only address existing erosion problems but should aim toward minimizing future erosion problems. Actions required to deal with erosion problems are very expensive. In addition to the direct costs of erosion abatement measures, many other costs, such as maintenance of projects, disaster relief, and infrastructure repair will be borne by the public sector. Responses to the erosion should be designed to limit these public costs.

(i) The state will promote education of the public on the dynamic nature of the coastal zone and on effective measure to cope with our ever changing shorelines.

\textbf{History Note:}  
\textit{Authority G.S. 113A-102(b); 113A-107; 113A-124; 16 U.S.C. Sec. 1453 (12);  
Eff. March 1, 1979;  
Amended Eff. March 1, 1985;  
RRC Objection due to lack of necessity and unclear language Eff. October 17, 1991;  
Amended Eff. March 1, 1992;  
RRC Objection due to ambiguity and lack of necessity Eff. March 16, 1995;  
Amended Eff. May 4, 1995.}
STIPULATED FACTS

1. Petitioner, the North Carolina Department of Transportation ("NCDOT"), is an agency of the State of North Carolina.

2. "The general purpose of the Department of Transportation is to provide for the necessary planning, construction, maintenance, and operation of an integrated statewide transportation system for the economical and safe transportation of people and goods as provided for by law."

3. NCDOT operates, controls, and maintains a ferry service as part of the NC highway system at Hatteras Southdock Ferry Terminal located at the north end of Ocracoke Island NC 12 (Irving Garrish Highway) in Hyde County. ("The Project Site"). NCDOT began providing ferry service across Hatteras Inlet in 1953 to connect the islands of Hatteras and Ocracoke. Hatteras Southdock Ferry Terminal was put into service in approximately 1970.

4. The Project Site is entirely within the Cape Hatteras National Seashore which is a federally designated National Seashore (1937) preserving portions of the Outer Banks of North Carolina from Bodie Island to Hatteras Island to Ocracoke Island, stretching over 70 miles. The National Seashore is managed by the National Park Service.

5. NCDOT does not have a recorded easement in the area of the stacking lanes, but has permission from NPS to do work on the property through a Special Use Permit ("SUP"). The most recent SUP was signed on July 5, 2019 (by NPS and July 9, 2019 by NCDOT), a copy of which is attached, and authorized the proposed work on the Project Site.

6. NCDOT has approval from the National Park Service to utilize approximately 24.8 acres of land and water on the northeast end of Ocracoke Island to operate a ferry service between Hatteras Island and Ocracoke Island, including terminal buildings, parking facilities, a ferry basin, and related facilities. While the most recent permit expired in 2015 and was not renewed through an oversight, NPS and NCDOT officials are working on the renewal now for the facilities, ramp and gantries and the highway, and the permit will then be scheduled for renewal every five years thereafter.

7. The Project Site is adjacent to and runs parallel to the Hatteras Inlet portion of Pamlico Sound, which provides a connection between the Atlantic Ocean and Pamlico Sound. An aerial view of the Project Site can be seen in the attached Powerpoint.

8. Ocracoke Island is a coastal barrier island in the southeast portion of Hyde County. The majority of the island is part of the Cape Hatteras National Seashore. Vehicular Access to Ocracoke Island is provided by three NCDOT-operated ferries: Hatteras Inlet Ferry from Dare County, Swan Quarter Ferry from Hyde County, and Cedar Island Ferry from Carteret County. The Hatteras Inlet Ferry is the most widely used ferry to access Ocracoke Island. NC 12 also runs throughout the entire Outer Banks region of North Carolina. NC 12 and ferry
operations are subject to heavy seasonal variations in traffic and use related to summer tourism.

9. Shoreline erosion, dune loss, frequent overwash, flooding, damage due to high frequency storm events, and the shifting of Hatteras Inlet have been particularly severe in this area where the Hatteras Southdock Ferry Terminal is located. The ferry boarding lanes in the hairpin turn are now in a condition of disintegration and have been closed since March of 2019 due to safety concerns. Aerial photographs attached as part of the Powerpoint and taken on February 1, 2018 and March 13, 2018 show a dramatic decrease of shoreline between the inlet and pavement. These circumstances could undermine the integrity of the Project Site, making travel by the general public unsafe and forcing NCDOT to close the Hatteras Southdock Ferry Terminal.

10. On March 13, 2018, DCM issued CAMA General Permit #68669B authorizing the placement of a 225' long temporary erosion control structure adjacent to the north end of the stacking lanes at the Southdock Ferry Terminal. A copy of this permit is attached. On May 5, 2018, DCM re-issued the earlier General Permit as CAMA General Permit #71409B, a copy of which is attached. The sandbags authorized by these permits were installed in the spring of 2018 and were covered with sand. The sandbags were installed around the perimeter of the stacking lanes at the hairpin turn, all above the mean high water line as an effort to protect the lanes from collapsing into the Sound, but by the spring of 2019 with erosion continuing, the asphalt had begun to crumble into the sound.

11. Following Hurricane Florence, on October 15, 2018, DCM authorized the maintenance of a dune that had been located on top of the temporary erosion control structure at the north end of the Project Area, but was washed away in the storm.

12. A Declaration of Emergency (“Declaration”), attached as a stipulated exhibit, was issued on March 13, 2019 by NCDOT Chief Engineer T.M. Little due to rapid erosion. According to the Declaration, the paved area of the ferry basin bulkhead and stacking lanes have incurred significant damage. If continued erosion were to cause the existing bulkhead to fail, the entire basin would be impacted, causing unsafe conditions for the loading and unloading of the travelling public. Additionally, NC 12 is North Carolina’s easternmost primary route and is a two-lane roadway, and if the stacking lanes are closed, vehicles waiting to board the ferry backs up onto NC 12.

13. Over the last several years the shoreline in the Project Site has been eroding. On July 21, 2017, DCM authorized a Major Modification to CAMA Major Permit No. 224-87, to place approximately 20,000 cubic yards of excavated sand on the shoreline adjacent to the stacking lanes/hairpin turn. This project was undertaken and was the most recent time sand was placed in the area of the sandbags.

14. In December of 2018, NCDOT again placed sand over the bags to cover them, but within a couple of weeks the bags were exposed again. By the spring of 2019 with erosion continuing, the asphalt had begun to crumble into the sound. Recent photographs from May of 2019 of the Project Area are attached as stipulated exhibit in the Powerpoint.
NCDOT and NPS are in the process of preparing an Environmental Assessment ("EA") in compliance with the National Environmental Policy Act ("NEPA") and Section 106 of the National Historical Preservation Act for long-term structural shoreline protection measures. In December of 2016, NCDOT received a Feasibility Study for the NC 12 Ocracoke Island Hot Spot, a copy of which is attached, and explores possible alternatives to address erosion in this area. The NPS issued a public notice on June 20, 2019, a copy of which is attached, requesting comments on the long-term project. However, until NCDOT and NPS complete the EA analysis of a proposed long-term project, a temporary solution to protect the Project Site from further shoreline erosion is being requested.

According to NCDOT, the purpose of a short-term project is primarily to protect the ferry basin because without the sheet pile wall there is no protection to the ferry boats and basin from winds and they will not be able to maintain service. Secondarily, this project is to protect what is left of the stacking lanes. NCDOT wants to repair and reopen these lanes once they are protected from further winds/erosion by this project. However, one of the main objectives of the current EA study by NPS/DOT is to protect and improve stacking lanes.

The National Park Service performed an Environmental Screening in response to NCDOT’s request for emergency action to protect the Southdock ferry facilities. According to the information provided by the National Park Service in its’ Environmental Screening Form, dated April 15, 2019, attached as an exhibit, “If the area around the point adjacent to the hairpin turn is not protected and erodes away, this would eliminate a safe harbor for the NCDOT ferries while docked loading/unloading traffic. This could cause damage to the vessels, damage to traveling public’s vehicles, and would increase the likelihood of injury to the public and crews onboard the vessels during strong wind events. Increased rough conditions in the basin could damage marine assets such as ramps, gantries and dolphins which in turn could cause delays/cancellation of ferry schedules.”

On March 14, 2019, in response to a request from DCM Director Braxton Davis, the Secretary of the Department of Environmental Quality ("DEQ") authorized the activation of emergency major permit procedures described in the Coastal Area Management Act ("CAMA") at N.C.G.S. § 113A-118(f).

On June 13, 2019, NCDOT submitted a request to DCM for an emergency shoreline stabilization project ("The Proposed Project") as a temporary solution to protect the Project Site from further shoreline erosion. The Proposed Project proposes installation of approximately 1,000 linear feet of sheet pile bulkhead along the estuarine shoreline in front of an existing steel sheet pile bulkhead on the south side of the Project Site within the ferry basin and then extending around the north side of Ocracoke Island.

Portions of the Proposed Project are located within the Coastal Shorelines, Estuarine Waters, Public Trust Area and Inlet Hazard Areas of Environmental Concern ("AECs"). The only portion of the Proposed Project that is located in the Inlet Hazard AEC is a portion of the proposed sandbags. A GIS image of the Inlet Hazard AEC in the area of the Project Site is attached as a stipulate exhibit. Pursuant to N.C.G.S. § 113A-118(f), any "development"
proposed in these areas requires a permit issued pursuant to the CAMA and the State Dredge and Fill Law.

21. In addition to the proposed bulkhead, the Proposed Project includes a proposal to install sandbags on the northeast end of the sheet pile bulkhead to protect the area behind the sheet pile bulkhead from erosion, especially from easterly wind-driven waves. In their CAMA permit application, NCDOT claims that over 70 feet of shoreline has been lost within the past year due to erosion. (See Form DCM MP-2, page 2 of 3, attached as part of the permit application materials)

22. The Commission’s rules, specifically at 15A NCAC 7H .0310 provide Use Standards for the Inlet Hazard AEC and 15A NCAC 7H .0308(a)(2) provides Use Standards for Temporary Erosion Control Structures (sandbags). Copies of these rules are found at the front of this Variance Packet. These rules at 7H .0308(a)(2)(L) require that temporary erosion control structures be comprised of sandbags “tan in color and three to five feet wide and seven to 15 feet long when measured flat. Base width of the temporary erosion control structure shall not exceed 20 feet, and the total height shall not exceed six feet.” Additionally, 7H .0308(a)(2)(A) requires that temporary erosion control structures be limited to “sandbags placed landward of mean high water and parallel to the shore.”

23. The sandbags requested for use by NCDOT are three different sizes. These sizes are 2’x 5’ x’15’, 3’x 3’, and 4’x 4’. The different sized sand bags would be used to protect the end of the wall as depicted in the permit drawings. The sandbags would be installed in both a perpendicular stack, as well as parallel stack in order to create more structural stability, according to NCDOT. Additionally, NCDOT proposes that the footprint of the bags be stacked in a perpendicular, as well as parallel orientation to the shoreline, to temporarily allow NCDOT to stabilize the area from the proposed sheet pile bulkhead to the existing shoreline.

24. The proposed approximate maximum dimensions of the temporary erosion control structure are 50 linear feet long, by 15’ wide. The estimated maximum height is 15’ but will depend on site conditions at the time of installation. The estimated number of sand bags is 40, depending on the depths of the water at the time of placement. The tie backs would be installed over top of the sandbag structure. Currently, the water is 12 feet deep in the area where the sandbags are proposed, but NCDOT estimates the depths where the sandbag structure is proposed could be 14 to 15 feet by the time NCDOT tentatively plans to install the sandbag structure in late-September or early-October. The sandbags must be placed in the water and exceed the height of the water in order to protect the sheet pile bulkhead from wind, currents, and water. Otherwise, the area behind the sheet pile bulkhead would be exposed to erosion.

25. NCDOT’s CAMA Major Permit Modification application for the Project, attached as a stipulated exhibit, was initially submitted on June 13, 2019, and was accepted as complete by DCM on June 20, 2019, after coordination with DCM and required revisions were made.

26. NCDOT’s application included a “Historic Architecture and Landscapes No Survey Required” form and a “No Archaeological Survey Required” form, copies of which are attached.
27. Due to the activation of emergency major permitting procedures outlined in the CAMA at N.C.G.S. § 113A-118(f), an expedited review process took place. As part of the CAMA major permit review process, a reduced number of state and federal resource agencies were asked for comment.

28. The North Carolina Division of Marine Fisheries ("DMF") reviewed the project and had no objections to the project as proposed. A copy of their comments are attached as a stipulated exhibit.

29. The North Carolina Wildlife Resources Commission ("WRC") reviewed the project and had no objections to the project as shown in the permit drawings. A copy of their comments are attached as a stipulated exhibit.

30. On June 28, 2019, NC Division of Water Resources ("DWR") issued a 401 Water Quality Certification to NCDOT authorizing the proposed bulkhead and sandbag structure project, a copy of which is attached.

31. While NCDOT has been in contact with the Army Corps of Engineers ("Corps") regarding this project, the Corps is waiting on comments from NMFS before making a permit decision.

32. DCM staff’s review of the project resulted in no objections to the portions of the project outside the Inlet Hazard AEC, but recommended that the proposed temporary erosion control structure within the Inlet Hazard AEC be denied because the placement and design of the sandbags did not conform to requirements of 15A NCAC 07H .0308(a)(2). The review by Greg Daisey, DCM’s Transportation Project Field Representative, is attached as a stipulated exhibit.

33. The National Park Service has also reviewed NCDOT’s emergency action plan and on July 5, 2019, signed a revised SUP authorizing this proposed project, a copy of which is attached.

34. On June 21, 2019, DCM issued an Emergency Major Modification to CAMA Major Permit No. 224-87 (the “Permit”), attached as a stipulated exhibit. The Permit allowed the installation of an approximately 1,000 linear foot sheet pile bulkhead, including supporting elements, for emergency shoreline stabilization at the Hatteras Southdock Ferry Terminal, as depicted on the attached work plan drawings.

35. The Permit authorizes NCDOT to install a temporary erosion control structure which includes sandbags placed landward of mean high water and parallel to the shore. The sandbags are limited to certain sizes, consistent with 15A NCAC 7H .0308(a)(2)(L), are limited to a shoreline-parallel alignment, consistent with 15A NCAC 7H .0308(a)(2)(A), and the overall structure is limited in size, consistent with 15A NCAC 7H .0308(a)(2)(A). The Permit allows the majority of work requested by NCDOT, however, the Permit conditioned out those proposed sandbags of irregular sizes, those aligned perpendicular to the shoreline, and those portions of the structure in excess of the maximum size limits (i.e. over 6 feet high).
36. NCDOT has tentatively planned a pre-construction meeting for July 23, 2019 at the Project Site, and plans to start bulkhead installation shortly after that date, with an estimated bulkhead completion date of late-September or early-October of 2019. This will be followed by the installation of the proposed sandbag structure. NCDOT estimates the installation of the proposed sandbag structure will likely take one month to complete.

37. Ocracoke Island is connected to the mainland or other barrier islands only by ferry, therefore, residents and visitors are dependent on using the ferry system to travel to and from the island. Permanent residents depend on the ferry system for routine trips such as daily commutes, school-related travel, trips to medical care facilities, and shopping, either on the mainland or other islands.

38. The Hatteras Inlet Ferry carries the greatest volume of traffic to and from Ocracoke Island (75 to 80 percent of all traffic to Ocracoke Island during the summer), based on “ferry data” at Table 1-1 of the 2016 Feasibility Study, attached as a stipulated exhibit.

39. Ocracoke Island residents use the Hatteras Inlet Ferry to transport medical emergencies by ambulance. Additional fire and law enforcement service response to Ocracoke is quicker from Hatteras Island than from Swan Quarter (one hour versus three hours).

40. According to information in the 2016 Feasibility Study, attached, Ocracoke Island is home to 948 permanent residents according to the 2010 US Census. The island’s economy is based almost entirely on tourism, which peaks during the summer months. The summer population is approximately 90 percent tourists. Of the tourists, 70 percent are day trippers who make their arrival to and departure from the island via ferries on the same day.

41. On June 27, 2019 NCDOT filed this variance petition related to the Emergency Major Modification of CAMA Major Permit No. 224-87, seeking a variance from 15A NCAC 7H .0308(a)(2), in order to use non-standard size sandbags, to authorize some perpendicular placement of the sandbag structure. NCDOT’s proposed structure is 50 linear feet long and up to 15’ wide. NCDOT also seeks a variance to allow a sandbag structure in excess of the 6’ high limit in order to place it in the existing 12-feet deep waters behind the authorized bulkhead up to a height sufficient to protect the bulkhead. NCDOT estimates the overall height of the sandbag structure could be up to 15 feet overall (submerged and above mhw), and depends on the depth of the area where the sandbags are proposed at the time of installation.

42. Also, on June 26, 2019, NCDOT filed a request to hear this variance in an expedited fashion at the Commission’s July 17, 2019 meeting. A copy of that request is attached, as are DCM’s response and the CRC Chair’s decision.

43. As part of the variance process, NCDOT provided notice through certified mail, attached as a stipulated exhibit, to the only adjacent riparian owner, which is the NPS. If NPS submits
written comments to this variance petition by the date of the Commission meeting, those will be shared with the Commission.

44. As part of the variance process, NCDOT stipulates that its proposed development is inconsistent with the rules for which it seeks a variance—here portions of 15A NCAC 7H.0308(a)(2).

**Stipulated Exhibits**

- Special Use Permit for NCDOT Easement from NPS dated July 5, 2019
- CAMA General Permit #68669B issued March 13, 2018
- CAMA General Permit #71409B issued May 5, 2018
- Declaration of Emergency issued by T.M. Little, P.E., Chief Engineer
- December 2016 feasibility study
- April 15, 2019 NPS Environmental Screening Form
- CAMA Major Permit Modification Application Package of June 2019, with attachments including Historic Arch/Landscapes form and No archaeological form
- Comments of NC Division of Marine Fisheries
- Comments of North Carolina Wildlife Resources Commission
- General 401 WQC 4134 issued June 28, 2019
- Comments of DCM Transportation Project Field Representative
- June 21, 2019 Emergency Major Modification to CAMA Major Permit No. 224-87
- NCDOT’s Request to expedite hearing, DCM’s response, CRC Chair’s Grant letter
- Notice of the Variance Petition to Adjacent Riparian Owner NPS
- Powerpoint Slideshow with relevant maps, GIS images, diagrams, site photos
PETITIONER’S and STAFFS’ POSITIONS

To qualify for a variance, Petitioner must show all of the following:

I. Will Unnecessary Hardships result from strict application of the rules, standards, or orders? If so, Petitioner must identify the unnecessary hardships.

Petitioner’s Position: Yes.

Strict application of the applicable development rules, standards, or orders issued by the CRC will cause NCDOT unnecessary hardships. Pursuant to 15A NCAC 07H.1701, NCDOT may perform “work necessary to protect property and/or prevent further damage to property caused by a sudden or unexpected natural event or structural failure which imminently endangers life or structure.” The regulations specifically allow NCDOT to perform work needed “to protect against or reduce the imminent danger caused” and “to re-establish necessary public facilities or transportation corridors.” 15A NCAC 07H. 1704(a)(2). Moreover, “If a building or road is found to be imminently threatened and at increased risk of imminent damage due to site conditions, such as a flat beach profile or accelerated erosion, temporary erosion control structures may be located more than 20 feet waterward of the structure being protected. In cases of increased risk of imminent damage, the location of the temporary erosion control structures shall be determined by the Director of the Division of Coastal Management or the Director’s Designee.” 15A NCAC 7H. 0308(2)(E).

Current regulations provide that sandbags used to construct temporary erosion control structures “shall be limited to sandbags placed landward of mean high water and parallel to shore.” 15A N.C.A.C. 07H. 0308(a)(2)(A). The sandbags used to construct the temporary erosion control structure “shall be tan in color and 3 to 5 feet wide and 7 to 15 feet long when measured flat with a base width that does not exceed 20 feet and a total height not exceeding 6 feet, as measured from the bottom of the lowest bag.” 15A N.C.A.C. 07H. 0308(a)(2)(L). Strict application of these regulations would prevent NCDOT from building a temporary erosion control barrier that protects the sheet pile wall materials until the future groin project is completed.

In previous years, the north end of the island was permitted to re-nourish the beach adjacent to the hairpin turn. This semi-regular nourishment worked for many years, but stopped being a viable option after storms significantly altered the inlet and the replenished shoreline began eroding away within a short time span of only a few weeks. In December of 2018, sandbags were installed around the perimeter of the stacking lanes as an effort to protect the lanes from collapsing into the sound, but by the spring of 2019 the asphalt had begun to crumble into the sound. The erosion rates observed at the project site over winter of 2018-2019 was 7’ to 15’ per month. The sandbags used previously have been insufficient to protect the stacking lanes and the ferry basin.

NCDOT needs to install temporary sandbags on the end of the sheet pile wall until the groin project is complete. The sandbags are needed to protect the sheet pile wall and prevent any erosion occurring from easterly winds. Over 70 feet of shoreline has been lost within the past year due to erosion. The proposed variance will enable NCDOT to build an effective temporary sandbag
structure that serves its purpose of protecting the materials behind the sheet pile wall. The sandbags requested are 3 different sizes, which is not at issue. These sizes are 2’x5’x15”, 3’x3’, and 4x4’. The different sized sandbags will be used jointly to seal off the end of the wall as depicted in the permit drawings. The sandbags would be installed as a temporary groin meaning they will be stacked perpendicular as well as parallel to the shoreline. This physical orientation of the sandbags creates more structure and stability. Sandbags placed parallel to the shore are typically used to protect existing shoreline that is in danger of being eroded. However, at this Project Site the shoreline has already eroded and in need of more substantial stabilization. The footprint of the perpendicular bags would temporarily allow NCDOT to stabilize the area that would be located behind the proposed sheet pile wall to the existing shoreline and will protect the area until more permanent material is placed behind the sheet pile wall. The sandbags would be placed in an area that is partially located within the inlet hazard area. The approximate number of sand bags is 40 total, depending on the depths of the water at the time of placement. The approximate length at the top of the sandbag wall would most likely be 50’ with a width of 15’, which will taper as it rises to a height of 15’ maximum. The tie backs would be installed over top of the sandbag wall. Currently, the water is 12 feet deep, but it is predicted to be 14 to 15 feet by the time construction begins. The sandbags must be placed in the water and exceed the height of the water in order to protect the sheet pile wall from winds, currents, and water. Otherwise, the sheet pile wall would be exposed and lost to continued erosion.

NCDOT’s requested variance will help better protect the structure integrity of the sandbag structure, the sheet pile wall, and the site. While the permit allows sandbags to be placed parallel to the shoreline and at a height of six (6) feet, the variance seeks to allow the placement of the sandbags both parallel and perpendicular to the shore. In addition, because the existing water is 12 feet deep and placement of sandbags underwater to only 6 feet will serve little purpose, the variance also seeks to place the sandbags at a height sufficient to protect the sheet pile wall from the currents, winds, and water. Based on current conditions, the necessary height for the sandbags would be 15 feet. Without the variance for the perpendicular orientation and increased height of the sandbags, natural forces could reach behind the wall and material behind the wall could be lost. It is also important to note that NCDOT in coordination with federal agencies, is currently developing long term improvements to be implemented at the Site.

As mandated by the North Carolina General Assembly, NCDOT has an obligation and responsibility to provide and maintain ferries connecting the parts of the State highway system, such as connecting highway 12 via the ferry route from Ocracoke to Hatteras Island. See N.C.G.S. § 136-82 (a). The Hatteras Ferry is a vital link to the mainland for Ocracoke. Through the Hatteras Ferry, visitors and residents of Ocracoke receive access to their homes, goods and services, healthcare, and waste disposal. The Hatteras Ferry also provides access to important State and national resources such as the Cape Hatteras National Seashore. Perhaps most importantly, residents and visitors rely on the Hatteras Ferry as an evacuation route. The proposed design of the sandbags will help NCDOT protect NC 12 via the ferry route and will provide a more secure means of access to the mainland for the residents of and visitors to Ocracoke Island.
As explained above, strict application of 15A N.C.A.C. 07H.0308(a)(2) will cause serious hardships and difficulties to both NCDOT and the public, which NCDOT serves. NCDOT needs the requested variance because the existing rule does not adequately provide for the degree and extent of erosion control needed to protect the sheet pile wall, ferry basin, and stacking lanes in this area. Without immediate and adequate erosion control measures, the structural integrity of the ferry basin and the Site becomes increasingly threatened by continued overwash, erosion, and sand cover and the stacking lanes will remain closed. Thus, without the variance, NCDOT will experience a hardship because the site will not have any temporary protection until a long-term alternative is implemented. This would result in the continued closure of the stacking lanes and the potential of complete failure of the ferry basin. This also results in a hardship to the traveling public especially if an emergency evacuation was needed. The proposed variance would protect the safety and welfare of the travelling public while affording NCDOT the time needed to develop, in conjunction with federal agencies a reasonable solution that would address the unique issues associated with this dynamic environment.

**Staffs' Position: Yes.**

Staff agree that strict application of the Commission’s rules for temporary erosion control structures found at 15A NCAC 7H .0208(a)(2), from which NCDOT seeks a variance¹, cause them unnecessary hardships. As noted in Stipulated Fact 41, the rules which NCDOT is seeking a variance from are in 15A NCAC 7H .0308(a)(2), specifically (a)(2)(A) in order to orient a sandbag structure in a manner other than parallel to the shoreline, and (a)(2)(L) in order to use non-standard size sandbags and to authorize a sandbag structure in excess of the 6’ high and 20’ width limits so that the sandbags may be placed in the existing 12-feet deep waters behind the authorized bulkhead up to a height sufficient to protect the bulkhead. The Commission sets limitations on the size of individual sandbags and limits the overall size of temporary erosion control structures and their orientation to the shoreline to ensure that they are well-defined and limited in application. NCDOT seeks a partially-perpendicular structure alignment as a tool to limit further erosion of the bulkhead permitted in the adjacent Estuarine Shoreline AEC, along with the use of non-standard sandbags and a taller structure to respond to the deep water immediately adjacent to the imminently threatened stacking lanes as well as the the vulnerable Hatteras Southdock Ferry Terminal facility. NCDOT and NPS are studying long-term erosion responses, and strict adherence to the rule creates an unnecessary hardship that would prevent NCDOT from protecting the facility for continued public use (and emergency use) in the short-term until a long-term alternative is implemented.

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¹ In NCDOT’s argument on this variance criterion, NCDOT references two provisions of the Emergency Dredge & Fill General Permit at 7H .1700 and from the “accelerated erosion” portion of the Commission’s rule on temporary erosion control structures. However, these rules are not the basis for NCDOT’s permit and the aspects of their proposed sandbag structure which were conditioned out of the permit, so are not relevant to this variance.
II. Do the hardships result from conditions that are peculiar to the property, such as the location, size, or topography of the property? Explain.

Petitioner's Position: Yes.

The hardships explained above result from conditions peculiar to the property. The project area is almost entirely within the Cape Fear Hatteras National Seashore which is a federally designated National Seashore (1937) preserving portions of the Outer Banks through Hatteras Island to Ocracoke Island, stretching over 70 miles. The project site runs parallel to the Hatteras Inlet. The project area is also in close proximity to the Atlantic Ocean and Pamlico Sound. These features make the property susceptible to erosion, overwash, and sand cover especially during storm events. A shifting channel to the north of the ferry basin and encroachment of the inlet has caused significant erosion to take place on the north end of the island. Due to this erosion, the ferry boarding lanes are in a condition of disintegration and have been closed due to safety concerns. Further, the ability to travel NC 12 via ferry unimpeded plays a vital role in the lives of residents and visitors because this ferry route is critical to ensure their safety and welfare. This ferry route is used as an emergency evacuation route off Ocracoke Island as well.

Staffs' Position: Yes.

Staff notes that NCDOT's Hatteras Southdock Ferry Terminal is on NPS property located adjacent to Pamlico Sound and Hatteras Inlet, and is partially located in an Inlet Hazard AEC. While erosion present at this site is typical of inlets, even where they intersect with the Estuarine Shoreline AEC on the "back side" of a barrier island, the recent erosion in the Project Area has been accelerated due to recent storms, as seen in the various photographs contained in the stipulated exhibits. Staff agree that this accelerated erosion quickly altering the topography of the site combined with the site supporting a large public transportation facility located on federally owned/managed public land, contribute to NCDOT's hardships.

III. Do the hardships result from actions taken by the petitioner? Explain.

Petitioner's Position: No.

The hardships facing NCDOT and the travelling public do not result from actions taken by the department. NCDOT has implemented approved temporary erosion control measures in the past, but those temporary measures have lost function and the site continues to experience extensive erosion. No actions by NCDOT led to the destruction of the previous temporary erosion control measures. Rather, these hardships are a direct result of the natural coastal processes associated with this dynamic environment, which are actions beyond the control of NCDOT.
Staffs’ Position: No.

Staff agrees that NCDOT has done nothing to accelerate the erosion affecting the Project Area and has tried to respond to the recent accelerated erosion located in the Project Area, in an expeditious manner using both nourishment and sandbags both before and after Hurricane Florence. This response is also demonstrated by NCDOT and NPS studying long-term erosion protection responses to protect the Hatteras Southdock Ferry Terminal. Therefore, Staff agrees that Petitioner meets this variance criterion.

IV. Is the requested variance (1) consistent with the spirit, purpose, and intent of the rules, standards, or orders, (2) will secure public safety and welfare; and (3) will preserve substantial justice? Explain.

Petitioner’s Position: Yes.

· Consistent with the spirit, purpose and intent of rules.

The proposed placement of sandbags to temporarily protect the ferry basin is consistent with the spirit, purpose, and intent of the rules. The rules allow the placement of sandbags up to 6 feet high, but require them to be placed in a parallel orientation to the shore. Placement of sandbags at a height necessary for temporarily control erosion and in a perpendicular orientation is also consistent with the purpose of the rule allowing temporary erosion control measures. Protecting the structural integrity of NC 12 ferry route with temporary erosion control measures by placing some sandbags in a perpendicular orientation and at a greater height is consistent with the spirit, purpose, and intent of the applicable regulations. NCDOT is allowed to undertake work “which is necessary to protect against or reduce the imminent danger” caused by the storm activities and inlet migration and to “re-establish necessary public facilities or transportation corridors.” 15A NCAC 07H .1704(a)(2). The variance to the modification will help NCDOT achieve the task at hand. This is a situation that involves a site significantly affected by erosion, and the previously installed sandbags were insufficient to protect the area in the short-term until a long-term solution is implemented.

The proposed erosion control measure is temporary. When its’ useful and “permitted” service life ends, the sand from the associated sandbags will be integrated back into the environment. As such, the requested variance is an effective temporary erosion control measure which will further protect the area. This type of temporary protection is necessary while NCDOT and NPS, in consultation with other state and federal agencies, pursue long-term improvements that will be designed to minimize the risk of shoreline erosion. An environmental assessment for the long term groin project is ongoing. Because of coastal conditions in the vicinity of the project area and their impact on the transportation corridor, it is NCDOT’s priority to work with other agencies to study, select, and implement long-term improvements in this area.
The Coastal Area Management Act states, in pertinent part, that a goal of the Act is “[t]o establish policies, guidelines and standards for... transportation for the coastal area including transportation routes, navigation channels and harbors, and other public facilities for recreation and tourist facilities; and for economic development of the coastal area, including construction, location and design of port facilities, commercial establishments, and other developments.” N.C. Gen. Stat. § 113A-102(b)(4). Ferry service began across Hatteras Inlet in 1953 to connect the islands of Hatteras and Ocracoke. This basin was put into service in May of 1970. This navigation channel, and turning basin were already in existence at the time CAMA was enacted in 1974, and CAMA recognizes that such ferry facilities are a part of the existing coastal area and should be taken into account when developing the CAMA program.

The Management Objective for Ocean Hazard Areas found in 15A NCAC 7H.0303 states:

It is the CRC’s objective to provide management policies and standards for ocean hazard areas that serve to eliminate unreasonable danger to life and property and achieve a balance between the financial, safety, and social factors that are involved in hazard area development... The purpose of these Rules shall be to further the goals set out in G.S. 113A-102(b), with particular attention to minimizing losses to life and property resulting from storms and long term erosion... reducing the public costs of inappropriately sited development. Furthermore, it is the objective of the CRC to protect present common law and statutory public rights of access to and use of the lands and waters of the coastal area.

In its Shoreline Erosion Policies, the Commission has determined that “Temporary measures to counteract erosion, such as the use of sandbags... should be allowed, but only to the extent necessary to protect property for a short period of time until threatened structures may be relocated or until the effects of a short-term erosion event are reversed.” “In all cases, temporary stabilization measures must be compatible with public use and enjoyment of the beach.” 15A NCAC 7M .0202(e). Thus, sandbags that vary from the CAMA guidelines are appropriate in certain circumstances. The installation of sandbags that vary from CAMA regulations as proposed by NCDOT is a reasonable response to help protect the ferry basin until a long-term solution can be implemented. Due to the location of the site and the extent of the erosion, the public’s access to the ocean beach is already limited or completely diminished in this area. Allowing the variance should not have significant additional impacts on the beach access. The public’s access to Hatteras Island from Ocracoke depends on being able to utilize this ferry route and so this aspect of public access should be considered in this case as well.

For these reasons, the project is consistent with the spirit, purpose and intent of the CRC Rules.

- Secure the public safety and welfare.

The variance secures the safety and welfare of the public by contributing to the stabilization of the ferry basin and stacking lanes. Approval of the variance will help NCDOT ensure
that the ferry route remains an available, structurally sound route for residents and visitors, whether they are travelling for work, school, business, recreation, or in the event of an emergency.

A Declaration of Emergency was issued on March 13, 2019 because of the significant damage caused by erosion incurred to the ferry basin bulkhead and stacking lanes. The northern shoreline is actively scouring and requires stabilization. If erosion is not controlled this will cause the existing bulkhead to fail and the entire basin would be impacted, causing unsafe conditions for the loading and unloading of the travelling public. If the area around the point (the point adjacent to the hairpin turn at Southdock) is not protected and erodes away, this would eliminate a safe harbor for the NCDOT ferries while docked loading/unloading traffic. This could cause damage to the vessels, damage to traveling public’s vehicles, and would increase the likelihood of injury to the public and crews onboard the vessels during strong wind events. Increased rough conditions in the basin could damage marine assets such as ramps, gantries and dolphins which in turn could cause delays/cancellation of ferry schedules. Because of the damage to the Site, the stacking lanes have been temporarily closed, as it is unsafe for public use. NC 12 is North Carolina’s easternmost primary route and is a two-lane roadway. When the stacking lanes are closed, the ferry traffic backs up onto NC-12.

Hatteras Inlet Ferry carries the greatest volume of traffic to and from Ocracoke Island (75 to 80 percent during the summer). Ocracoke Island uses this ferry route to transport medical emergencies by ambulance. Additional fire and law enforcement service response to Ocracoke is quicker from Hatteras Island than from Swan Quarter (one hour versus three hours). Ocracoke Island is home to 948 permanent residents (2010 US Census). The island’s economy is based almost entirely on tourism, which peaks during the summer months. The summer population is approximately 90 percent tourists. Of the tourists, 70 percent are day trippers who make their arrival to and departure from the island via ferries on the same day. Ocracoke Island is connected to the mainland or other barrier islands only by ferry, therefore, residents and visitors are dependent on using the ferry system to travel to and from the island. Permanent residents depend on the ferry system for routine trips such as daily commutes, school-related travel, trips to medical care facilities, and shopping, either on the mainland or other islands. The need to keep this ferry route open for access to and from Ocracoke, especially for emergency evacuation purposes is important and will further public safety and welfare.

· Preserve substantial justice.

The variance will also preserve substantial justice because NCDOT did not undermine the structural integrity of the Site or the highway. As such, NCDOT should be authorized to install a more effective temporary erosion control measure, as requested until the long term project can be studied and installed. Without the variance, the sheet pile wall will be unprotected and could be lost to erosion, overwash, and sand cover. In turn, these natural events may result in closure of the ferry terminal and the loss of that ferry as a transportation route – an unjust result for the residents of and visitors to Ocracoke Island.
**Staffs’ Position:** Yes.

Staff agrees that the proposed placement of a larger sandbag structure in a partially-perpendicular orientation as part of a near-term response, while NCDOT and NPS study, select, permit and implement a long-term response, is consistent with the spirit, purpose, and intent of the Commission’s rules. The Commission’s sandbag rules set limitations on the orientation and size of temporary erosion control structures to ensure they are used only in certain circumstances within well-defined criteria and standards. In its Shoreline Erosion Policies, the Commission has determined that “[T]emporary measures to counteract erosion, such as the use of sandbags . . . should be allowed, but only to the extent necessary to protect property for a short period of time until threatened structures may be relocated or until the effects of a short-term erosion event are reversed.” “In all cases, temporary stabilization measures must be compatible with public use and enjoyment of the beach.” 15A NCAC 7M .0202(e). In the spirit of taking a limited approach to authorizing sandbag use as contemplated by the rules above, DCM Staff agrees that the use of a larger temporary erosion control structure that is partially perpendicular to the shoreline is a reasonable response to protect the Hatteras Southdock Ferry Terminal until a long-term solution can be implemented.

Staff agrees that the variance will secure public safety and welfare. Staff believes that due to the proximity of the Hatteras Southdock Ferry Terminal basin to the sound and the inlet at the Project Area, the erosion already limits the public’s access to the shoreline. Allowing a larger sandbag structure in a partially perpendicular orientation adjacent to the permitted bulkhead should not have significant additional impacts on the public’s use of the shoreline, and should help protect this public transportation facility from further impacts of erosion in the near-term until a long-term response can be studied, chosen, permitted and implemented. Additionally, the public’s access to other parts of Ocracoke Island by residents and visitors depends in large part on being able to access Ocracoke Island through this ferry terminal, and so this aspect of public access should be considered in this case as well. Finally, the need to keep a public transportation connection open for access to and from the communities of Ocracoke Island and Hatteras Island, especially for emergency purposes is essential and will further public safety and welfare.

Staff agrees with the Petitioner that the variance will preserve substantial justice as it will allow the Petitioner to protect the Hatteras Southdock Ferry Terminal and its use by the public, both regular and emergency, while a long-term solution is sought to respond to the accelerated erosion at the Project Site.
ATTACHMENT D:

PETITIONERS' VARIANCE REQUEST MATERIALS
(except Petitioner's initially proposed facts/exhibits)
CAMA VARIANCE REQUEST FORM

PETITIONER'S NAME: N.C. Department of Transportation

COUNTY WHERE THE DEVELOPMENT IS PROPOSED: Hyde

Pursuant to N.C.G.S. § 113A-120.1 and 15A N.C.A.C. 07J .0700 et seq., the above named Petitioner hereby applies to the Coastal Resources Commission (CRC) for a variance.

VARIANCE HEARING PROCEDURES

A variance petition will be considered by the CRC at a regularly scheduled meeting, heard in chronological order based upon the date of receipt of a complete petition. 15A N.C.A.C. 07J .0701(e). A complete variance petition, as described below, must be received by the Division of Coastal Management (DCM) a minimum of six (6) weeks in advance of the first day of a regularly scheduled CRC meeting to be eligible for consideration by the CRC at that meeting. 15A N.C.A.C. 07J .0701(e). The final set of stipulated facts must be agreed to at least four (4) weeks prior to the first day of a regularly scheduled meeting. 15A N.C.A.C. 07J .0701(e). The dates of CRC meetings can be found at DCM's website: www.nccoastalmanagement.net

If there are controverted facts that are significant in determining the propriety of a variance, or if the Commission determines that more facts are necessary, the facts will be determined in an administrative hearing. 15A N.C.A.C. 07J .0701(b).

VARIANCE CRITERIA

The petitioner has the burden of convincing the CRC that it meets the following criteria:

(a) Will strict application of the applicable development rules, standards, or orders issued by the Commission cause the petitioner unnecessary hardships? Explain the hardships.

(b) Do such hardships result from conditions peculiar to the petitioner's property such as the location, size, or topography of the property? Explain.

(c) Do the hardships result from actions taken by the petitioner? Explain.

(d) Will the variance requested by the petitioner (1) be consistent with the spirit, purpose, and intent of the rules, standards or orders issued by the Commission; (2) secure the public safety and welfare; and (3) preserve substantial justice? Explain.

Please make your written arguments that Petitioner meets these criteria on a separate piece of paper.
The Commission notes that there are some opinions of the State Bar which indicate that non-attorneys may not represent others at quasi-judicial proceedings such as a variance hearing before the Commission. These opinions note that the practice of professionals, such as engineers, surveyors or contractors, representing others in quasi-judicial proceedings through written or oral argument, may be considered the practice of law. Before you proceed with this variance request, you may wish to seek the advice of counsel before having a non-lawyer represent your interests through preparation of this Petition.

For this variance request to be complete, the petitioner must provide the information listed below. The undersigned petitioner verifies that this variance request is complete and includes:

- X The name and location of the development as identified on the permit application;
- X A copy of the permit decision for the development in question;
- X A copy of the deed to the property on which the proposed development would be located;
- X A complete description of the proposed development including a site plan;
- X A stipulation that the proposed development is inconsistent with the rule at issue;
- X Proof that notice was sent to adjacent owners and objectors*, as required by 15A N.C.A.C. 07J .0701(c)(7);
- N/A Proof that a variance was sought from the local government per 15A N.C.A.C. 07J .0701(a), if applicable;
- X Petitioner’s written reasons and arguments about why the Petitioner meets the four variance criteria, listed above;
- X A draft set of proposed stipulated facts and stipulated exhibits. Please make these verifiable facts free from argument. Arguments or characterizations about the facts should be included in the written responses to the four variance criteria instead of being included in the facts.
- X This form completed, dated, and signed by the Petitioner or Petitioner’s Attorney.

*Please contact DCM or the local permit officer for a full list of comments received on your permit application. Please note, for CAMA Major Permits, the complete permit file is kept in the DCM Morehead City Office.
Due to the above information and pursuant to statute, the undersigned hereby requests a variance.

Mollie L. Cozart
Signature of Petitioner or Attorney

6/27/19
Date

Mollie L. Cozart
Printed Name of Petitioner or Attorney

mcozart@ncdoj.gov
Email address of Petitioner or Attorney

1505 Mail Service Center (Highway Building)
Mailing Address

(919) 707-4480
Telephone Number of Petitioner or Attorney

Raleigh
City

NC
State

27699-1505
Zip

Fax Number of Petitioner or Attorney

DELIVERY OF THIS HEARING REQUEST

This variance petition must be received by the Division of Coastal Management at least six (6) weeks before the first day of the regularly scheduled Commission meeting at which it is heard. A copy of this request must also be sent to the Attorney General's Office, Environmental Division, 15A N.C.A.C. 07J .0701(e).

Contact Information for DCM:

By mail, express mail or hand delivery:
Director
Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557

By Fax:
(252) 247-3330

By Email:
Check DCM website for the email address of the current DCM Director
www.nccoastalmanagement.net

Contact Information for Attorney General’s Office:

By mail:
Environmental Division
9001 Mail Service Center
Raleigh, NC 27699-9001

By express mail:
Environmental Division
114 W. Edenton Street
Raleigh, NC 27603

By Fax:
(919) 716-6767

Revised: July 2014
CAMA VARIANCE PETITION
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Petitioner, North Carolina Department of Transportation, through its Attorney, Mollie L. Cozart, Assistant Attorney General, stipulates that the proposed development that is subject of the Variance Petition is inconsistent with Coastal Resources Commission Rule 15A NCAC 7H .0308(a)(2).

By:  
Mollie L. Cozart  
Assistant Attorney General  
NC Bar No. 39862  
mcozart@ncdoj.gov  
Attorney for NC Department Transportation  
North Carolina Department of Justice  
Transportation Section  
1505 Mail Service Center  
Raleigh, NC 27699-1505  
Phone: (919) 707-4480  
Fax: (919) 733-9329
PETITIONER’S POSITION
ON
VARIANCE CRITERIA

(1) Will unnecessary hardships result from strict application of the rules, standards, or orders?

Petitioner’s position: Yes.

Petitioner’s argument: Strict application of the applicable development rules, standards, or orders issued by the CRC will cause NCDOT unnecessary hardships. Pursuant to 15A NCAC 07H.1701, NCDOT may perform “work necessary to protect property and/or prevent further damage to property caused by a sudden or unexpected natural event or structural failure which imminently endangers life or structure.” The regulations specifically allow NCDOT to perform work needed “to protect against or reduce the imminent danger caused” and “to re-establish necessary public facilities or transportation corridors.” 15A NCAC 07H. 1704(a)(2). Moreover, “If a building or road is found to be imminently threatened and at increased risk of imminent damage due to site conditions, such as a flat beach profile or accelerated erosion, temporary erosion control structures may be located more than 20 feet waterward of the structure being protected. In cases of increased risk of imminent damage, the location of the temporary erosion control structures shall be determined by the Director of the Division of Coastal Management or the Director’s Designee.” 15A NCAC 7H. 0308(2)(E).

Current regulations provide that sandbags used to construct temporary erosion control structures “shall be limited to sandbags placed landward of mean high water and parallel to shore.” 15A N.C.A.C. 07H. 0308(a)(2)(A). The sandbags used to construct the temporary erosion control structure “shall be tan in color and 3 to 5 feet wide and 7 to 15 feet long when measured flat with a base width that does not exceed 20 feet and a total height not exceeding 6 feet, as measured from the bottom of the lowest bag.” 15A N.C.A.C. 07H. 0308(a)(2)(L). Strict application of these regulations would prevent NCDOT from building a temporary erosion control barrier that protects the sheet pile wall materials until the future groin project is completed.

In previous years, the north end of the island was permitted to re-nourish the beach adjacent to the hairpin turn. This semi-regular nourishment worked for many years, but stopped being a viable option after storms significantly altered the inlet and the replenished shoreline began eroding away within a short time span of only a few weeks. In December of 2018, sandbags were installed around the perimeter of the stacking lanes as an effort to protect the lanes from collapsing into the sound, but by the spring of 2019 the asphalt had begun to crumble into the sound. The erosion rates observed at the project site over winter
of 2018-2019 was 7’ to 15’ per month. The sandbags used previously have been insufficient to protect the stacking lanes and the ferry basin.

NCDOT needs to install temporary sandbags on the end of the sheet pile wall until the groin project is complete. The sandbags are needed to protect the sheet pile wall and prevent any erosion from occurring from easterly winds. Over 70 feet of shoreline has been lost within the past year due to erosion. The proposed variance will enable NCDOT to build an effective temporary sandbag structure that serves its purpose of protecting the materials behind the sheet pile wall. The sandbags requested are 3 different sizes, which is not at issue. These sizes are 2’x5’x15”, 3’x3’, and 4x4’. The different sized sand bags will be used jointly to seal off the end of the wall as depicted in the permit drawings. The sandbags would be installed as a temporary groin meaning they will be stacked perpendicular as well as parallel to the shoreline. This physical orientation of the sandbags creates more structure and stability. Sandbags placed parallel to the shore are typically used to protect existing shoreline that is in danger of being eroded. However at this Project Site the shoreline has already eroded and in need of more substantial stabilization. The footprint of the perpendicular bags would temporarily allow NCDOT to stabilize the area that would be located behind the proposed sheet pile wall to the existing shoreline and will protect the area until more permanent material is placed behind the sheet pile wall. The sandbags would be placed in an area that is partially located within the inlet hazard area. The approximate number of sand bags is 40 total, depending on the depths of the water at the time of placement. The approximate length at the top of the sandbag wall would most likely be 50’ with a width of 15’, which will taper as it rises to a height of 15’ maximum. The tie backs would be installed over top of the sandbag wall. Currently, the water is 12 feet deep, but it is predicted to be 14 to 15 feet by the time construction begins. The sandbags must be placed in the water and exceed the height of the water in order to protect the sheet pile wall from winds, currents, and water. Otherwise, the sheet pile wall would be exposed and lost to continued erosion.

NCDOT’s requested variance will help better protect the structure integrity of the sandbag structure, the sheet pile wall, and the site. While the permit allows sandbags to be placed parallel to the shoreline and at a height of six (6) feet, the variance seeks to allow the placement of the sandbags both parallel and perpendicular to the shore. In addition, because the existing water is 12 feet deep and placement of sandbags underwater to only 6 feet will serve little purpose, the variance also seeks to place the sandbags at a height sufficient to protect the sheet pile wall from the currents, winds, and water. Based on current conditions, the necessary height for the sandbags would be 15 feet. Without the variance for the perpendicular orientation and increased height of the sandbags, natural forces could reach behind the wall and material behind the wall could be lost. It is also important to note that NCDOT in coordination with federal agencies, is currently developing long term improvements to be implemented at the Site.

As mandated by the North Carolina General Assembly, NCDOT has an obligation and responsibility to provide and maintain ferries connecting the parts of the State highway system, such as connecting highway 12 via the ferry route from Ocracoke to Hatteras Island. See N.C.G.S. § 136-82 (a). The Hatteras Ferry is a vital link to the mainland for
Ocracoke. Through the Hatteras Ferry, visitors and residents of Ocracoke receive access to their homes, goods and services, healthcare, and waste disposal. The Hatteras Ferry also provides access to important State and national resources such as the Cape Hatteras National Seashore. Perhaps most importantly, residents and visitors rely on the Hatteras Ferry as an evacuation route. The proposed design of the sandbags will help NCDOT protect NC 12 via the ferry route and will provide a more secure means of access to the mainland for the residents of and visitors to Ocracoke Island.

As explained above, strict application of 15A N.C.A.C. 07H.0308(a)(2) will cause serious hardships and difficulties to both NCDOT and the public, which NCDOT serves. NCDOT needs the requested variance because the existing rule does not adequately provide for the degree and extent of erosion control needed to protect the sheet pile wall, ferry basin, and stacking lanes in this area. Without immediate and adequate erosion control measures, the structural integrity of the ferry basin and the Site becomes increasingly threatened by continued overwash, erosion, and sand cover and the stacking lanes will remain closed. Thus, without the variance, NCDOT will experience a hardship because the site will not have any temporary protection until a long-term alternative is implemented. This would result in the continued closure of the stacking lanes and the potential of complete failure of the ferry basin. This also results in a hardship to the traveling public especially if an emergency evacuation was needed. The proposed variance would protect the safety and welfare of the travelling public while affording NCDOT the time needed to develop, in conjunction with federal agencies a reasonable solution that would address the unique issues associated with this dynamic environment.

(2) **Do such hardships result from conditions peculiar to Petitioner’s property such as the location, size, or topography of the property?**

**Petitioner’s position:** Yes.

**Petitioner’s argument:** The hardships explained above result from conditions peculiar to the property. The project area is almost entirely within the Cape Fear Hatteras National Seashore which is a federally designated National Seashore (1937) preserving portions of the Outer Banks through Hatteras Island to Ocracoke Island, stretching over 70 miles. The project site runs parallel to the Hatteras Inlet. The project area is also in close proximity to the Atlantic Ocean and Pamlico Sound. These features make the property susceptible to erosion, overwash, and sand cover especially during storm events. A shifting channel to the north of the ferry basin and encroachment of the inlet has caused significant erosion to take place on the north end of the island. Due to this erosion, the ferry boarding lanes are in a condition of disintegration and have been closed due to safety concerns. Further, the ability to travel NC 12 via ferry unimpeded plays a vital role in the lives of residents and visitors because this ferry route is critical to ensure their safety and welfare. This ferry route is used as an emergency evacuation route off Ocracoke Island as well.

(3) **Do the hardships result from actions taken by the Petitioner?**

**Petitioner’s position:** No.
Petitioner’s argument: The hardships facing NCDOT and the travelling public do not result from actions taken by the department. NCDOT has implemented approved temporary erosion control measures in the past, but those temporary measures have lost function and the site continues to experience extensive erosion. No actions by NCDOT led to the destruction of the previous temporary erosion control measures. Rather, these hardships are a direct result of the natural coastal processes associated with this dynamic environment, which are actions beyond the control of NCDOT.

Will the variance requested by the Petitioner (1) be consistent with the spirit, purpose, and intent of the rules, standards or orders issued by the Commission; (2) secure the public safety and welfare; and (3) preserve substantial justice?

Petitioner’s position: Yes.

Petitioner’s argument:

- Consistent with the spirit, purpose and intent of rules.

The proposed placement of sandbags to temporarily protect the ferry basin is consistent with the spirit, purpose, and intent of the rules. The rules allow the placement of sandbags up to 6 feet high, but require them to be placed in a parallel orientation to the shore. Placement of sandbags at a height necessary for temporarily control erosion and in a perpendicular orientation is also consistent with the purpose of the rule allowing temporary erosion control measures. Protecting the structural integrity of NC 12 ferry route with temporary erosion control measures by placing some sandbags in a perpendicular orientation and at a greater height is consistent with the spirit, purpose, and intent of the applicable regulations. NCDOT is allowed to undertake work “which is necessary to protect against or reduce the imminent danger” caused by the storm activities and inlet migration and to “re-establish necessary public facilities or transportation corridors.” 15A NCAC 07H .1704(a)(2). The variance to the modification will help NCDOT achieve the task at hand. This is a situation that involves a site significantly affected by erosion, and the previously installed sandbags were insufficient to protect the area in the short-term until a long-term solution is implemented.

The proposed erosion control measure is temporary. When its’ useful and “permitted” service life ends, the sand from the associated sandbags will be integrated back into the environment. As such, the requested variance is an effective temporary erosion control measure which will further protect the area. This type of temporary protection is necessary while NCDOT and NPS, in consultation with other state and federal agencies, pursue long-term improvements that will be designed to minimize the risk of shoreline erosion. An environmental assessment for the long term groin project is ongoing. Because of coastal conditions in the vicinity of the project area and their impact on the transportation corridor, it is NCDOT’s priority to work with other agencies to study, select, and implement long-term improvements in this area.
The Coastal Area Management Act states, in pertinent part, that a goal of the Act is “[t]o establish policies, guidelines and standards for... transportation for the coastal area including transportation routes, navigation channels and harbors, and other public facilities for recreation and tourist facilities; and for economic development of the coastal area, including construction, location and design of port facilities, commercial establishments, and other developments.” N.C. Gen. Stat. § 113A-102(b)(4). Ferry service began across Hatteras Inlet in 1953 to connect the islands of Hatteras and Ocracoke. This basin was put into service in May of 1970. This navigation channel, and turning basin were already in existence at the time CAMA was enacted in 1974, and CAMA recognizes that such ferry facilities are a part of the existing coastal area and should be taken into account when developing the CAMA program.

The Management Objective for Ocean Hazard Areas found in 15A NCAC 7H.0303 states:

It is the CRC’s objective to provide management policies and standards for ocean hazard areas that serve to eliminate unreasonable danger to life and property and achieve a balance between the financial, safety, and social factors that are involved in hazard area development...The purpose of these Rules shall be to further the goals set out in G.S. 113A-102(b), with particular attention to minimizing losses to life and property resulting from storms and long term erosion...reducing the public costs of inappropriately sited development. Furthermore, it is the objective of the CRC to protect present common law and statutory public rights of access to and use of the lands and waters of the coastal area.

In its Shoreline Erosion Policies, the Commission has determined that “Temporary measures to counteract erosion, such as the use of sandbags...should be allowed, but only to the extent necessary to protect property for a short period of time until threatened structures may be relocated or until the effects of a short-term erosion event are reversed.” “In all cases, temporary stabilization measures must be compatible with public use and enjoyment of the beach.” 15A NCAC 7M .0202(e). Thus, sandbags that vary from the CAMA guidelines are appropriate in certain circumstances. The installation of sandbags that vary from CAMA regulations as proposed by NCDOT is a reasonable response to help protect the ferry basin until a long-term solution can be implemented. Due to the location of the site and the extent of the erosion, the public’s access to the ocean beach is already limited or completely diminished in this area. Allowing the variance should not have significant additional impacts on the beach access. The public’s access to Hatteras Island from Ocracoke depends on being able to utilize this ferry route and so this aspect of public access should be considered in this case as well.

For these reasons, the project is consistent with the spirit, purpose and intent of the CRC Rules.

- **Secure the public safety and welfare.**

The variance secures the safety and welfare of the public by contributing to the stabilization of the ferry basin and stacking lanes. Approval of the variance will help NCDOT ensure
that the ferry route remains an available, structurally sound route for residents and visitors, whether they are travelling for work, school, business, recreation, or in the event of an emergency.

A Declaration of Emergency was issued on March 13, 2019 because of the significant damage caused by erosion incurred to the ferry basin bulkhead and stacking lanes. The northern shoreline is actively scouring and requires stabilization. If erosion is not controlled this will cause the existing bulkhead to fail and the entire basin would be impacted, causing unsafe conditions for the loading and unloading of the travelling public. If the area around the point (the point adjacent to the hairpin turn at Southdock) is not protected and erodes away, this would eliminate a safe harbor for the NCDOT ferries while docked loading/unloading traffic. This could cause damage to the vessels, damage to traveling public’s vehicles, and would increase the likelihood of injury to the public and crews onboard the vessels during strong wind events. Increased rough conditions in the basin could damage marine assets such as ramps, gantries and dolphins which in turn could cause delays/cancellation of ferry schedules. Because of the damage to the Site, the stacking lanes have been temporarily closed, as it is unsafe for public use. NC 12 is North Carolina’s easternmost primary route and is a two-lane roadway. When the stacking lanes are closed, the ferry traffic backs up onto NC-12.

Hatteras Inlet Ferry carries the greatest volume of traffic to and from Ocracoke Island (75 to 80 percent during the summer). Ocracoke Island uses this ferry route to transport medical emergencies by ambulance. Additional fire and law enforcement service response to Ocracoke is quicker from Hatteras Island than from Swan Quarter (one hour versus three hours). Ocracoke Island is home to 948 permanent residents (2010 US Census). The island’s economy is based almost entirely on tourism, which peaks during the summer months. The summer population is approximately 90 percent tourists. Of the tourists, 70 percent are day trippers who make their arrival to and departure from the island via ferries on the same day. Ocracoke Island is connected to the mainland or other barrier islands only by ferry, therefore, residents and visitors are dependent on using the ferry system to travel to and from the island. Permanent residents depend on the ferry system for routine trips such as daily commutes, school-related travel, trips to medical care facilities, and shopping, either on the mainland or other islands. The need to keep this ferry route open for access to and from Ocracoke, especially for emergency evacuation purposes is important and will further public safety and welfare.

- **Preserve substantial justice.**

The variance will also preserve substantial justice because NCDOT did not undermine the structural integrity of the Site or the highway. As such, NCDOT should be authorized to install a more effective temporary erosion control measure, as requested until the long term project can be studied and installed. Without the variance, the sheet pile wall will be unprotected and could be lost to erosion, overwash, and sand cover. In turn, these natural events may result in closure of the ferry terminal and the loss of that ferry as a transportation route – an unjust result for the residents of and visitors to Ocracoke Island.
ATTACHMENT E:

STIPULATED EXHIBITS INCLUDING POWERPOINT

1. Special Use Permit for NCDOT Easement from NPS dated July 5, 2019
2. CAMA General Permit #68669B issued March 13, 2018
3. CAMA General Permit #71409B issued May 5, 2018
4. Declaration of Emergency issued by T.M. Little, P.E., Chief Engineer
5. December 2016 feasibility study
6. April 15, 2019 NPS Environmental Screening Form
7. CAMA Major Permit Modification Application Package of June 2019, with attachments including Historic Arch/Landscapes form and No archaeological form
8. Comments of NC Division of Marine Fisheries
9. Comments of North Carolina Wildlife Resources Commission
10. General 401 WQC 4134 issued June 28, 2019
11. Comments of DCM Transportation Project Field Representative
12. June 21, 2019 Emergency Major Modification to CAMA Major Permit No. 224-87
13. NCDOT’s Request to expedite hearing, DCM’s response, CRC Chair’s Grant letter
14. Notice of the Variance Petition to Adjacent Riparian Owner NPS
15. Powerpoint Slideshow with relevant maps, GIS images, diagrams, site photos
# SPECIAL USE PERMIT

Outer Banks Group:
Cape Hatteras NS, Fort Raleigh NHS, & Wright Brothers NMEM
1401 National Park Drive
Manteo, NC 27954
(252) 475-9000 [email]caha_special_use_permits@nps.gov[/email]

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Park Alpha Code
CAHA

Type of Use
Emergency Sheet Pile Repair
Ferry South Dock Ocracoke Island

Permit #
USA19-5700-014

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is hereby authorized to use the following described land or facilities on Cape Hatteras National Seashore necessary to stabilize and protect the point adjacent to the "hairpin" turn stacking lanes at the South dock ferry landing on the north end of Ocracoke island.

The permit begins at 12:01 am / pm on 07/01/19. The permit expires at 11:59 am / pm on 12/31/19.

**SUMMARY OF PERMITTED ACTIVITY:** NCDOT along with Moffatt & Nichols the installation of approximately 990 feet of new sheet pile to protect the eroding area at the Ferry South Dock of Ocracoke Island. See Condition #34 Maps.

1. Install approximately 1000 feet of new sheet pile to protect the area.
2. Grade the area between the basin and inlet side to allow a crane to move along the point to install the new sheet pile.
3. Installation of approximately 40 temporary sandbags that vary in size from 2'x5'x5', 3'x3' and 4'x4'.

**Equipment needed:** Crane, bulldozer and 18 wheeler and trailer, tug and barge.

Person on site responsible for adherence to the terms and conditions of the permit (include contact information)
As named above

Authorizing legislation or other authority:
PEPC# 86528, 36 CFR Chapter 1, Part 1.6 & 2.50

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</thead>
<tbody>
<tr>
<td>Received</td>
<td>Amount</td>
</tr>
<tr>
<td>Not Required</td>
<td>$ 0</td>
</tr>
</tbody>
</table>

ISSUANCE of this permit is subject to the attached conditions. The undersigned hereby accepts this permit subject to the terms, covenants, obligations, and reservations, expressed or implied herein.
SPECIAL USE PERMIT

Outer Banks Group:
Cape Hatteras NS, Fort Raleigh NHS, & Wright Brothers NMEM
1401 National Park Drive
Manteo, NC 27954
(252) 475-9000 caha_special_use_permits@nps.gov

Title: Asst. Director of Marine Asset Management
Date: 7-9-19

Authorizing NPS Official

Title: Superintendent
Date: 7/5/2019

CONDITIONS OF THIS PERMIT

Failure to comply with any of the terms and conditions of this permit may result in the immediate suspension or revocation of the permit. [36 CFR 1.6(h)]

1. The permittee is prohibited from giving false information; to do so will be considered a breach of conditions and be grounds for revocation: [36 CFR 2.32(a) (3)].

2. This permit may not be transferred or assigned without the prior written consent of the Superintendent.

3. The permittee shall exercise this privilege subject to the supervision of the Superintendent or designee, and shall comply with all applicable Federal, State, county and municipal laws, ordinances, regulations, codes, and the terms and conditions of this permit. Failure to do so may result in the immediate suspension of the permitted activity or the revocation of the permit. All costs associated with clean up or damage repairs in conjunction with a revoked permit will be the responsibility of the permittee.

4. The permittee is responsible for making all necessary contacts and arrangements with other Federal, State, and local agencies to secure required inspections, permits, licenses, etc.

5. The park area associated with this permit will remain open and available to the public during park visiting hours. This permit does not guarantee exclusive use of an area. Permit activities will not unduly interfere with other park visitors' use and enjoyment of the area.

6. This permit may be revoked at the discretion of the Superintendent upon 24 hours notice.

7. This permit may be revoked without notice if damage to resources or facilities occurs or is threatened, notwithstanding any other term or condition of the permit to the contrary.

8. This permit is made upon the express condition that the United States, its agents and employees shall be free from all liabilities and claims for damages and/or suits for or by reason of any injury, injuries, or death to any person or persons or property of any kind whatsoever, whether to the person or property of the Permittee, its agents or employees, or third parties, from any cause or causes whatsoever while in or upon said premises or any part thereof during the term of this permit or occasioned by any occupancy or use of said premises or any activity carried on by the Permittee in connection herewith, and the Permittee hereby covenants and agrees to indemnify, defend, save and hold harmless the United States, its agents, and employees from all liabilities, charges, expenses and costs on account of or by reason of any such injuries, deaths, liabilities, claims, suits or losses however occurring or damages growing out of the same.

9. Permittee agrees to carry general liability insurance against claims occasioned by the action or omissions of the permittee, its agents and employees in carrying out the activities and operations authorized by this permit. The policy shall be in the amount of $1,000,000.00 per Occurrence, $2,000,000.00 Aggregate and underwritten by a United States company naming the United States of America as additional insured. The permittee agrees to provide the Superintendent with a Certificate of Insurance with the proper endorsements prior to the effective date of the permit.
SPECIAL USE PERMIT

Outer Banks Group:
Cape Hatteras NS, Fort Raleigh NHS, & Wright Brothers NMEM
1401 National Park Drive
Manteo, NC 27954
(252) 475-9000 caha_special_use_permits@nps.gov

10. Permittee agrees to deposit with the park a bond in the amount of $__N/A__ from an authorized bonding company or in the form of cash or cash equivalent, to guarantee that all financial obligations to the park will be met.

11. Costs incurred by the park as a result of accepting and processing the application and managing and monitoring the permitted activity will be reimbursed by the permittee. Administrative costs and estimated costs for activities on site must be paid when the permit is approved. If any additional costs are incurred by the park, the permittee will be billed at the conclusion of the permit. Should the estimated costs paid exceed the actual costs incurred, the difference will be returned to the permittee.

12. The person(s) named on the permit as in charge of the permitted activity on-site must have full authority to make any decisions about the activity and must remain available at all times. He/she shall be responsible for all individuals, groups, vendors, etc. involved with the permit.

13. Nothing herein contained shall be construed as binding the Service to expend in any one fiscal year any sum in excess of appropriations made by Congress or administratively allocated for the purpose of this permit for the fiscal year, or to involve the Service in any contract or other obligation for the further expenditure of money in excess of such appropriations or allocations.

14. If any provision of this permit shall be found to be invalid or unenforceable, the remainder of this permit shall not be affected and the other provisions of this permit shall be valid and be enforced to the fullest extent permitted by law.

15. In the event of an emergency, dial 911. In the event of an incident that does not require emergency assistance, dial 252-473-3444.

16. The Permittee must notify the parks Special Parks Uses Coordinator, Carmen Pantaleo, carmen_pantaleo@nps.gov, 252-475-9034, at least 4 weeks prior to project activities.

17. The permittee will schedule a pre-construction meeting, (at least 2 weeks in advance), with the Special Parks Use Coordinator, Carmen Pantaleo. The meeting will include the contractor, park management team, Safety Officer, Environmental Protection Specialist, Cultural Program Manager and district leads.

18. Site plans need to be submitted to Environmental Protection Specialist, Sabrina Henry, sabrina_henry@nps.gov and approved prior to project implementation.

19. Sheet piles and sandbags are a temporary installation (~1 year) and will be removed upon NPS request. If sheet piles are required for long term protection then NCDOC is responsible for completing NEPA analysis to determine appropriate alternatives and long-term effects of shoreline hardening.

20. The National Park Service reserves the right to conduct inspections during the course of the project.

21. Slit fencing shall be installed in appropriate areas around the work site to insure minimal run-off and siltation of the waterways in the areas adjacent to the demolition site. This fencing shall be removed from the site after the ground cover is established and the discretion of the National Park Service.

22. Care must be taken to avoid any rutting caused by vehicles or equipment.

23. Equipment used at the site shall be pressure cleaned and free of weeds, seeds, debris, and mud to prevent the introduction and/or spread of exotic, invasive plants.

24. Equipment and material staging and storage, as well as vehicle turnarounds, would be confined to designated areas that would include existing disturbed areas along park roadways and within parking areas for construction activities inside the park.
SPECIAL USE PERMIT

Outer Banks Group:
Cape Hatteras NS, Fort Raleigh NHS, & Wright Brothers NMEM
1401 National Park Drive
Manteo, NC 27954
(252) 475-9000 caha_special_use_permits@nps.gov

25. CONSTRUCTION: All work and activities in the park by the permittee will be done in accordance with the attached maps, drawings, documents and representations made or furnished to the park in support of the permittee's application for this permit.

26. PARKING AND STAGING: Permittee will coordinate with the park for the parking of its vehicles and staging of materials to facilitate the continuing use of the facilities by park visitors. The permittee will ensure that no vehicle fuel, oil or other fluids escape from its vehicles on park land. Permittee is responsible for any containment and cleanup required to return the site to original condition. The permittee shall comply with all State of North Carolina Department of Environmental Quality and National Park Service rules and regulations including, but not limited to the handling and storage of fuel, oil and hazardous substances. The District Ranger, Ed Fuller (252-475-8313) must be notified of any leaks or spills. The permittee will assist the park as may be directed in fire suppression in the event permittee's activities cause a wildfire event.

27. All construction generated debris will be removed from the park to an approved landfill.

28. The permittee is responsible to provide a revegetation plan to restore disturbed areas to the Special Use Coordinator for NPS approval.

29. NATURAL AND CULTURAL RESOURCE PROTECTION: Permittee should avoid impacting Threatened or Endangered species and plants. Exposed soil shall be seeded with a park approved seed mix and mulched as soon as possible to prevent the establishment of invasive plants. Permittee will expeditiously repair to the Park’s satisfaction any damage to the Park’s physical resources caused by or occurring incident to the event, or if repair is not possible, to provide monetary compensation for the damages.

30. Permittee will restore existing landscape and vegetation to original condition. Re-contouring and revegetation of disturbed areas would take place following the project. Efforts would strive to reconstrust the natural contour, spacing, abundance, and diversity of native plant species using approved native species.

31. Only National Park Service park approved native plant species shall be used.

32. A copy of issued NPS permit must be with the permittee/workers and on site at all times when conducting project activities within the National Park.

33. Applicable federal and state permits are to be acquired before project start.

34. Maps:

Superintendent may revoke the permit and/or stop the construction project should any of the permit conditions or best management practices as set out herein be violated.
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HYDE COUNTY

LOCATION: SEAWALL AT NORTH END OF OCRA COKE ISLAND
NC 12 (IRVING GARRISH HWY) ON OCRA COKE ISLAND

TYPE OF WORK: EMERGENCY SEAWALL INSTALLATION
**FERRY BASIN SIDE**

- CONTRACTOR SHALL EIGHTEEN YARDS OF SAND
- EXISTING SEADIE EL -10.0'
- EXISTING SHEET PILE SEAWALL ISOLATED
- DESIGN SCOUR EL -9.0`
- TIP OF SEAWALL EL -10.0'

**HATTERAS INLET SIDE**

- APPROXIMATE FINISHED GRADE
- CONCRETE CAP, TYPE, SEE DETAIL A
- REMOVE TOP 3'-0" OF EXISTING STEEL SHEET PILE TO INSTALL TIE ROOD
- 3/4" GALVANIZED TIE ROOD
- INSTALL TIE ROOD AND CONCRETE CAP
- EXISTING SEARED VARIOUS
- HERO STEEL SHEET PILE SEAWALL ISOLATED
- DESIGN SCOUR EL -8.0'
- TIP OF SEAWALL EL -10.0'

**NOTE:**
ALL TIE ROOD COMPONENTS TO BE GALVANIZED.

---

**PROJECT NO.: SOUTHDOCK**

**HYDE COUNTY**

**STATION:** UNK L-0'

**DEPARTMENT OF TRANSPORTATION**

**SEAWALL SECTION A-A**
FERRY BASIN SIDE

CONTRACTOR SHALL
FILL HOLE WITH SAND

EXISTING SEALED EL -5.0'

STEEL SHEET PILE SEA WALL EXTENDING

DESIGN BOC H. EL -25.0'

TOP OF SEAL WALL EL -40.0'

HATTERAS INLET SID

CONCRETE CAP, TIP. SEE DETAIL A

-FIGURE 1-5/8' EXISTING
STEEL SHEET PILE TO INSTALL
TIE ROD

-FIGURE 1-5/8' GALVANIZED TIE ROD
AND CONCRETE CAP

EXISTING SEALED VAPERS

NOTICE SHEET PILE SEA WALL ISOLATED

NOTE
ALL THE ROOD COMPONENTS TO BE GALVANIZED.

SECTION B-B

PRELIMINARY PLANS

PROJECT NO. SOUTHDOCK
COUNTY
HYDE

STATION:

SEAWALL
SECTION B-B
NOTE:
ALL TIE ROD COMPONENTS TO BE GALVANIZED.
SPECIAL USE PERMIT

Outer Banks Group:
Cape Hatteras NS, Fort Raleigh NH-S, & Wright Brothers NMEM
1401 National Park Drive
Manteo, NC 27954
(252) 475-9000 caha_special_use_permits@nps.gov
GENERAL PERMIT

Applicant Name: NC DOT
Address: 113 Airport Dr, Suite 100
City: Edenton
State: NC
ZIP: 27932
Phone #: (252) 452-1850
E-Mail: twillis@ncdot.gov
Authorized Agent: CLAY WILLIS
Affected AEC(s): CW, EVW, PTA
ORW: yes

Project Location:
County: Hyde
Street Address/State Road/Lot #: NC Highway 12 At/Adjacent Fish Facility, Adjacent To Smith's Lumber/Martin Tire
Subdivision: Ocracoke
City: Ocracoke
ZIP: 27960
Phone #: ( )
River Basin: The Pamlico
Adj. Wtr. Body: Atlantic Ocean
Closest Maj. Wtr. Body: Atlantic Ocean

Type of Project/ Activity: INSTALLATION OF 125' OF PROTECTIVE SAND BAGS
APPROXIMATELY 100 SAND BAGS, INSTALL...6' HIGH, THEN TIE INTO EXISTING DUNGE.

Plans Attached and Incorporated Into Permit:
* SIX (6) DATES 2/23/2018

APPROXIMATELY 155' OF TEMPORARY SHEET PILE BEEN USED AS CONSTRUCTION METHODOLOGY MUST BE REMOVED UPON PROJECT COMPLETION OR UPON FORMAL NOTICE BY DIVISION OF COASTAL MANAGEMENT.

A building permit may be required by:
(Note Local Planning Jurisdiction)

Notes/Special Conditions:
1. Other fillings and other types of debris to protect sand bags shall not be allowed.
2. Sand bags shall be tan in color with base width not exceeding 30" and heighth shall not exceed 8'.
3. Permit owner shall be responsible for removal of remnants of all fillers of damaged temporary fences/structures.

CLAY WILLIS
Agent or Applicant Printed Name

GREG DAKEY
Permit Officer's Printed Name

05/13/2016
Issuing Date
09/12/2018
Expiration Date

$700.00
Application Fee(s)
Statement of Compliance and Consistency

This permit is subject to compliance with this application, site drawing and attached general and specific conditions. Any violation of these terms may subject the permittee to a fine or criminal or civil action; and may cause the permit to become null and void.

This permit must be on the project site and accessible to the permit officer when the project is inspected for compliance. The applicant certifies by signing this permit that 1) prior to undertaking any activities authorized by this permit, the applicant will confer with appropriate local authorities to confirm that this project is consistent with the local land use plan and all local ordinances, and 2) a written statement or certified mail return receipt has been obtained from the adjacent riparian landowner(s).

The State of North Carolina and the Division of Coastal Management, in issuing this permit under the best available information and belief, certify that this project is consistent with the North Carolina Coastal Management Program.

River Basin Rules Applicable To Your Project:

- Tar - Pamlico River Basin Buffer Rules
- Neuse River Basin Buffer Rules
- Other: _______________________

If indicated on front of permit, your project is subject to the Environmental Management Commission’s Buffer Rules for the River Basin checked above due to its location within that River Basin. These buffer rules are enforced by the NC Division of Water Resources. Contact the Division of Water Resources at the Washington Regional Office (252-946-6481) or the Wilmington Regional Office (910-796-7215) for more information on how to comply with these buffer rules.

Division of Coastal Management Offices

**Morehead City Headquarters**
400 Commerce Ave
Morehead City, NC 28557
252-808-2808/1-888-4RCOAST
Fax: 252-247-3330
(Serves: Carteret, Craven, Onslow - North of New River Inlet- and Pamlico Counties)

**Elizabeth City District**
1367 U.S. 17 South
Elizabeth City, NC 27909
252-264-3901
Fax: 252-264-3723
(Serves: Camden, Chowan, Currituck, Dare, Gates, Pasquotank and Perquimans Counties)

**Washington District**
943 Washington Square Mall
Washington, NC 27889
252-946-6481
Fax: 252-948-0478
(Serves: Beaufort, Bertie, Hertford, Hyde, Tyrrell and Washington Counties)

**Wilmington District**
127 Cardinal Drive Ext.
Wilmington, NC 28405-3845
910-796-7215
Fax: 910-395-3964
(Serves: Brunswick, New Hanover, Onslow - South of New River Inlet- and Pender Counties)

http://www.nccoastalmanagement.net/  
Revised 08/27/14
## General Permit Information

- **Applicant Name:** NCDOT
- **Address:** 113 Airport Dr., Suite 100
- **City:** Edenton
- **State:** NC
- **ZIP:** 27932
- **Phone #:** 252-1162-1850
- **E-Mail:** twillis@ncdot.gov

### Project Details
- **Project Location:** Hyde
- **Street Address/State Road/Lot #:** NC Hwy 12 at South End of Facility, Adjacent to Stays Heads Harbor, NC
- **Subdivision:**
- **City:** Ocracoke
- **ZIP:** 27960
- **Phone #:**
- **River Basin:** Pamlico
- **Adjacent Water Body:** Atlantic Ocean
- **Closest Major Water Body:** Atlantic Ocean

### Type of Project/Activity

<table>
<thead>
<tr>
<th>Details</th>
<th>Dimensions</th>
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<tbody>
<tr>
<td>Installation of 205' of Protective Sandbags</td>
<td>N/A</td>
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<tr>
<td>(approximately 100 bags) adjacent to</td>
<td></td>
</tr>
<tr>
<td>roadway, relocate peck, stacking lanes 20'</td>
<td></td>
</tr>
<tr>
<td>landward, construct dune/pond over</td>
<td></td>
</tr>
<tr>
<td>Sandbags and tie into existing dunes.</td>
<td></td>
</tr>
</tbody>
</table>

### Notes/Special Conditions
- A building permit may be required by: (Note Local Planning Jurisdiction)
- See note on back regarding River Basin rules.
- Due to pilings and other devices to achieve sandbags, are prohibited.
- Bag shall be tan in color with the wake of structure shall not exceed 20 feet in height shall not exceed 12 feet.
- Builders are responsible for removal of any damaged, temporary erosion control structure.

### Financial Information
- **Application Fee(s):** $400.00
- **Signature:** Clay Willis
- **Check #:** 1SP10481112
- **Issuing Date:** 05/23/2018
- **Expiration Date:** 06/22/2018

---

Signature: Clay Willis

Permit Officer’s Printed Name: Clay Willis
SAND FENCE DETAILS

SAND FENCE TYPICAL DETAIL
Elevation View

SAND FENCE TYPICAL DETAIL
Cross Section View

North East
Wind

Sand Fence (Typ.)

Existing Ground

Unmanned 2"x4" Stud

4" MIN

4" NTS

TYPICAL SECTIONS WILL BE PLACED PARALLEL TO NC 12 ON TOP OR NEAR THE TOP OF SAND DUNES AS DIRECTED BY THE ENGINEER

60 L.F. ±
10 FT OVERLAP
30 L.F. ±

6 L.F.
170 L.F. ±
EROSION PROTECTION
STACKING LАНES @ OCRACOKE ISLAND

PROPOSED TYPICAL SECTION

EXISTING EDGE OF PAVEMENT (BROKEN)

PROPOSED EDGE OF PAVEMENT

PROPOSED DUNE (VARIABLE SLOPE)

SHEET PILES (TEMPORARY)

STACKING LANCES

HATTERAS INLET

MHW

MLW

15'

EXISTING GROUND

NOTES:
- BAGS (FILLED) SHOULD BE 5' WIDE, 15' LONG, & 2' HIGH
- DUNE SLOPE VARIES. TYPICAL SHOWN AT ROADWAY PORTION CLOSEST TO SHORELINE
- MATERIAL USED FOR DUNE CONSTRUCTION SHALL HAVE BEACH QUALITY CHARACTERISTICS
  AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT
- MATERIAL EXCAVATED FOR INSTALLATION OF SANDBAGS MAY BE TEMPORARILY PLACED
  SEAWARD OF THE MHW LINE. THE DISTANCE SEAWARD SHOULD BE MINIMIZED AS
  MUCH AS POSSIBLE, BUT SHALL IN NO CASE EXCEED 20 FEET.

Prepared in the Office of:
DIVISION OF HIGHWAYS
113 Airport Dr., Edenton, NC 27932

Drawn By: D. H. Scullings

MB STANDARD SPECIFICATIONS

GRAPHIC SCALES
SCALE 1"=10' (HALF SIZE)

DATE: 2/21/18

PROJECT REFERENCES NO. SHEET NO.
HP1462 2
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HYDE COUNTY

LOCATION: NC 12 (IRVIN GARRISH HWY) ON OCRACOKE ISLAND
BOARDING LANES AT SOUTH DOCK FERRY TERMINAL

TYPE OF WORK: SANDBAG INSTALLATION, BERM CONSTRUCTION,
RELOCATION AND RESURFACING OF STACKING LANES

VICINITY MAP

FAMILICO SOUND

PROPOSED TEMPORARY SHEET PILE (10 L.F. 7")

HATTERAS INLET

EXISTING TOE OF DUNE

EXISTING DUNE

BEGIN PROJECT 10+00

PROPOSED EDGE OF PAVEMENT

END PROJECT 12+65

NATIONAL PARK SERVICE
0/0

SOUTH DOCK FERRY TERMINAL

ATLANTIC OCEAN

PROJECT LENGTH

LENGTH STATE PROJECT ISP.10481.12 = 0.85 MILES

DIVISION OF HIGHWAYS

W. B. HOIBS, P.E.
ENGINEER PROJECT MANAGER

D. H. STALINGS
PROJECT DIRECTOR

CHRIS SLATCHA
DIVISION MANAGER HIGHWAY OFFICE
### SUMMARY OF QUANTITIES

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>DESCRIPTION</th>
<th>TYP NO</th>
<th>LANES</th>
<th>LANE TYPE</th>
<th>FINAL SURFACE TESTING REQUIRED</th>
<th>WARM MIX ASPHALT REQUIRED</th>
<th>LENGTH</th>
<th>WIDTH</th>
<th>MOBILIZATION</th>
<th>GENERIC MISCELLANEOUS ITEM (FULLY OPERATED BULLDOZER)</th>
<th>GRADING</th>
<th>BORROW</th>
<th>REMOVAL OF EXISTING ASPHALT PAVEMENT</th>
<th>TEMPORARY SHORING</th>
<th>GENERIC GRADING ITEM (NON-SAND DERRIS REMOVAL)</th>
<th>BASE COURSE, B25.0C</th>
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<tbody>
<tr>
<td>12 STACKING LANES</td>
<td>SANDBAG INSTALLATION &amp; RESURFACING</td>
<td>1</td>
<td>S</td>
<td>MU</td>
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<td>NO</td>
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### SUMMARY OF QUANTITIES

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<th>LANE TYPE</th>
<th>FINAL SURFACE TESTING REQUIRED</th>
<th>WARM MIX ASPHALT REQUIRED</th>
<th>LENGTH</th>
<th>WIDTH</th>
<th>SURFACE COURSE, 50.58</th>
<th>ASPHALT BINDER FOR PLANT MIX</th>
<th>TEMPORARY TRAFFIC CONTROL</th>
<th>4&quot; X 90 M WHITE THERMO</th>
<th>GENERIC EROSION CONTROL ITEM (2'X5'X5') SAND BAGS FILLED IN PLACE</th>
<th>GENERIC EROSION CONTROL ITEM (SPRIGGING)</th>
<th>GENERIC EROSION CONTROL ITEM (SAND FENCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 STACKING LANES</td>
<td>SANDBAG INSTALLATION &amp; RESURFACING</td>
<td>1</td>
<td>S</td>
<td>MU</td>
<td>NO</td>
<td>NO</td>
<td>0.05</td>
<td>50</td>
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<td>15</td>
<td>1</td>
<td>2,100</td>
<td>100</td>
<td>0.15</td>
<td>450</td>
</tr>
</tbody>
</table>

|       |                              |       |      |     |     |     | 0.05 | 200 | 15 | 1 | 2,100 | 100 | 0.15 | 450 | MI | FT | TONS | TONS | LS | LF | EA | ACR | LF |
DATE: March 13, 2019

TO: File

FROM: T. M. Little, P.E.
Chief Engineer

SUBJECT: Declaration of Emergency
Southdock - Ocracoke

Immediate attention has been requested to repair Southdock at Ocracoke due to rapidly increasing erosion. The ferry basin bulkhead and stacking lanes have incurred significant damage to the pavement. If continued erosion were to cause the existing bulkhead to fail, the entire basin would be impacted.

Due to the impacts of these failures, I have declared an emergency exists and determined it is not feasible nor in the public’s interest, for the Department of Transportation to comply with the statutory bidding requirements in obtaining materials, equipment and/or Contractors assistance in our efforts to restore these structures. This is being done pursuant to the authority granted by G.S. 136-28.1(e).

Instruction has been given to the Division 1 Engineer to immediately proceed to accomplish necessary repairs.

TML/ajs

cc: James H. Trogdon, PE, Secretary of Transportation
Jerry Jennings, P.E., Division Engineer
John Rouse, P.E., Western Deputy Chief Engineer
Ron Hancock, P.E., Deputy Chief Engineer
Patrick Norman, P.E., Director of Highway Operations
Kim Padfield, Director of Accounting Operations & Budget
Joni Robbins, Procurement Director
Feasibility Study

NC 12 Ocracoke Island Hot Spot
Ocracoke Island

Hyde County, North Carolina

Division 1
R-3116A
WBS No. 34525.1.3

Prepared for the
North Carolina Department of Transportation

Nicole H. Bennett, AICP
WSP | Parsons Brinckerhoff
Project Manager

Nora McCann, E.I.T.
North Carolina Department of Transportation
Project Development Engineer

Brian Yamamoto, P.E.
North Carolina Department of Transportation
Project Development Group Supervisor
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1.0 Executive Summary

Ocracoke Island is a coastal barrier island in the southeast portion of Hyde County. The majority of the island is part of the Cape Hatteras National Seashore. Regional access is provided by three NCDOT operated ferries: Hatteras Inlet Ferry Dare County, Swan Quarter Ferry, Hyde County, and Cedar Island, Carteret County. The Hatteras Inlet Ferry is the most widely used ferry to access Ocracoke Island. NC 12 runs throughout the entire Outer Banks region of North Carolina. NC 12 and ferry operations are subject to heavy seasonal variations in traffic and use related to summer tourism. Summer weekends are the peak times for short-term population increase. In general, the summer population makeup is approximately 90 percent tourists and 10 percent permanent residents.

NC 12 is North Carolina’s easternmost primary route. It is mostly a two-lane roadway that runs along the North Carolina Outer Banks from Corolla in the northeastern section of the state, Dare County, to the unincorporated community of Sea Level in southeastern Carteret County.

In 1991, NCDOT identified six “hot spots” along NC 12 in need of extensive maintenance due to continued severe storm and erosion damage.

The project’s need is based on frequent overwash and flooding on NC 12; need for continual maintenance; vulnerability of the roadway in its current location due to erosion trends; and the potential for Ocracoke Village to be without reliable access to Hatteras Island and points north. NCDOT initiated the NC 12 feasibility study on Ocracoke Island because of the potential disruption of service to the island’s only major arterial roadway due to storm damage and strong tidal events. The design alternatives examined in this study include beach, berm and dune nourishment, roadway relocation, bridging, and relocating the Hatteras Inlet Ferry Terminal. This feasibility study evaluates short-term (5-Year) alternatives and long-term (50-Year alternatives). Four 5-Year options and seven 50-Year options were considered.

At this time, the hot spot projects are not funded in NCDOT’s State Transportation Improvement Program.

For this study, alternatives were broadly categorized as nourishment options, road and bridge options, ferry options, and combination options. Detailed descriptions and potential impacts of the options are presented in this document. A summary of key findings follows in this section. It is important to note that the applicability of Section 4(f) with regard to the Cape Hatteras National Seashore will be determined by FHWA should the project proceed to the National Environmental Policy Act (NEPA) phase using federal funds. In other projects involving NC 12, FHWA has determined that NC 12 was jointly developed with the Cape Hatteras National Seashore and, as such, Section 4(f) did not apply to the Seashore. Early coordination between the National Park Service
and FHWA is recommended, should the project proceed to the NEPA phase with federal funds.

**Beach Nourishment Options**

- The availability of sand for fill, in both the short- and long-term, its transport method and permitting concerns are key constructability considerations for these options.

- The nourishment of the beach, berm, and dune alternatives will likely have minor potential impact on recreational resources.

- These options have the potential for impacts to Section 4(f) resources.

- Minor visual resource impacts may occur with these options.

- Minor temporary impacts to protected species, Submerged Aquatic Vegetation (SAV), and Essential Fish Habitat (EFH) may occur with these options. No impact is anticipated to Significant Natural Heritage Areas (SNHA) or wetlands.

- The two 5-year beach nourishment alternatives range in cost from $1,350,000 to $13,950,000. The former is primarily a dune re-nourishment and the latter dune and beach re-nourishment.

- The 50-year beach nourishment alternative has an approximate cost of $41,600,000. The cost for the long term option includes one pre-nourishment treatment and template nourishments every four years or 12.5 nourishment cycles over the course of 50 years.

**Road and Bridge Options**

- Constructability concerns include: the ability to maintain construction activities within existing easements, the manner of transporting and staging of construction materials, the ability to transport prefabricated bridge parts, and construction methodology. Limitations on construction activities during peak tourist season are also a factor. There are campgrounds near the study area. Construction activities could be limited to minimize impacts to such areas during peak tourist season.

- These options are expected to have moderate impacts to recreation access points.

- These options are likely to enhance bicycle and pedestrian travel throughout the island.

- These options may constitute a use under Section 4(f). There are three conditions that constitute a use by using road and bridge options. First, it may be determined that Seashore land is permanently incorporated into a transportation
facility. Second, there may be a temporary occupancy of the Seashore land. Finally, there may be a constructive use of the Seashore land.

- Permanent use and potential for constructive and temporary use under Section 4(f).
- Visual impacts range from minor, with roadway relocation options, to substantial, for new bridge options.
- These options are likely to affect sea turtles, piping plover, and red knot. Only the Pamlico Sound Bridge (50-Year Option 1) is expected to impact SAV and EFH. There are also expected to be impacts to SNHAs.
- Costs for these five options are as follows:
  - 5-Year Option 4: approximately $76,700,000
  - 50-Year Option 1: approximately $194,750,000
  - 50-Year Option 2: approximately $188,800,000
  - 50-Year Option 3: approximately $234,950,000
  - 50-Year Option 4: approximately $248,450,000

**Ferry Options**

- Constructability concerns include: land and harbor acquisition, channel development, terminal facility development during concomitant operations, and permitting.
- Travel time to and from the island will be increased with implementation of a ferry option. This could affect visitors to the island and delivery of goods and services.
- These options have the potential to reduce access to some recreational opportunities, including bicycle and pedestrian access, if NC 12 is not maintained north of the ferry terminal. The ferry terminal associated with the proposed alternatives would either be an additional dock at the current Ocracoke Island Ferry Terminal at Silver Lake in Ocracoke Village, or at a proposed new site just south of the Ocracoke Pony Pens.
- There are potential Section 4(f) impacts with the conversion of NPS land to develop new ferry facilities. In addition, the Ocracoke Historic District could be affected, depending on the design of Option 6.
- There could be moderate visual impacts from additional ferry infrastructure and new ferry terminal.
• There is limited potential for impact to protected species, SNHA, or wetlands. Dredging for a new ferry route could disrupt SAV and EFH habitats.

• The total estimated cost for installing, operating, and maintaining a ferry system that would service the current traffic demand over the course of the next 50 years was determined to be approximately $2,030,350,000 billion for Option 6 and $2,148,600,000 for Option 7. These costs also include crew, supporting facilities (including a new shipyard), maintenance, and vessel replacement at 30 years.

• NCDOT is required by law to provide at least one free route to all locations in the state. Currently, the ferry between Hatteras Island and Ocracoke Island serves as the free route to Ocracoke Island, while the ferries from Swan Quarter and Cedar Island are tolled. If the ferry from Hatteras Island were to become tolled, one of the other routes would need to be fare-free.

A summary of costs for all alternatives is presented in Table 1.

**Table 1 Cost Summary Table**

<table>
<thead>
<tr>
<th>5-Year Alternatives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option 1</strong></td>
<td><strong>Option 2</strong></td>
</tr>
<tr>
<td>Large Scale Beach Nourishment</td>
<td>Dune Nourishment</td>
</tr>
<tr>
<td>$13,950,000</td>
<td>$1,350,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50-Year Alternatives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option 1</strong></td>
<td><strong>Option 2</strong></td>
</tr>
<tr>
<td>Pamlico Sound Bridge</td>
<td>Bridge throughout Hot Spot</td>
</tr>
<tr>
<td>$194,750,000</td>
<td>$188,800,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50-Year Alternatives - continued</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option 5</strong></td>
<td><strong>Option 6</strong></td>
</tr>
<tr>
<td>Large Scale Beach Nourishment</td>
<td>Ferry Service to Ocracoke Village Ferry Terminal</td>
</tr>
<tr>
<td>$41,600,000</td>
<td>$2,030,350,000</td>
</tr>
</tbody>
</table>

¹ Does not include cost of new ferry terminal
**Next Steps**
Factors to consider as the project advances to study under the NEPA include the following:

**Short-Term Alternatives**

- Natural Environment
  - Beach/dune nourishment sources
  - Protected species impacts
  - Habitat modification

- Constructability
  - Easement requirements
  - Beach/dune nourishment volumes
  - Construction material transport to site, staging (especially for in-easement alternatives)
  - Durability through short-term timeframe

- Recreation
  - Section 4(f) impacts
  - Access maintenance during construction

**Long-Term Alternatives**

- Costs
  - Ferry acquisition and maintenance
  - New harbor facility development & maintenance
  - Channel development and maintenance
  - Long term nourishment costs

- Constructability
  - Construction methodology
  - Material transport requirements, construction staging within Seashore
  - Permit/new easement requirements

- Nourishment
  - Costs of template nourishment maintenance
  - Continued availability of suitable sand sources
• Natural Environment
  o Submerged Aquatic Vegetation (SAV)
  o Essential Fish Habitat (EFH)

• Recreation & Access
  o Section 4(f) - access to NPS recreation facilities
  o Bike and pedestrian access
  o Off road vehicles (ORV)
  o Economic impact
    ▪ Travel convenience

Investigations and studies that may be conducted include:
• Natural environment studies
• Economic impact studies
• Section 4(f) Evaluation
• Detailed sand sediment analysis
• Storm surge analysis to determine bridge height, design
• Offshore surveys to determine sand source availability
• Studies to determine extent of dredging and potential for shoaling if ferry terminal is moved
• Shoreline studies to determine likelihood of a breach in the study area

To help prepare for an emergency situation, potential options may include:

• Stockpiling temporary bridges that can accommodate an appropriate set of spans. This would allow NCDOT to react swiftly in an emergency storm situation. Also, depending on the specific span length ranges of temporary bridges that may be required to respond to post-storm conditions, cored slab units could also be stockpiled for the purposes of constructing emergency temporary bridges.

• Stockpiling precast prestressed concrete piles for the purposes of building the foundations for temporary bridges. This would also allow NCDOT to be prepared in the event that a temporary bridge is needed to respond to post-storm conditions.
2.0 Introduction

2.1 Project History

In August 1991, NCDOT sponsored a research project conducted by North Carolina State University (NCSU) to identify vulnerable sections of North Carolina’s coastal highways and options available for maintaining them. The study concluded that NC 12 has six critical sections, or “hot spots,” between Oregon Inlet and the southwestern tip of Ocracoke Island. One of the hot spots is located at the north end of Ocracoke Island and extends from the Hatteras Inlet Ferry Terminal south for approximately five (5) miles. This is the project area described herein. NCDOT initiated planning studies for the project in 2001, but funding to complete construction was never allocated. Currently, the State Transportation Improvement Program (STIP) (FY 2016 – 2025) does not include funding to improve this section of NC 12; however, this feasibility study will aid decision-makers as they consider funding for future projects in this area.

Established in 2002, the project’s Purpose and Need was to “implement interim measures to maintain the integrity and viability of the transportation system (movement of people, goods, and services) with minimal interruption of traffic service due to a moderate storm event at the Ocracoke Island Hot Spot for a period of 10-15 years until a long-term solution is in place.”

This statement will need to be revised during the project’s NEPA phase since the timeframes for this report have changed. However, the primary objectives of the project remain the same. The project’s need is based on frequent overwash and flooding on NC 12; need for continual maintenance; vulnerability of the roadway in its current location due to erosion trends; and the potential for Ocracoke Island to be without reliable access to Hatteras Island and points north. This includes tourists who access the island via the Hatteras Inlet Ferry.

2.2 Funding

As part of implementing the new Strategic Transportation Investments (STI) Law, NCDOT released its draft 10-year STIP on December 4, 2014 which scheduled the statewide projects proposed for full or partial funding between 2016 and 2025. The purpose of the STI Law is to allow NCDOT to maximize North Carolina’s existing transportation funding to enhance the state’s infrastructure and support economic growth, job creation, and high quality of life.

STI established the Strategic Mobility Formula, a new way of allocating available revenues based on data-driven scoring and local input. Proposed transportation projects go through a prioritization process during which they are evaluated through an analysis of the existing and future conditions, the benefits the project is expected to provide, the project’s multi-modal characteristics, and how the project fits in with local priorities. Generally, the projects that increase capacity, safety, connectivity, and economic development score higher under the prioritization formula. The NC 12 R-3116A Hot Spot project was not included in the latest Prioritization 4.0 (P4.0) process, which is currently underway. The project is anticipated to be included for evaluation and
prioritization in the Prioritization 5.0 process which is anticipated to begin sometime in 2017.

2.3 Problem Statement and Purpose of Study

NC 12 is the lifeline to Ocracoke Village. The approximate 5.25 mile project section of NC 12 on Ocracoke Island is vulnerable to loss of pavement, breach and overwash due to its low elevation, flat topography and the short distance between the ocean beach and Pamlico Sound. When the project section, or “hot spot,” is damaged during storms and strong tidal events, travel is cut off and repairs are needed (see Figure 1). Because of this potential to cut off service on the island’s only major arterial roadway, NCDOT initiated this feasibility study. This study will consider the feasibility of implementing five-year and 50-year design options to maintain the operation of NC 12 on Ocracoke Island.

2.4 Project Limits

The project area (see Figure 2) is located in southeastern Hyde County, North Carolina, on the northern extent of Ocracoke Island. The project area starts on NC 12 approximately 0.25 mile south of the Hatteras Inlet Ferry Terminal on Ocracoke Island and extends to a point approximately 5.5 miles south along NC 12 to the entrance of the National Park Service’s (NPS) Ocracoke Pony Pens. While NCDOT has a 100 foot wide easement for NC 12, the project area is otherwise within NPS-owned lands in the Cape Hatteras National Seashore (Seashore). The project corridor’s width is bounded on the east by the mean high water line on the beach and to the west in Pamlico Sound, approximately 2,800 feet west of the existing NC 12 centerline. Two new ferry terminal locations are also being considered for this study: one is located south of the Pony Pens, and the other would be adjacent to the existing ferry terminal on Silver Lake.
Silver Lake Ferry Terminal (Potential)

Ocracoke Pony Pens Ferry Terminal (Potential)

Ocracoke Island

Pamlico Sound

Atlantic Ocean

Hatteras Inlet Ferry Terminal (Existing)

Project Study Area
3.0 Coastal Conditions

3.1 Shoreline and Erosion Studies

A Vulnerability Analysis and Coastal Engineering Evaluation for NC 12 at Ocracoke Island was prepared in 2010 (Moffatt and Nichol). The purpose of the study was to assess the vulnerability of NC 12 along Ocracoke Island. The work built on prior investigations conducted by Moffatt and Nichol in 2003, 2004, and 2005. For the 2010 study, the area evaluated included approximately 4.8 miles of NC 12 between stations 430 and 685 (see Figure 3). The study was updated in 2014.

Coastal studies have revealed that a critical area of erosion was identified along 2.6 miles of shoreline (Station 530 to 665, See Figure 3A). This portion of NC 12 is particularly vulnerable to damage from the because of its exposure to high frequency (2-year) storm events. This section summarizes key findings of the 2010 study and 2014 update.

3.1.1 Definition of Vulnerability and Methods for Evaluation

Vulnerability of NC 12 is defined with respect to maintenance requirements and storm damage.

- Maintenance Requirements: Maintenance requirements are considered to be excessive when NC 12 becomes vulnerable to repetitive overwash and sand deposits. Potential for increased maintenance is evaluated based on a single parameter – the setback distance of the roadway from the Mean High Water Level (MHWL). Consistent with previous studies done for NCDOT, when the setback is less than 230 feet, the roadway is considered to be vulnerable to damage from storm events and overwash and thus is likely to require increased maintenance. The projected shoreline position was evaluated based on the assumption that the average historical shoreline recession rate is representative of the erosion that will occur over the planning horizon.

- Storm Damage: Vulnerability with respect to storm damage (damage to or undermining of the road) was evaluated following general methods outlined in prior studies. Storm damage was assessed based on the area of erosion above the 4-foot contour (between the edge of the roadway and the beach) for a series of storm events. Volumes are computed before and after a storm in order to determine material loss due to the wave climate generated by the storm. If the dune area loss above the 4-foot contour is more than 50 percent of the total material, then the area of roadway is considered vulnerable to that storm. For this study, it is assumed that an acceptable level of risk of storm damage is a 50-year return period storm event (i.e. a storm event with a 1/50 or 0.02% chance of occurring in any given year). A detailed methodology and model results are included in the 2010 report.
3.1.2 Setback

The setback is defined as the distance from where Mean High Water (MHW) intersects the shoreline to the center of the roadway. Setback information for the project area was updated in 2014. Table 2 shows the setback distance measured at each of the stations (as shown in Figures 3A – 3D) based on 2013 aerial photography and compares this data to the setback distance established in the 2010 report. The 2010 numbers indicated that the shoreline is closest to the highway between stations 605 and 620, where the existing setback was less than 150 feet. The 2014 update shows notable changes in the estimated setback at stations 585 and 605, where there has been 118 feet and 55 feet of shoreline recession in four years. This finding is consistent with the 2010 vulnerability analysis report, which determined that this section of roadway (specifically at station 605) is most vulnerable to damage and requires regular maintenance to rebuild a protective dune. This is discussed further in the next section.

Table 2. Setback Distance from Roadway Centerline

<table>
<thead>
<tr>
<th>Station</th>
<th>Setback Distance (ft.) (2010 Report)</th>
<th>Setback Distance (ft.) (2014 Update)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430</td>
<td>420</td>
<td>397</td>
</tr>
<tr>
<td>475</td>
<td>384</td>
<td>357</td>
</tr>
<tr>
<td>505</td>
<td>295</td>
<td>266</td>
</tr>
<tr>
<td>540</td>
<td>287</td>
<td>271</td>
</tr>
<tr>
<td>565</td>
<td>226*</td>
<td>197*</td>
</tr>
<tr>
<td>585</td>
<td>216*</td>
<td>98*</td>
</tr>
<tr>
<td>605</td>
<td>124*</td>
<td>69*</td>
</tr>
<tr>
<td>620</td>
<td>145*</td>
<td>132*</td>
</tr>
<tr>
<td>650</td>
<td>251</td>
<td>163*</td>
</tr>
<tr>
<td>685</td>
<td>421</td>
<td>331</td>
</tr>
</tbody>
</table>

* These locations have a setback distance less than NCDOT’s optimal distance of 230 feet.
3.1.3 Background Erosion Rates

For the 2010 study, historical shoreline erosion rates were evaluated for the project area. Prior estimates of the long-term shoreline erosion rates along Ocracoke Island were updated by including the most recent shoreline delineation (2008) in the shoreline database (see Table 3). The highest erosion rates (8.6 and 9.4 feet/year) correspond to the area with the least setback distance, between stations 585 and 620.

Table 3. Estimated Average Annual Erosion Rates (from 2010 Study)

<table>
<thead>
<tr>
<th>Station</th>
<th>Annual Erosion Rate (ft./yr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430</td>
<td>2.9</td>
</tr>
<tr>
<td>475</td>
<td>5.2</td>
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<tr>
<td>505</td>
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<tr>
<td>685</td>
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</tr>
</tbody>
</table>

The 2014 update used a digitized shoreline from 2013 aerial photography. The setback distance was measured based on the aerials and compared to the shoreline established in the 2010 report. The background erosion rates shown in Table 3 were used to approximate the amount of erosion that would occur in 5 years and 50 years. The results are presented in Table 4 and illustrated in Figure 3A – 3D.
Figure 3A

Critical Area of Erosion

Legend
- 2063 Predicted Shoreline (50 yrs)
- 2018 Predicted Shoreline (5 yrs)
- 2013 Digitized Wet/Dry Shoreline
- Transect Midpoints
- Selected Transects
- NC 12 Centerline

Source: Update Shoreline & Erosion for Ocracoke Island Memorandum, Moffatt & Nichol, August 30, 2016
Shorelines – Southwest Reach

Legend

- 2063 Predicted Shoreline (50 yrs)
- 2018 Predicted Shoreline (5 yrs)
- 2013 Digitized Wet/Dry Shoreline
- Transect Midpoints
- Selected Transects
- NC 12 Centerline

Figure 3B
### Table 4. 5-Year and 50-Year Erosion Rate Analysis (2014 Update)

<table>
<thead>
<tr>
<th>Station</th>
<th>Annual Erosion Rate (ft./yr.)</th>
<th>5-Year Erosion (ft.)</th>
<th>50-Year Erosion (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430</td>
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</table>

### 3.1.4 Baseline Conditions

The vulnerability of NC 12 to storm damage and maintenance was evaluated at each of the ten stations shown in Figures 3A-3D. This evaluation uses the shoreline shown on December 2013 aerial photography as the starting point for predicting 5-year and 50-year shorelines based on background erosion rates. This work builds on prior investigations, most recently documented in the 2010 Vulnerability Analysis & Coastal Engineering Evaluations (VA&CEE).

#### 3.1.4.1 Maintenance Requirements

Table 5 identifies the existing setback of the mean high water line (MHWL) and the projected setback based on continued shoreline recession (assuming historical erosion rate) for 5-year and 50-year planning horizons in decennial time blocks. The grey cells indicate that the roadway is vulnerable to shoreline erosion and will likely require frequent maintenance (Setback <230 ft.). Currently, the roadway is vulnerable between stations 565 and 620. If recession continues at the historical rate, by 2020, NC 12 between stations 505 and 650 will require frequent maintenance.
Table 5. NC 12 – Vulnerability to Maintenance

<table>
<thead>
<tr>
<th>Station</th>
<th>Erosion Annual Rate (ft./yr.)</th>
<th>Setback Distance from Road to Mean High Water Line (MHWL) (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>430</td>
<td>2.9</td>
<td>417</td>
</tr>
<tr>
<td>475</td>
<td>5.2</td>
<td>379</td>
</tr>
<tr>
<td>505</td>
<td>6.0</td>
<td>289</td>
</tr>
<tr>
<td>540</td>
<td>7.5</td>
<td>280</td>
</tr>
<tr>
<td>565</td>
<td>8.2</td>
<td>218</td>
</tr>
<tr>
<td>585</td>
<td>8.6</td>
<td>208</td>
</tr>
<tr>
<td>605</td>
<td>8.6</td>
<td>116</td>
</tr>
<tr>
<td>620</td>
<td>9.4</td>
<td>135</td>
</tr>
<tr>
<td>650</td>
<td>8.3</td>
<td>243</td>
</tr>
<tr>
<td>685</td>
<td>3.1</td>
<td>418</td>
</tr>
</tbody>
</table>

Notes:
1. Straightline erosion rates used to 2063 horizon.
2. Negative figures indicate road inundated by MHWL
3.1.4.2 Storm Damage

Table 6 presents the vulnerability of the roadway to storm damage. Vulnerability with respect to storm damage was assessed based on the area of erosion above the 4-foot contour (between the edge of the roadway and the beach) for a series of storm events. Volumes are computed before and after a storm in order to determine the material loss due to the wave climate generated by the storm. If the dune area loss above the 4-foot contour is more than 50 percent of the total material, then the profile is considered vulnerable to that storm. For this study it is assumed that an acceptable level of risk of storm damage is a 50-year return period storm event.

The grey cells indicate locations where the road is vulnerable to less than a 50-year storm event. Under 2014 projected conditions, at stations 505, 585, 605, and 620, the road is vulnerable to storm damage (<50 year return period storm event). The portion of NC 12 along stations 605 and 620 is vulnerable to damage in a 2-year or 3-year storm event. With continued shoreline recession, in four years, damage to this section of roadway is imminent. After four years, NC 12 will be vulnerable to storm damage at stations 564 and 650.

Engineering and planning mitigation strategies to reduce the vulnerability of NC 12 including nourishment, roadway relocation, bridge construction, and ferry terminals will be guided by the locations where NC 12 was shown to be less than 230 feet from the 50-year shoreline. Decisions on alternative development will also be guided by the NPS guidelines, potential impacts to natural resources, the availability of sand resources and anticipated costs for implementation.

---

1 The term “50-year storm” is used to define a storm that statistically has a 2-percent chance of occurring in any given year. The storm’s intensity refers to the frequency at which a particular amount of rainfall in a given duration (from 30 minutes to 24 hours) is expected to “return,” on average. Storms may be classified by any time period from one year to 100 year storms.” A 100-year storm refers to storm rainfall totals that have a one percent probability of occurring at that location in that year. A “100-year storm” on one day does not decrease the chance of a second 100-year storm occurring in that same year or any year to follow.
Table 6. NC 12 – Vulnerability to Storm Damage (Recurrence Interval)

<table>
<thead>
<tr>
<th>Station</th>
<th>Beginning of Cycle (Years)</th>
<th>After 4 Years (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>475</td>
<td>85</td>
<td>75</td>
</tr>
<tr>
<td>505</td>
<td>38</td>
<td>18</td>
</tr>
<tr>
<td>540</td>
<td>150</td>
<td>120</td>
</tr>
<tr>
<td>565</td>
<td>78</td>
<td>44</td>
</tr>
<tr>
<td>585</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>605</td>
<td>3</td>
<td>&lt;1</td>
</tr>
<tr>
<td>620</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td>650</td>
<td>55</td>
<td>37</td>
</tr>
<tr>
<td>685</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

Grey cells indicate where the road is going to be vulnerable to less than a 50-year storm event.

3.2 Dredging Operations – Potential Sand Resources

The dredging of the existing channel within Hatteras Inlet results in a potential source of sediment that is close to the study area. The US Army Corps of Engineers (USACE) is responsible for dredging operations between the Hatteras Island ferry terminal and the Hatteras Inlet channel. Based on communications with USACE staff, dredging operations by the USACE yield on average approximately 80,000 cubic yards (cy) of beach compatible material every four years.

The remainder of the Hatteras Inlet/Ocracoke ferry terminal channel is maintained by the NCDOT Ferry Division. Typically, the ferry channel from Hatteras Inlet to the Ocracoke terminal is dredged annually; however, dredging quantities and frequencies have varied historically with the occurrence of storm events. Following major storm events resulting in significant overwash and loss of dunes, this upland material has typically been used to rebuild the small frontal dune system along the Ocracoke Island hot spot. The average annual dredging quantity from 1975-2004 was approximately 55,000 cubic yards. Data from 2005 to 2010 were not available.
3.3 Nearshore/Offshore Sediment Sources

A sand resource study developed by the North Carolina Geological Survey (NCGS) provides nearshore/offshore sediment availability information in the vicinity of the study area. Twelve potential sand resource areas were identified. South of Diamond Shoals, five target areas were identified for the fine-grained beaches of Ocracoke, one potential area for the medium-grained scenario applicable to Hatteras, and one compatible for both. The closest potential target area is Ocracoke 3, sited within 1 to 3 miles of the hot spot. Based on NCGS analysis, approximately 45.8 million cubic yards of potentially-compatible beach material would be available from the Ocracoke 3 area. The material is characterized as fine grand sands, which is generally compatible with the sediments on Ocracoke Island beaches.

3.4 Consideration of Geotextiles

In similar projects dealing with stabilizing and protecting NC 12 against shoreline erosion, the use of geotextile containers has been suggested to slow or stop beach erosion. Geotextile containers consist of an engineering textile filled with sand. Applications include installations in the core of a sand dune re-construction project, as breakwaters (parallel to the shoreline), and as groins (perpendicular to the shoreline). Geotextile containers are not a reasonable alternative for long-term reliability of NC 12 for two reasons.

First, their installation would likely face serious permitting obstacles under North Carolina state law. The potential use of geotextile containers for shoreline protection would be regulated by the North Carolina Administrative Code on Ocean Hazards. North Carolina Administrative Code outlines specific use standards for the ocean hazard areas. According to the use standard for all activities:

“Permanent erosion control structures may cause significant adverse impacts on the value and enjoyment of adjacent properties or public access to and use of the ocean beach, and, therefore, are prohibited. Such structures include bulkheads, seawalls, revetments, jetties, groins and breakwaters.”

NCDOT is not aware of any changes or pending changes in state law or regulations that would lessen the regulatory constraints on the use of geotextile containers.

Second, the stability of geotextile container installations during storm events, such as hurricanes, that occur along the North Carolina coast is a concern. Failure modes for geotextile containers during storm events could include failure because of scour (undermining at the base), rotation, and lateral displacement. One NCDOT goal is to minimize the necessity of major repairs to NC 12 following storm events, and NCDOT is concerned that geotextile containers would not adequately support that goal.
4.0 Design Considerations and Criteria

4.1 Design Criteria

Design criteria were developed for the road relocation, bridge, and beach nourishment alternatives. Additional criteria were developed for the ferry alternatives. Table 7 through Table 10 present these criteria.

Table 7. Design Criteria for Beach Nourishment

<table>
<thead>
<tr>
<th>Element</th>
<th>Dune and Berm Nourishment</th>
<th>Dune Nourishment</th>
<th>Roadway Relocation and Dune Nourishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC 12 Setback from Mean High Water</td>
<td>230 feet</td>
<td>110 feet*</td>
<td>230 feet</td>
</tr>
<tr>
<td>Dune Crest Elevation above Grade (NAVD 88)</td>
<td></td>
<td>15 ft.**</td>
<td></td>
</tr>
<tr>
<td>Maximum Crest Width</td>
<td></td>
<td>25 ft.</td>
<td></td>
</tr>
<tr>
<td>Landward / Seaward Slope</td>
<td></td>
<td>5:1 / 3:1</td>
<td></td>
</tr>
<tr>
<td>Berm Elevation above Grade (NAVD 88)</td>
<td>4 ft.</td>
<td>0 ft.</td>
<td>4 ft.</td>
</tr>
</tbody>
</table>

* Dune nourishment developed with consideration given to the NPS guidelines.
** Dune crest heights may vary depending on the surrounding dune system.

Table 8. Design Criteria for Roadway Relocation

<table>
<thead>
<tr>
<th>Element</th>
<th>Roadway Relocation Values (for All Options with Roadways)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Classification</td>
<td>Major Collector</td>
</tr>
<tr>
<td>Design Speed</td>
<td>60 mph</td>
</tr>
<tr>
<td>Posted Speed</td>
<td>55 mph</td>
</tr>
<tr>
<td>Access Control</td>
<td>None</td>
</tr>
<tr>
<td>Lane Widths</td>
<td>12 ft.</td>
</tr>
<tr>
<td>Number of Lanes</td>
<td>Two</td>
</tr>
<tr>
<td>Terrain</td>
<td>Level</td>
</tr>
<tr>
<td>Right-of-way width</td>
<td>100</td>
</tr>
<tr>
<td>Shoulder Width</td>
<td>8 ft. (5 ft. paved)</td>
</tr>
</tbody>
</table>

Note: Italicized values are those that are not changed from the existing NC 12 design.
Table 9. Design Criteria for Bridges

<table>
<thead>
<tr>
<th>Element</th>
<th>Bridge Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5-Year Options Bridging</td>
</tr>
<tr>
<td>Bridge Type</td>
<td>24” cored slab bridge with concrete overlay</td>
</tr>
<tr>
<td>Lane Widths</td>
<td>12 ft.</td>
</tr>
<tr>
<td>Number of Lanes</td>
<td>Two</td>
</tr>
<tr>
<td>Shoulder Width</td>
<td>6 ft. – 5 in.</td>
</tr>
<tr>
<td>Bridge Deck Width</td>
<td>36 ft. – 10 in.</td>
</tr>
<tr>
<td>Center Barrier</td>
<td>None</td>
</tr>
</tbody>
</table>

Note: Italicized values are those that are not changed from the existing NC 12 design.

Table 10. Design Criteria for Ferry Terminals

<table>
<thead>
<tr>
<th>Element</th>
<th>New Ferry Terminal Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Channel Width</td>
<td>At least 200 ft. in width</td>
</tr>
<tr>
<td>Turning Basin</td>
<td>No less than 400 ft. x 400 ft.</td>
</tr>
<tr>
<td>Docks</td>
<td>At least 3</td>
</tr>
<tr>
<td>Ramps</td>
<td>At least 3</td>
</tr>
<tr>
<td>Stacking Lanes</td>
<td>At least 3</td>
</tr>
</tbody>
</table>

Note: Italicized values are those that are not changed from the existing NC 12 design.

Note: Formal design of a new ferry terminal was not scoped for this project. The design criteria presented above are based on discussions on the general feasibility of relocating the Hatteras Inlet Ferry Terminal farther south on Ocracoke Island between the project area and Ocracoke Village and the NCDOT Ferry Division.
4.2 Traffic Estimate

A 2040 traffic estimate was prepared using data and methodology shown in Appendix A. The 2040 AADT and annual growth rates were compared to historical forecasts for the R-3116A project (Ocracoke Island Hotspot) as well as the R-3116B project (Hatteras Village Hotspot) to the immediate north of the project on Hatteras Island. This comparison is shown in Table 11. Based on the R-4070B (Buxton Hot Spot) draft forecast, it is apparent that while volumes are forecast to be higher on Hatteras Island, overall future growth will be slower than anticipated on Ocracoke Island.

### Table 11. Comparison of Forecasts/ Estimates

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Annual Daily Traffic (AADT)</td>
<td>2013 2040 Growth Rate</td>
<td>2002 2025 Growth Rate</td>
</tr>
<tr>
<td></td>
<td>NA NA NA</td>
<td>3,000 6,600 3.5%</td>
<td>2,200 4,200 2.4%</td>
</tr>
<tr>
<td></td>
<td>Summer Weekday</td>
<td>5,800 7,900 1.1%</td>
<td>NA NA NA</td>
</tr>
<tr>
<td></td>
<td>8,400 11,400 1.1%</td>
<td>NA NA NA</td>
<td>5,100 9,800 2.4%</td>
</tr>
</tbody>
</table>

As indicated in Table 11, the estimated AADT for the R-3116A forecast is 4,200 vpd in 2040. Based on this finding, the NCDOT Roadway Design Manual recommends the provision of a two-lane roadway with 8 foot shoulders (2 foot paved) for this type of facility. The paved shoulder policy also indicates that a 5-foot paved shoulder may be considered along bike routes.
5.0 Environmental Setting

5.1 Human Environment

5.1.1 Socio-economics

Ocracoke Island is home to 948 permanent residents (2010 US Census). The island’s economy is based almost entirely on tourism, which peaks during the summer months and declines during the winter off-season. The summer population is approximately 90 percent tourists and 10 percent permanent residents. Of the tourist population, 70 percent are day trippers who make their arrival to and departure from the island within one day.

Ocracoke Island is not connected to the mainland or other barrier islands via bridges; residents and visitors alike are dependent on using the ferry system to travel to and from the island. Three ferry lines serve Ocracoke: the Hatteras Inlet Ferry, the Cedar Island Ferry, and the Swan Quarter Ferry. While some amenities are present on the island, especially during peak tourist season, permanent residents depend on the ferry system for routine trips such as daily commutes, school-related travel, trips to medical care facilities, and shopping, either on the mainland or other islands.

On the island, residents and visitors primarily make use of recreational opportunities provided by the Cape Hatteras National Seashore.

5.1.2 Land Use

Existing land use within the project area on Ocracoke Island is Ocracoke Village, approximately seven miles south of the project area, and NPS park land (Cape Hatteras National Seashore). Ocracoke Village contains residential and commercial properties that serve both permanent residents and tourists. Commercial and private docks are located along the perimeter of Silver Lake in Ocracoke Village. The Cape Hatteras National Seashore is a federally designated National Seashore (1937) preserving portions of the Outer Banks of North Carolina from Bodie Island through Hatteras Island to Ocracoke Island, stretching over 70 miles. Its primary intended purpose was that of a public recreational area. It is managed by the National Park Service. Cape Hatteras is a combination of natural and cultural resources, and provides a wide variety of recreational opportunities.

There are five main types of recreational opportunities found along the Seashore including on Ocracoke Island; water and sand-based activities, camping, fishing, hiking and hunting. The water-based activities include swimming and surfing (which may be enjoyed on the high-energy Atlantic Ocean or the calmer Pamlico Sound side). Sand-based activities include sunbathing and shell-hunting on the ocean side. Approximately three miles south of the project area, one of four National Seashore campgrounds can be found on Ocracoke Island with tent, trailer, and motor home sites. Camping is allowed between April and October. The Seashore offers a variety of fishing opportunities. Several kinds of fish can be caught from the surf, piers, and freshwater ponds or from...
boats in the inlets, the sound, and offshore in the Gulf Stream. Hiking designated trails can be used to explore other aspects of a barrier island beyond the beach. The islands also provide a variety of habitats and are a valuable wintering area for migrating waterfowl. Waterfowl hunting is permitted during designated seasons and with strict guidelines.

5.1.3 Cultural Resources

Three resources in Ocracoke Village are either listed on or eligible for the National Register of Historic Places (NRHP). These include:

- Ocracoke Historic District (Status: Listed on the NRHP since 1990). This historic district is a maritime community with homes built between 1823 and 1959. It encompasses the areas of Ocracoke Village immediately adjacent to Silver Lake and extending two to three blocks outward. This district does not include, but is immediately adjacent to, the Silver Lake ferry terminal on three sides.

- Ocracoke Light Station (Status: Listed on the NRHP since 1977). The Ocracoke Light Station, located southeast of Silver Lake, is the conical brick lighthouse built in 1823. It is the oldest functioning lighthouse on the North Carolina coast.

- Ocracoke Lighthouse Keeper’s Quarters (Status: Study List/Eligible for NRHP since 1977). This dwelling, adjacent to the lighthouse, was built in 1823 with improvements made in 1868 and 1897.

A detailed cultural resources survey will need to be completed as part of the NEPA process for this project.

5.1.4 Bicycle and Pedestrian Facilities

5.1.4.1 Bicycle Facilities and Use

North Carolina offers a designated cross-state system of Bicycling Highways. These routes generally parallel major highways. There are nine different routes covering 3,000 miles of North Carolina. Bicycle Route 7, the Ocracoke Option, connects Bike Route 2 (near Wilson) and extends 170 miles to the southeast to Ocracoke Island. The route passes through New Bern and Beaufort and utilizes the Cedar Island Ferry to Ocracoke Island.

The regional bicycle route is part of the Outer Banks Scenic Byway. From Whalebone Junction in Dare County to Beaufort in Carteret County, this Scenic Byway traces the easternmost parts of North Carolina along the state’s barrier islands. The unique maritime culture shared by the 21 coastal villages along this route led to its designation as a national scenic byway.

Locally, Ocracoke Island offers several levels of bicycling facilities for residents and tourists. There is one trail that allows off road cycling. Currently 0.25 miles of NC 12 immediately north of Ocracoke village has striped lanes. There are 3.25 miles of paved shoulder south of the project area. The remaining portions of NC 12 on the island have
varying degrees of shoulder width that are used to access activities. This is particularly true within Ocracoke Village, home to several bicycle rental facilities and narrow streets best navigated by this form of transport.

5.1.4.2 Pedestrian Facilities and Use

There are no sidewalks in the project area. Visitors to the Seashore frequently stop on the side of NC 12 to walk over the sand dunes east of NC 12 to reach the Atlantic Ocean.

Wildlife trails used by visitors to the sound side are west of NC 12. These trails do not cross NC 12.

Pedestrians cross NC 12 in Ocracoke Village to get from vacation homes to the beach, and to commercial recreation facilities and other commercial uses.

5.1.5 Section 4(f) Resources

Section 4(f) of the Department of Transportation Act of 1966, as amended (49 USC 303), states that the US Department of Transportation (USDOT) may not approve the use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site, unless a determination is made that the project will have a de minimis impact or unless a determination is made that:

- There is no feasible and prudent avoidance alternative, as defined in 23 CFR 774.17, to the use of land from the property; and
- The action includes all possible planning, as defined in 23 CFR 774.17, to minimize harm to the property resulting from such use.

There are four properties that could require Section 4(f) evaluation; the Cape Hatteras National Seashore, Ocracoke Historic District, Ocracoke Light Station, and the Ocracoke Lighthouse Keeper’s Quarters.

The Cape Hatteras National Seashore (Seashore) is a publicly-owned resource that serves as a park and recreation area. The project area is located entirely within the Seashore within an easement granted by the NPS. Facilities belonging to NPS within the project area include part of the Pony Pens, two beach user parking lots, two dirt sound access roads, and an off-road vehicle ramp. One of four National Seashore campgrounds can be found on Ocracoke Island with tent, trailer, and motor home sites. Camping is allowed between April and October.

Three resources in Ocracoke Village are either listed on or eligible for the National Register of Historic Places (NRHP). These resources were described in Section 5.1.3, Cultural Resources.

A determination regarding the applicability of Section 4(f) for the Seashore will be made by the Federal Highway Administration (FHWA) during the NEPA process if the project proceeds using federal funds. For other projects involving NC 12, FHWA determined that the Seashore was ‘jointly developed’ with NC 12 and as such the Seashore was
determined to be exempt from Section 4(f). An important next step in this project’s development to have early coordination between the NPS and FHWA to determine the applicability of Section 4(f) with regard to the Seashore.

5.1.6 Visual Character

The Outer Banks of North Carolina are known for the rare and striking beauty of the natural setting of the barrier islands. NC 12 is designated as a Scenic Byway by the NCDOT between the community of Ocracoke on Ocracoke Island and Whalebone Junction on Bodie Island. Views on Ocracoke Island are characterized by a low vertical profile with a slightly rolling terrain and scattered vegetation. Sandy beaches are along the oceanfront and inlet side of the island, while the salt marsh and mudflats can be viewed on the sound side of the island. From NC 12, users generally see vegetated dunes on the ocean side, and lower-lying vegetated terrain on the sound side. From the beach, views of NC 12 are generally obscured by the vegetated dunes that border the roadway.

5.2 Natural Environment

5.2.1 Significant Natural Heritage Area

The majority of the project area, generally on the sound side of NC 12, is designated as a Significant Natural Heritage Area, classified as Ocracoke Island Eastern End.

5.2.2 Terrestrial Communities

The Natural Resources Technical Report (NRTR) prepared in 2010 by PBS&J (now Atkins) identified seven terrestrial communities in the study area, including: dune grass, maritime dry grassland, maritime shrub, salt shrub, brackish marsh, and salt marsh. These communities are described below:

5.2.2.1 Maintained/Disturbed

Maintained/disturbed areas are scattered throughout the study area in places where the vegetation is periodically mowed, such as roadside shoulders. Maintained/disturbed areas also include NC 12 as well as gravel or paved parking areas along NC 12. The plant species are similar to those of Dune Grass and Maritime Dry Grassland communities.

5.2.2.2 Dune Grass

The Dune Grass community occurs within the study corridor adjacent to and seaward of NC 12. This community is characterized by a dynamic environment of shifting sands driven by wind accretion and erosion as well as erosion from lunar and storm tides. The constant stress of sea salt spray prevents many natural competitors from successful vegetative colonization within this community. The specialized, salt tolerant sea oat is the dominant plant species within this community. Other, less salt tolerant species survive with lower abundance such as beach grass, seaside blue stem, trailing wild bean, silverleaf croton, dune pennywort, and panic grass.
5.2.2.3  Maritime Dry Grassland

The Maritime Dry Grassland community occurs throughout the study corridor adjacent to NC 12 on the beach and sound sides. The community is characterized by low dunes and overwash terraces from previous stochastic events. This community is dominated by saltmeadow cordgrass, with lower abundances of firewheel and trailing wild bean. These plant species are tolerant of overwash and exposure to salt spray and quickly recover after burial. In localized areas with more protection from stressors, isolated shrubs characteristic of the Maritime Shrub community occur with some regularity. Typically, if the protection by dune areas persists for years, the isolated shrub patches will become more common, and the grassland will succeed into the less salt tolerant Maritime Shrub community.

5.2.2.4  Maritime Shrub

The Maritime Shrub community occurs in areas more protected from salt and overwash stressors than Maritime Dry Grassland. Located closer to the Sound than Maritime Dry Grassland, Maritime Shrub is dominated by short shrubs that are stunted by sea salt spray carried above the tops of low dunes. Dominant species include southern bayberry, yaupon holly, and live oak. If dune accretion continues to offer protection from salt stress, this community will succeed to Maritime Evergreen Forest. If overwash occurs or dunes are damaged or removed, this community will grade into Maritime Dry Grassland. Maritime Shrub communities occasionally have high water tables, and may contain isolated wet depressions. This community can be relatively stable and persist for many years, but is highly dependent upon dune stability.

5.2.2.5  Salt Shrub

The Salt Shrub community is very similar to Maritime Shrub, but is recognized separately by Schafale and Weakley (1990) because it occurs as raised areas within Salt or Brackish Marshes rather than a continuous vegetation zone that runs parallel to the ocean/sound waterlines. Dominant vegetation is similar to Maritime Shrub, but also supports inclusions of marsh species.

5.2.2.6  Brackish Marsh

The Brackish Marsh community is found along the study corridor’s northwestern boundary. Brackish Marsh is distinguished from Salt Marsh by dominance of black needlerush, with saltmeadow cordgrass and sawgrass present in lower abundance. The boundary of this extensive community undulates in and out of the study corridor, dependent upon drainage networks and local topography. The presence of this community is reflective of the width of the littoral (intertidal) zone. In areas where the littoral zone is narrow, the ecosystem grades directly from the lower elevation Salt Marsh into higher elevation Salt Shrub and Maritime Shrub communities. If the littoral zone is extensive, then minor changes in elevation occur over long distances inland, and the normal tidal flooding regime will give rise to a distinct zonation in vegetative communities. The Brackish Marsh community is acclimated to irregular flooding.
resulting from extreme lunar (spring) tides, the cumulative influence of lunar high tide and a long fetch of wind driven tide, and storm events.

### 5.2.2.7 Salt Marsh

The Salt Marsh community is found at the lowest elevations along the study corridor’s northwestern boundary. Salt Marsh is distinguished from Brackish Marsh by homogenous dominance of smooth cordgrass. The boundary of this extensive community undulates in and out of the study corridor, primarily associated with the two named tidal creeks near the study corridor’s southwestern terminus. The Salt Marsh community is acclimated to tidal flooding associated with semidiurnal, lunar tides.

### 5.2.3 Terrestrial Wildlife

Terrestrial communities in the study area are comprised of both natural and disturbed habitats that may support a diversity of wildlife species (those species actually observed are indicated with *). The grassland and shrub communities within the study area favor small mammal species like the cotton mouse, marsh rabbit*, and raccoon*. Reptiles and amphibian species that may use grassland and shrub habitats within the study area include Carolina anole*, rough green snake*, eastern coachwhip, and yellow rat snake. Birds utilizing grassland and shrub communities include palm warbler, common yellowthroat, and common grackle. Mammal species that commonly exploit marsh communities within the study area include river otter*, nutria*, mink* and muskrat. Birds that commonly use marsh habitats include saltmarsh sparrow*, Nelson’s sparrow, great egret*, tricolored heron*, red-winged blackbird*, and northern harrier*. Reptiles and amphibians may include eastern mud turtle, Carolina diamondback terrapin, common snapping turtle*, and banded water snake.

### 5.2.4 Aquatic Communities

While terrestrial habitats are more common within the study area, the salt creeks and ponds provide adequate habitat for a variety of aquatic wildlife. Salt creeks could support blue crab, fiddler crab, bluefish, and flounder. Pond habitats could provide adequate habitat for banded water snake, eastern mud turtle, green treefrog and Fowler’s toad.

### 5.2.5 Protected Species

Table 12 shows the Hyde County species currently listed as protected by USFWS as of March 25, 2015.
Table 12. Protected Species Listed for Hyde County

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Federal Status</th>
<th>Habitat Present</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alligator mississippiensis</em></td>
<td>American alligator</td>
<td>T(S/A)</td>
<td>No</td>
</tr>
<tr>
<td><em>Chlonia mydas</em></td>
<td>Green sea turtle</td>
<td>T</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Eretmochelys imbricate</em></td>
<td>Hawksbill sea turtle</td>
<td>E</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Lepidochelys kempii</em></td>
<td>Kemp’s ridley sea turtle</td>
<td>E</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Dermochelys coriacea</em></td>
<td>Leatherback sea turtle</td>
<td>T</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Caretta</em></td>
<td>Loggerhead sea turtle</td>
<td>E</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Canis rufus</em></td>
<td>Red wolf</td>
<td>E</td>
<td>No</td>
</tr>
<tr>
<td><em>Calidris canutus rufa</em></td>
<td>Rufa red knot</td>
<td>T</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Charadrius melodus</em></td>
<td>Piping plover</td>
<td>T</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Picoides borealis</em></td>
<td>Red-cockaded woodpecker</td>
<td>E</td>
<td>No</td>
</tr>
<tr>
<td><em>Trichechus manatus</em></td>
<td>West Indian manatee</td>
<td>E</td>
<td>No</td>
</tr>
<tr>
<td><em>Amaranthus pumilus</em></td>
<td>Seabeach amaranth</td>
<td>T</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Aeschynomene virginica</em></td>
<td>Sensitive joint-vetch</td>
<td>T</td>
<td>No</td>
</tr>
</tbody>
</table>

The following species listed by USFWS as endangered have habitat present within the study area:

**Sea Turtles.** Five species of endangered sea turtle have habitat within the study area, including the green sea turtle, the hawksbill sea turtle, Kemp’s ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle. Sea turtle nests have been documented within 50 feet of the study corridor in 2008 and 2009. The eastern fringe (upper ocean beach) of the study corridor contains suitable habitat for turtle nesting.

**Piping Plover.** North Carolina is an important breeding and wintering habitat for this bird species. They nest most commonly where there is little or no vegetation, but some may nest in stands of beachgrass. The study corridor provides poor nesting and roosting habitat but moderate feeding habitat. Coordination with the National Park Service has confirmed that no nests have been documented within the study corridor.

**Seabeach Amaranth.** This vegetation occurs on barrier island beaches where its primary habitat consists of overwash flats at accreting ends of islands, lower foredunes, and upper strands of noneroding beaches (landward of the wrack line). The study area includes dune and grassland habitats suitable for seabeach amaranth. National Park Service biologists indicated that while there are historical records of seabeach amaranth within the study area, no recent occurrences have been identified. NCNHP records, updated May 2009 indicate no known seabeach amaranth occurrences within 1.0 mile of the study area.
**Rufa red knot.** The rufa red knot has been listed as threatened by the USFWS as of January 2015. The rufa red knot is a migratory bird species that uses the Outer Banks of North Carolina as a stopover point along its long migration pattern.

The American oystercatcher while not listed as endangered by USFWS, is a species found in the project area that has special conservation status:

**American oystercatcher.** The American oystercatcher is classified as a Species of High Concern in shorebird conservation plans for the Eastern and Gulf coasts of the United States because of its small overall population (11,000 individuals), widespread habitat loss, and the threats it faces both during the breeding and non-breeding seasons. The species occurs only in the coastal zone in areas that support intertidal shellfish beds. All thirteen states along the Atlantic Coast of the United States list American oystercatcher as either officially threatened or endangered, or as a Species of Greatest Conservation Need in their state wildlife action plans. In North Carolina the official state designation is significantly rare. Northward migration begins in late winter. On the Outer Banks of North Carolina, oystercatchers begin to arrive on breeding territories in late February.

Biological determinations will be made for each species during the NEPA process.

### 5.2.6 Wetlands

Within the project study area, wetlands are likely to be found on the sound side of NC 12, in mostly non-contiguous patches, with a higher concentration located at the north end of the island. Wetland types present in the project area are anticipated to be variations of the Cowardin classification E2EM (estuarine, intertidal, and emergent).

### 5.2.7 Essential Fish Habitat

Pamlico Sound and the marine water column in the Atlantic Ocean are considered Essential Fish Habitat (EFH), as well as the estuarine emergent wetlands and several salt creeks on Ocracoke Island.

**5.2.7.1 Submerged Aquatic Vegetation (SAV)**

Submerged Aquatic Vegetation (SAV) is found throughout the Pamlico Sound. As it was mapped in 2008 by the USFWS and its partners, there are approximately 17 square miles of SAVs immediately west of the island. At its widest area of growth, SAVs can be found up to two miles from the island. Its growth is most dense along the west central coastline of the island and is less so southwesterly along the shoreline towards Ocracoke Village.
6.0 Description of Alternatives

Engineering and planning project alternatives to reduce the vulnerability of NC 12 were reviewed, including: beach nourishment, dune nourishment, roadway relocation, bridges, and ferries. Key considerations for developing alternatives included: guidelines by the National Park Service (NPS), the potential impact to human and natural environmental resources, constructability, travel convenience, the availability of sand resources, damage potential with shoreline erosion and/or storm overwash, dredging requirements, effects on National Park Service uses, and anticipated costs for implementation.

Using the above guidelines and considerations, short-term (5-Year) and long-term (50-Year) alternatives were developed. Several options were developed for each alternative. These include:

- **5-Year Alternatives:**
  - **Option 1 – Large Scale Beach Nourishment.** This option includes nourishment along 4.65 miles of the beach to a predetermined project baseline. The nourishment seeks to ensure a suitable distance between the roadway and the shoreline is maintained.
  - **Option 2 – Dune Nourishment.** Sand would be used to nourish 3.63 miles of dune. This option would comply with current NPS requirements that generally preclude nourishment of the ocean beach.
  - **Option 3 – Roadway Relocation and Dune Nourishment.** NC 12 would be relocated relative to the forecast 2018 (5-Year) shoreline and sand would be used to nourish a protective dune along the east side of the roadway.
  - **Option 4 – Bridge over Hot Spot.** NC 12 would be bridged within the existing easement throughout most of the hot spot. Bridging the hot spot removes the need for major dune construction and berm nourishment.

- **50-Year Alternatives:**
  - **Option 1 – Pamlico Sound Bridge.** A bridge would be constructed from the project’s northern terminus on existing NC 12, through the Pamlico Sound along the west side of Ocracoke Island, terminating along existing NC 12 approximately four miles south of the starting point.
  - **Option 2 – Bridge Alternative throughout Hot Spot.** A bridge would be constructed starting at the project’s northern terminus on existing NC 12, through NPS land and west of the forecast 50-Year shoreline, terminating approximately two and a half miles south on existing NC 12.
Option 3 – Relocate Roadway and Bridging. NC 12 would be relocated to the west of the 2063 (50-Year) projected shoreline, and bridges would be constructed over streams and small coves.

Option 4 – Bridge in Existing Easement. NC 12 would be bridged within the existing roadway easement throughout nearly all of the project area.

Option 5 – Large Scale Beach Nourishment. The dune and beach nourishment cycles would occur once every 4 years for up to 50 years. Under this option, sand would be used to nourish 4.82 miles of the beach and existing dune system.

Option 6 – Ferry Service to Ferry Terminal in Ocracoke Village. Ferry service would be extended from the Hatteras Inlet Ferry Terminal on Hatteras Island to the Ocracoke Island Ferry Terminal at Silver Lake in Ocracoke Village.

Option 7 – Ferry Service to New Ferry Terminal North of Ocracoke Village. Ferry service would be extended from the Hatteras Inlet Ferry Terminal on Hatteras Island to a new ferry terminal located between the project area and Ocracoke Village.

6.1 Short-Term (5-Year) Alternatives

6.1.1 5-Year Option 1 – Large Scale Beach Nourishment

5-Year Option 1- Large Scale Beach Nourishment (see Figure 4) includes nourishment of a dune and berm, and is intended to maintain a setback of 230 feet and withstand up to a 50-year return period storm. This option includes a “pre-nourishment” cycle, which is a one-time placement of sand along 25,076 feet (4.75 miles) of the beach to a predetermined project baseline. Another nourishment, called a “template nourishment” will occur four years later and will nourish 15,654 feet (2.96 miles) of the dune and berm. The template nourishment is designed to maintain the beach profile set during the pre-nourishment cycle. The template nourishment will assure a suitable distance from the shoreline is maintained.

No road realignment or bridging is proposed under this option. The sand volume anticipated to complete this option is approximately 1,208,700 cubic yards (cy) for the pre-nourishment, and 224,900 cy for the template nourishment, for a total of 1,433,600 cy.

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2 Pre-nourishment requirements are estimated as a function of historical erosion rates. Pre-nourishment is defined as the quantity of material required to be placed on the beach such that the design template is maintained for the entire time until the next re-nourishment cycle; thereby providing the protection afforded by the design template throughout the life of the project. This approach to maintaining a minimum design profile is typical of USACE designed beach nourishment / storm risk reduction projects.
of sand resources. For this option, sand resources are anticipated to come from offshore sites, described in Section 3.3.

### 6.1.2 5-Year Option 2 – Dune Nourishment

5-Year Option 2 - Dune Nourishment (see Figure 5) was developed with consideration of the NPS guideline that restricts the location of placed material to the dune and the portion of the beach profile above mean high water level. Under this option, sand resources would be used to nourish 19,200 feet (3.63 miles) of dune. This option was developed to comply with NPS nourishment requirements that currently preclude nourishment of the ocean beach.

No road realignment or bridging is proposed with this option, as the dune nourishment is intended to be suitable for protecting NC 12. The sand volume anticipated to complete this option is 139,000 cy. Under this option, sand is anticipated to come from NCDOT Ferry Division dredging or United States Army Corps of Engineers (USACE) dredging operations.

Each five year alternative will include one pre-nourishment treatment and one template nourishment after four years. The latter is to return sand to pre-erosion levels. Sand dunes would require 25 percent of pre-nourishment sand volumes between years 4 and 5 to be at design heights at the conclusion of the project.

### 6.1.3 5-Year Option 3 – Roadway Relocation and Dune Nourishment

5-Year Option 3 - Roadway Relocation and Dune Nourishment is shown in Figure 6. With this option, NC 12 would be relocated 140 feet inland from the existing roadway, 230 feet away from the forecast 2018 (5-Year) shoreline. Sand would be used to nourish a protective dune along the east side of the relocated NC 12.

The relocated roadway would be approximately 20,000 feet (3.78 miles) long, and sand resources would be used to nourish 12,070 feet (2.28 miles) of existing dune. The sand volume anticipated to complete this option is 256,000 cy. Sand resources for this option are anticipated to come from NCDOT Ferry Division or USACE dredging operations.

Each five year alternative will include one pre nourishment treatment and one template nourishment after four years. The latter is to return sand to pre-nourishment levels following erosion. Sand dunes would require 25 percent of pre-nourishment sand volumes between years 4 and 5 to be at design heights at the conclusion of the project.

### 6.1.4 5-Year Option 4 – Bridge over Hot Spot

5-Year Option 4 - Bridge over Hot Spot is shown in see Figure 7. For this alternative, NC 12 would be bridged within the existing NC 12 easement throughout most of the hot spot. Construction of this option would be accomplished by providing a detour alongside existing NC 12 as the bridge is built. Bridging the hot spot precludes the need for major dune construction and berm nourishment. The bridge would be 6,000 feet (1.15 miles) in length, with 6,500 feet (1.24 miles) of new roadway at its termini. The termini and some of existing NC 12 would be protected by 13,000 feet (2.49 miles) of
dune. The sand volume anticipated to complete this option is 66,250 cy. Under this alternative, sand resources are anticipated to come from NCDOT Ferry Division or USACE dredging operations. Each five year alternative will include one pre-nourishment treatment and one template nourishment after four years. The latter is to return sand to pre-nourishment levels following erosion. Sand dunes would require 25 percent of pre-nourishment sand volumes between years 4 and 5 to be at design heights at the conclusion of the project.
5-Year Alternative: Option 1 – Large Scale Beach Nourishment

Legend
- Pink: Dune Nourishment
- Blue: Beach Nourishment
- Gray: Existing NC 12

Legend:
- Hatteras Inlet Ferry Terminal
- Ocracoke Pony Pens
- Pamlico Sound
- Atlantic Ocean

Project Area

Figure 4
5-Year Alternative: Option 2 – Dune Nourishment
Legend

- Pink: Dune Nourishment
- Green: Road Relocation
- Gray: Existing NC 12

Figure 6

5-Year Alternative: Option 3 – Roadway Relocation and Dune Nourishment
5-Year Alternative: Option 4 – Bridge Over Hot Spot

Legend
- Dune Nourishment
- Road Relocation
- Bridging
- Existing NC 12

Project Area

Hatteras Inlet Ferry Terminal

Ocracoke Pony Pens

Pamlico Sound

Atlantic Ocean

Figure 7
6.2 Long-Term (50-Year) Alternatives

6.2.1 50-Year Option 1 – Pamlico Sound Bridge

50-Year Option 1 – Pamlico Sound Bridge is shown in Figure 8. For this option, a bridge would be constructed from the project’s northern terminus on existing NC 12, through Pamlico Sound along the west side of Ocracoke Island, terminating at a point along existing NC 12 approximately four miles south of the origination point. Since a primary consideration in determining the location of this option is minimizing impacts to submerged aquatic vegetation (SAV), the bridge could be built using “top down” construction. This method would minimize construction impacts to Pamlico Sound and wetlands because it would eliminate the need for a temporary work bridge. However, the feasibility of top-down construction would need to be investigated in detail during subsequent phases of the project’s development. If top-down construction methods are not implemented, then it is expected that a temporary work bridge(s) would be required to facilitate bridge construction.

The bridge would be approximately 17,000 feet (3.3 miles) in length, with 11,000 feet (2.2 miles) of new roadway at its termini. The termini and some of existing NC 12 would be protected by 5,950 feet (1.13 miles) of dune. The sand volume anticipated to complete this option is approximately 153,000 cy per template nourishment cycle, or 1,917,000 cy for the 50-Year timeframe. This option will include one pre-nourishment treatment and template nourishments every four years or 12.5 nourishment cycles over the course of the project.

Under this option, sand resources are anticipated to come from NCDOT Ferry Division or USACE dredging operations.

6.2.2 50-Year Option 2 – Bridge Alternative throughout Hot Spot

The 50-Year Option 2 (see Figure 9) would consist of a bridge from the project’s northern terminus on existing NC 12, through NPS land at least 230 feet west of the forecast 50-Year shoreline, terminating at a point approximately two and a half miles south on existing NC 12.

The bridge could be built using “top down” construction to minimize construction phase impacts to Pamlico Sound and wetlands on the west side of Ocracoke Island because it would eliminate the need for a temporary work bridge. The feasibility of using this method will be determined in subsequent phases of the project. The bridge would be approximately 25,000 feet (4.7 miles) in length, with approximately 3,000 feet (0.5 miles) of new roadway at its termini. The termini and some of existing NC 12 would be protected by 500 feet (0.10 mile) of new dune. The sand volume anticipated to complete this option is approximately 9,000 cy per nourishment cycle, or approximately 111,000 cy for the 50-Year timeframe. This option will include one pre nourishment treatment and template nourishments every 4 years or 12.5 nourishment cycles over the course of the project.
Under this option, sand resources are anticipated to come from NCDOT Ferry Division or USACE dredging operations.

### 6.2.3 50-Year Option 3 – Relocate Roadway and Bridging

The 50-Year Option 3 (see Figure 10) would relocate NC 12 at least 230 feet to the west of the 2063 (50-Year) projected shoreline. Two small bridges and one larger bridge would be constructed over streams and small coves. The bridges could be built using “top down” construction to minimize construction impacts to the wetlands and terrestrial habitats because it would eliminate the need for a temporary work bridge. The feasibility of using this method will be determined during subsequent phases of the project. The relocated roadway and bridge lengths would be as follows:

- Relocated roadway - Combined, all segments would total approximately 23,000 feet (4.3 miles) in length.
- Bridge 1 (longest and northernmost) – approximately 4,000 feet (0.80 miles) in length.
- Bridge 2 (short and central) – approximately 330 feet (0.06 miles) in length.
- Bridge 3 (short and southernmost) – approximately 350 feet (0.07 mile) in length.

It is anticipated that precast pre-stressed concrete girders with composite concrete deck superstructures would be used for all three bridges. Segmental concrete superstructure may be an option for the long bridge (Bridge 1), but the optimum structure type would be determined during the final design phase of the project. All of the bridges would be supported on concrete substructure units with deep foundations. Pile bents (trestle bents) or post-and-beam bents would be the anticipated substructure types depending on the required height of the bridges above the existing ground or water.

The relocated roadway would be protected by approximately 21,000 feet (3.9 miles) of new dunes. The sand volume anticipated to complete this option is approximately 382,000 cu yd per template nourishment cycle, or approximately 4,776,000 cu yd for the 50-Year timeframe. This option will include one pre-nourishment treatment and template nourishments every four years or 12.5 nourishment cycles over the course of 50 years.

Under this option, sand resources are anticipated to come from NCDOT Ferry Dredging or USACE Operations.

### 6.2.4 50-Year Option 4 – Bridge in Existing Easement

For 50-Year Option 4 – Bridge in Existing Easement, NC 12 would be bridged within the existing roadway easement throughout nearly all of the project area (see Figure 11). This would be accomplished by providing a detour alongside existing NC 12 as the bridge is built. The bridge would be approximately 25,000 feet (4.7 miles) in length, with approximately 2,600 feet (0.50 miles) of new roadway at its termini. The termini would be protected by approximately 500 feet (0.10 miles) of new dune.
It is estimated that the sand volume required to complete this option is similar to 50-Year Option 2, which is approximately 9,000cy per template nourishment cycle, or 112,500cy for the 50-Year timeframe. This option will include one pre nourishment treatment and template nourishments every four years or 12.5 nourishment cycles over the course of the project.

Under this option, sand resources are anticipated to come from NCDOT Ferry Division or USACE dredging operations.

### 6.2.5 50-Year Option 5 – Large Scale Beach Nourishment

50-Year Option 5 - Large Scale Beach Nourishment is shown in Figure 12. It is similar to 5-Year Option 1, but includes 12 dune and berm re-nourishment cycles with the last cycle only providing half the necessary volume since it will just extend for 2 years, where the 5-Year option has only 1 cycle. The dune and berm nourishment cycles would occur once every 4 years for up to 50 Years. Under this option, sand resources would be used to pre-nourish approximately 26,900 feet (5.10 miles) of the beach and dune. The pre-nourishment would be the onetime nourishment of sand along the beach to a predetermined project baseline. The template nourishments that follow are designed to maintain the beach profile set during the pre-nourishment cycle. Each nourishment cycle will assure that a suitable distance between the roadway and the shoreline is maintained.

No road realignment or bridging is proposed under this option, as the beach and dune nourishment will be suitable for protecting NC 12 for up to a 50-Year timeframe. The sand volume anticipated to complete this option is approximately 1,454,000 cubic yards (cy) for the pre-nourishment and first year template nourishment, and approximately 226,000 cy of template nourishment every four years up to 2063, resulting in an approximate total of 4,279,000cy for the entire nourishment. This option will include one pre-nourishment treatment and template nourishments every four years or 12.5 nourishment cycles over the course of the project.

Under this option, sand resources are anticipated to come from offshore sites.

### 6.2.6 50-Year Option 6 – Ferry Service to Expanded Terminal in Ocracoke Village

50-Year Option 6 - Ferry Service to Ocracoke Village Ferry Terminal is shown in Figure 13. For this alternative, ferry service would be extended from the Hatteras Inlet Ferry Terminal on Hatteras Island to the Ocracoke Island Ferry Terminal at Silver Lake in Ocracoke Village. According to NCDOT Ferry Division, the property adjacent to the east of the Ocracoke Village Silver Lake Ferry Terminal may be considered for purchase to expand the terminal to accommodate the additional ferries from the Hatteras Inlet ferry route. The Hatteras Inlet South Dock at the north end of Ocracoke Island would be removed as part of this option.
6.2.7 50-Year Option 7 – Ferry Service to New Ferry Terminal North of Ocracoke Village

50-Year Option 7 - Ferry Service to New Ferry Terminal North of Ocracoke Village is shown in Figure 13. With this option, ferry service would be extended from the Hatteras Inlet Ferry Terminal on Hatteras Island to a new ferry terminal located between the project area and Ocracoke Village. For the purposes of this study, a site just south of the Ocracoke Pony Pens was assumed. This location is subject to change based on consultation with the NPS because it is within the boundary of the Cape Hatteras National Seashore. The Hatteras Inlet South Dock on the north end of Ocracoke Island would be removed as part of this option.
Figure 9

50-Year Alternative: Option 2 – Bridge Throughout Hot Spot

Legend
- Dune Nourishment
- Road Relocation
- Bridging
- Existing NC 12

Project Area

Hatteras Inlet Ferry Terminal

Ocracoke Pony Pens

Pamlico Sound

Atlantic Ocean

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

NC 12 IMPROVEMENTS PROJECT
FEASIBILITY STUDY

Hyde County
NCDOT Div. 1
Figure 10

50-Year Alternative: Option 3 – Relocate Roadway and Bridging
Figure 1

- **Legend**
  - Dune Nourishment
  - Road Relocation
  - Bridging
  - Existing NC 12

- **Project Area**

- **Locations**
  - Hatteras Inlet Ferry Terminal
  - Ocracoke Pony Pens
  - Pamlico Sound
  - Atlantic Ocean
  - Hatteras Inlet
  - Ferry Terminal

- **Figure 11**

- 50-Year Alternative:
  - Option 4 – Bridge in Existing Easement
Option 6: New Ferry Route to New Terminal Adjacent to Ocracoke Village (Silver Lake) Ferry Terminal

Option 7: New Ferry Route to New Ferry Terminal Along NC 12

Legend:
- Existing Ferry Route
- New Ferry Route
- Existing Ferry Terminal
- New Ferry Terminal

Figure 13

50-Year Alternative:
Option 6 – New Ferry Route to Ocracoke Village
Option 7 – New Ferry Route to New Ferry Terminal Along NC 12
7.0 Comparison of Alternatives

A more detailed assessment of impacts for each alternative will be conducted during the National Environmental Policy Act (NEPA) documentation process but to simplify the comparison of alternatives, design options were broadly categorized as nourishment options, road and bridge options, ferry options, or a combination as shown below:

**Nourishment Options**
- 5-Year Option 1 – Large Scale Beach Nourishment
- 5-Year Option 2 – Dune Nourishment
- 50-Year Option 5 – Large Scale Beach Nourishment

**Road and Bridge Options**
- 5-Year Option 4 – Bridge Over Hot Spots
- 50-Year Option 1 – Pamlico Sound Bridge
- 50-Year Option 2 – Bridge throughout Hot Spot
- 50-Year Option 3 – Relocate Roadway and Bridge
- 50-Year Option 4 – Bridge in Existing Easement

**Ferry Options**
- 50-Year Option 6 – Ferry Service to New Ferry Terminal in Ocracoke Village
- 50-Year Option 7 – Ferry Service to New Ferry Terminal North of Ocracoke Village

**Combination Options**
- 5-Year Option 3 – Roadway Relocation and Dune Nourishment

A determination regarding the applicability of Section 4(f) for the Seashore will be made by the Federal Highway Administration (FHWA) during the NEPA process if the project proceeds using federal funds. For further details See Section 5.1.5

7.1 Nourishment Options: 5-Year Option 1, 5-Year Option 2, 50-Year Option 5

7.1.1 Human Environment Impacts

Recreation
The nourishment of the beach, berm and dune under 5-Year Options 1 and 2 and 50-Year Option 5 would likely have minor potential to affect recreational resources on the beach and in the National Seashore. While beach nourishment could occur at any time within the year, efforts could be made to minimize impacts by nourishing the beach during the off-peak tourism timeframes.
Section 4(f) Resources

5-Year Options 1 and 2 and 50-Year Option 5 have the potential for impacts under Section 4(f) because dune and berm nourishments outside of the existing easement are likely to be considered a use of the Cape Hatteras National Seashore.

Visual Character

The beach, berm, and dune nourishment design criteria shown in Table 7 indicate that dune heights could be 15 feet above grade. Currently, some dunes along NC 12 in the project area are lower than 15 feet. Because of this, minor visual resource impacts would occur with the nourishment alternatives. Views of and from the beach would have minor changes, but would still be consistent with the existing viewshed.

7.1.2 Natural Environment Impacts

Protected Species

While nourishment could temporarily impact sea turtle nesting habitat, nourishment activities could be timed to reduce impacts to sea turtles by avoiding beach nourishment between May and November (the sea turtle nesting season). There could also be temporary impacts to piping plover and red knot during construction. A detailed assessment of impacts, as well as avoidance, minimization and mitigation options will be completed during the NEPA process.

Essential Fish Habitat

With the nourishment options, marine EFH in the vicinity of the offshore sand extraction and beach replenishment operations would be affected because these activities would generate turbidity and potentially low dissolved oxygen conditions. The direct effects of beach nourishment would be temporary and localized. However, long-term indirect impacts to marine EFH and managed species could result if the post-nourishment habitat is of lesser quality compared to baseline conditions (causing changes in sediment fill characteristics, beach morphology, and hydrology, properties that largely structure beach communities).

7.1.3 Constructability

5-Year Option 1

The factors affecting the constructability of Option 1 are: availability of a sand resource for fill; manner of bringing sand onto the project area; and regulatory concerns of obtaining and using sand resources. Likely sources for the sand include the twelve potential sand resource areas identified from the North Carolina Geological Survey (NCGS) geophysical data of near shore/offshore sediment surrounding the study area. South of Diamond Shoals, five target areas were identified for the fine-grained beaches of Ocracoke. Spoils from dredging Hatteras Inlet between Hatteras Island and Ocracoke Island, including the existing spoil area on the north end of Ocracoke Island are other potential sources. However, until the sand source is identified and its location and distance are known, a transport method cannot be determined. NPS, NCDCM and USACE must agree on the permit requirements and ability to use the sand resources.
Additionally, a relatively large amount of sand is required and currently there is much competition for coastal sand resources.

**5-Year Option 2**
Constructability factors for this option are similar to those for 5-Year Option 1. A key difference is this option will require substantially less sand fill than 5-Year Option 1.

**50-Year Option 5**
The factors affecting the constructability of 50-Year Option 5 are: availability of a continued suitable sand resource for beach and dune fill over the project’s design life; the transport of sand onto the project area; and NCDCM, USACE, and NPS regulatory requirements of obtaining and using sand resources.

### 7.1.4 Cost
The costs of the nourishment alternatives are shown below. The unit cost associated with beach nourishment is an average cost between three estimates in a May 2014 NCDOT bid abstract for obtaining sand resources for a beach nourishment project along a different section of NC 12.

- 5-Year Option 1: $13,950,000 (Dune and Beach Nourishment)
- 5-Year Option 2: $1,350,000 (Dune Nourishment Only)
- 50-Year Option 5: $41,600,000

### 7.2 Road and Bridge Options: 5-Year Option 4, 50-Year Options 1-4

#### 7.2.1 Human Environment Impacts

**Recreation**
- 5-Year Option 4, Bridging Over Hot Spot. The proposed option removes the current access from NC 12 to an ORV access ramp to the ocean beach and a parking area, thereby limiting recreation access in these areas.

- 50-Year Options 1, 2, 3, and 4 (Pamlico Sound Bridge, Bridge Alternative throughout Hot Spot, Roadway Relocation and Bridging, Bridging in Existing Easement respectively). These remove the existing direct access to recreation areas. Alternative access points would be needed for continued access.

**Land Use**
- 5-Year Option 4 could involve the use of NPS lands for a temporary construction easement.

- Some land use conversion would occur with 50-Year Options 1, 2, and 3. 50-Year Option 1 would convert approximately 22.4 acres for roadway right-of-way and
39.8 acres for bridge right-of-way (total of 62.2 acres). 50-Year Option 2 would convert approximately 2.2 acres for roadway right-of-way and 57.4 acres for bridge right-of-way (total of 59.6 acres). 50-Year Option 3 would convert approximately 48.3 acres for roadway right-of-way and 11.3 acres for bridge right-of-way (total of 59.6 acres). 5-Year Option 4 and 50-Year Option 4 would require no land use conversion. Following construction the existing easement that is no longer needed for NC 12 would be returned to the Cape Hatteras National Seashore.

7.2.1.3 Bicycle & Pedestrian Facilities and Use
The proposed roadway and bridge alternatives will include shoulders that would be safer for bicycle and pedestrian traffic. This is the recommended minimum width for accommodating cyclists. Bridge options are proposed to have 6.5-foot paved shoulders for short-term options and 8-foot paved for long-term options. The roadway is proposed to have 5-foot paved shoulders. These shoulder widths would be an improvement to the existing paved shoulder widths in the study area, which vary in the width of usable pavement outside the roadway.

7.2.1.4 Section 4(f)
As discussed in Section 5.1.5, Section 4(f) will be applicable only if federal funds are used for the project. If federal funds are used, FHWA will make a determination as to the applicability of Section 4(f) regarding the Seashore.

- 5-Year Option 4 could have constructive use impacts to the Seashore, depending upon the visual impact of the bridge. There is also potential for temporary use if a temporary construction easement is required.

- 50-Year Option 1 has the potential for Section 4(f) impacts to the Seashore under the permanent use category because approximately 62 acres of Section 4(f) resources would be converted to a new transportation facility.

- Both 50-Year Option 2 and 50-Year Option 3 have the potential for Section 4(f) impacts to the Seashore under the permanent use category because of conversion of potential 4(f) land to a new transportation facility.

- 50-Year Option 4 has no permanent use impacts because no additional right-of-way is proposed. The construction of a phased detour likely would be within the existing easement but temporary easements could be required and those could result in a temporary use of the Seashore under Section 4(f). Also, the introduction of a bridge in the existing right-of-way could be determined to be a constructive use of the Seashore.

No impacts are anticipated to any of the three historic resources at this time. Detailed analysis and coordination with the State Historic Preservation Office (HPO) would be done should the project proceed to the NEPA phase.
7.2.1.5 Visual Impacts

5-Year Option 3 and 50-Year Option 3 are road-based options that will be constructed on new alignment through NPS land. Minor visual impacts would be associated with their development because of the removal of some established vegetation to the west of existing NC 12. Although bridges would be part of 50-Year Option 3, they would be lower lying bridges that are roughly the same grade as the roadway. Because of this, only minor visual impacts would occur.

5-Year Option 4 and 50-Year Options 1, 2, and 4 are likely to represent the greatest visual impacts because they would be prominent within the viewshed, not only because of their height and length, but also because of their presence in a high quality viewshed where no prior structures have existed. Each bridge would represent a different type of impact and are discussed separately below:

- 5-Year Option 4. This option would consist of a bridge in the existing alignment over the hot spot. As such, the structure would be prominent within the views of beachgoers in the hot spot area, thereby detracting from the coastal view experience.

- 50-Year Option 1. This option would consist of a long bridge over an expanse of Pamlico Sound west of Ocracoke Island. The structure would be highly visible to persons viewing the Sound from the estuarine shoreline. Visual impacts to beachgoers would be far less because of the distance between the bridge and the beach. With this option, construction phase visual impacts would be experienced by both sound side and beach side viewers based on the proposed construction technique.

- 50-Year Option 2. This option would consist of an elevated bridge through NPS lands west of the existing NC 12 easement. It would be equally visible to beachgoers and persons viewing from the Sound. Construction phase visual impacts would be experienced by viewers from both perspectives.

- 50-Year Option 4. This option would consist of a bridge in the existing NC 12 easement throughout the entire project area. The structure would be prominent within the views of beachgoers in the entire project area, thereby detracting from the coastal view experience.

7.2.2 Natural Environment Impacts

7.2.2.1 Significant Natural Heritage Areas (SNHA)

The following road and bridge options would affect SNHA: (this represents the acreage of the new easement within the SNHA)

- 50-Year Option 1: 32.53 acres
- 50-Year Option 2: 12.70 acres
- 50-Year Option 3: 68.31 acres
- 50-Year Option 4: 12.06 acres
7.2.2.2 **Protected Species**

While none of the road and bridge alternatives would be constructed on the existing beach, sea turtle species could be impacted by the proximity of construction activities. Bridge alternatives within the existing NC 12 easement would likely have to be modified to minimize harm to sea turtles from both construction lighting and vehicle headlights during operation. In addition, with 50-Year Option 4, there is potential for impacts to piping plover and red knot during construction because of the proximity to the beach.

7.2.2.3 **Wetlands**

All road and bridge options have the potential to affect wetlands. The options involving roadway relocation, 5-Year Option 3 and 50-Year Option 3, would likely only affect wetlands west of NC 12.

7.2.2.4 **EFH**

The only road and bridge based option with the potential to impact the Sound is 50-Year Option 1. Based on the aerial photo review, it is estimated that this option has the potential to impact approximately 4,600 square feet of SAV habitat. The shading created by the bridge could have minor impacts on EFH. Construction of the bridge could impact some SAV.

7.2.3 **Constructability**

7.2.3.1 **5-Year Option 4**

Primary constructability issues with this option are the ability to detour traffic during construction and completing all construction activities, including staging, within the existing easement. A temporary construction easement outside of the existing easement would require a permit from NPS.

7.2.3.2 **50-Year Option 1**

The factors affecting the constructability of this option include ability to transport prefabricated bridge parts and materials through the sound and ability to build the bridge using a top down approach. Currently, the Hatteras Inlet Ferry has rerouted its course due to significant shoaling immediately northwest and west of Ocracoke Island. The condition is worse south of the existing Hatteras Inlet Ferry Terminal. If Hatteras Inlet is not accessible to barges because of shoaling, an alternate means of transporting materials must be used, such as work bridges to access barges in the sound. Temporary construction easements would need to be permitted by the NPS, and any temporary impacts due to construction activities in waters or wetlands would need to be permitted by the appropriate agencies (including the USACE, NCDCM, and NCDWR).

7.2.3.3 **50-Year Option 2**

The factors affecting the constructability of this option include ability to transport prefabricated bridge parts (if required) and materials through the sound and ability to build the bridge using a top down approach. While work barges could use the existing Hatteras Inlet Ferry route, the depth of the route would have to accommodate the draft of the work barges and tow vessels. Any dredging within the inlet to accommodate
barge traffic would require additional permitting. Barge traffic will need to be coordinated with the Hatteras Inlet ferry. In addition, construction of a bridge in the Sound would likely require an Advanced Approval from the US Coast Guard (USCG), and USCG would need to be notified of barge traffic in navigable waters so that public notices could be issued as needed. Temporary construction easements outside of the existing easement would need to be permitted by the NPS, and any temporary impacts due to construction activities in waters or wetlands would need to be permitted by the appropriate agencies (including the USACE, NCDCM, and NCDWR).

Another factor affecting constructability is the timing of construction activities during peak tourist season. Similar projects have required limiting or completely avoiding certain activities like jetting piles during peak season. This study notes the presence of campgrounds in the study area. More detailed studies during the NEPA process will determine the potential effect of construction activities on these resources and recommend the appropriate action by NCDOT.

7.2.3.4 50-Year Option 3

The factors affecting the constructability of 50-Year Option 3 are similar to those for 5-Year Option 3, with the exception of the bridges. The bridges for this option would be lower lying and, given the distance of the northernmost bridge, will likely utilize top down construction to avoid additional wetland impacts.

7.2.3.5 50-Year Option 4

Constructability concerns are similar to 5-Year Option 4. In addition to concerns about a detour and maintaining construction and staging activities within the existing easement, there is the additional consideration of potential limits to construction activities during peak tourist season.

7.2.4 Cost

Costs for the road and bridge options are shown below. In addition to the construction costs associated with new bridge construction or roadway relocation, these estimates include costs associated with the beach or dune nourishment associated with the alternatives. The unit cost associated with beach nourishment is based on an average cost between three estimates in a May 2014 NCDOT bid abstract for obtaining sand resources for a nourishment project along a different section of NC 12.

- 5-Year Option 4: $76,700,000
- 50-Year Option 1: $194,750,000
- 50-Year Option 2: $188,900,000
- 50-Year Option 3: $234,950,000
- 50-Year Option 4: $248,450,000
7.3 Ferry Options: 50-Year Options 6 and 7

7.3.1 Human Environment Impacts

7.3.1.1 Travel Time and Recreation

With both of the ferry options, the Hatteras Inlet Ferry trip time would be longer than the current ferry route between Ocracoke and Hatteras Islands. The current route is either approximately 4 miles long or 8.5 miles long, depending on whether the original channel is passable because of shoaling. It takes approximately 40 minutes to complete the 4 mile route and approximately 1 hour to complete the 8.5 mile alternate route that is currently being used by the NCDOT ferry. 50-Year Option 6 would be an approximately 20 mile route from the Hatteras Ferry terminal to the (expanded) Silver Lake Ferry Terminal on the south end of Ocracoke. 50-Year Option 7 would be an approximately 15 mile route from the Hatteras Ferry terminal to a new ferry terminal north of Ocracoke Village. These longer routes would translate to longer ferry rides. Depending upon the vessel used and the channel condition, Option 6 would take between 1.5 and 2 hours, and Option 7 would take between 1.25 and 1.75 hours. These times represent increases of approximately 1 hour 5 minutes and 45 minutes (Options 6 and 7, respectively) from the shorter current route, however it should be noted that in both cases, the drive to Ocracoke Village will be cut shorter than with the current ferry terminal at the north end of Ocracoke Island. These changes in travel times could affect visitors, commercial vehicles and delivery of goods and services, and residents.

The ferry based alternatives have the potential to reduce access to recreational opportunities with the possible closure of segments of NC 12 north of the proposed facilities. Without access provided by the NPS there could be a reduction in the number of people visiting the island.

7.3.1.2 Land Use

Conversion of Private Docks and Commercial Land in Ocracoke Village. The construction of 50-Year Option 6 would likely require the acquisition of private docks and commercial land space to the east of the existing Silver Lake Ferry Terminal. In so doing, these uses would be converted to state transportation facilities.

Conversion of NPS Land. The construction of 50-Year Option 7 would require the acquisition of NPS land to the west of existing NC 12. In so doing, the NPS land would be converted to state transportation facilities.

7.3.1.3 Cultural Resources

The 50-Year Option 6 proposes to expand ferry service to the Silver Lake ferry terminal, which is located immediately outside the Ocracoke Historic District boundary. If, as proposed, the ferry terminal were expanded, the approximately 4.5 acres of land needed for the proposed expansion might encroach upon the historic district. The other 5- and 50-Year alternatives are not expected to have any impact on cultural resources.
7.3.1.4 Section 4(f)

As discussed in Section 5.1.5, Section 4(f) will be applicable only if federal funds are used for the project. If federal funds are used, FHWA will make a determination as to the applicability of Section 4(f) regarding the Seashore.

50-Year Option 6 would alter access to a potential Section 4(f) site, as NC 12 would no longer pass through the Seashore and could impact Ocracoke Village Historic District.

50-Year Option 7 could have Section 4(f) impacts under the permanent use category because approximately 4.5 acres of potential Section 4(f) resources would be converted to new transportation facility.

7.3.1.5 Visual Impacts

50-Year Option 6 could cause moderate visual impacts through the creation of additional ferry terminal space at the Silver Lake Ferry Terminal. This additional ferry infrastructure will be seen during both construction and operation.

50-Year Option 7 also could cause moderate visual impacts through the construction of a new ferry terminal along the west side of NC 12. Although typical terminal buildings and structures are one story it is likely that this could be viewed from NC 12 and would be a visual disruption in the views of the sound.

7.3.2 Natural Environment Impacts

50-Year Option 6 would be constructed within an urbanized area in Ocracoke Village and would not have impacts on NCNHP areas, sea turtles or NPS species. 50-Year Option 7 impacts to NCNHP areas are unknown because the location is not established. It would likely not affect sea turtles that use the ocean beach, as all work would take place on the sound-side of Ocracoke Island. The presence of other threatened and endangered species and associated habitats will be a factor in establishing the location of the new ferry terminal.

Although the path(s) of a new ferry route under 50-Year Options 6 or 7 is unknown, it is likely that dredging would be necessary to facilitate construction and operation. With the dredging, the potential exists to disrupt SAV and EFH.

7.3.3 Constructability

50-Year Option 6

Since this option would be adjacent to an existing ferry terminal, the factors affecting its constructability include: acquiring the land and harbor space, performing dredging (if needed); and constructing new terminal facilities while operations are ongoing at the adjacent terminal. Additional vessels may be needed for this option. In addition, a new channel would have to be dredged for use. Excessive shoaling is present in the Hatteras Inlet, and, as a result, Hatteras Inlet Ferry has had to extend its route well beyond what it has been historically. This coupled with excessive siltation in Pamlico Sound off the west side of Ocracoke Island could prove challenging for dredging and maintaining the
channel. Additionally, an appropriate location for dredge spoil disposal would need to be identified.

50-Year Option 7
For this study, it is assumed that the ferry terminal for this option would be on the west side of Ocracoke Island, just south of the Ocracoke Pony Pens. However, this location is subject to change. If constructed at this location, a channel would need to be dredged for ferry clearance, and a road would need to be constructed to the terminal. Depending on the proposed path of a new ferry route, dredging could have regulatory and permitting issues related to SAV and EFH concerns. Given that the terminal would be constructed outside of the NC 12 right-of-way, complications from vehicle traffic are not a significant concern; however, all new land required for the terminal and the access roadway would have to be authorized by the NPS, likely in a new easement. Additional vessels may be required for this option. Concerns regarding dredging and maintaining a channel are the same as with 50-Year Option 6.

7.3.4 Cost
The NCDOT Ferry Division developed costs for the 50-Year Ferry Options 6 and 7. The cost assumes providing service for 2 million vehicles per year across Oregon Inlet. Option 6 would have an existing and adjacent ferry terminal. Option 7 would have a new free standing terminal.

The total estimated cost for installing, operating, and maintaining a ferry system that would service the current traffic demand over the course of the next 50 years is approximately $2.03 billion for Option 6 and $2.15 billion for Option 7. These costs also include crew, supporting facilities (including a new shipyard), maintenance, and vessel replacement at 30 years.

The NCDOT is legally required to provide at least one free route to all locations in the state. Currently, the ferry between Hatteras Island and Ocracoke Island serves as the free route to Ocracoke Island, while the ferries from Swan Quarter and Cedar Island are tolled. If the ferry from Hatteras Island were to become tolled, one of the other routes would have to be fare-free.

7.4 Combination Option: 5-Year Option 3

7.4.1 Human Environment Impacts
7.4.1.1 Recreation
5-Year Option 3 would remove the current access from NC 12 to one parking area, one ORV access ramp to the ocean beach, and two Pamlico Sound access roads, thereby limiting access to recreational opportunities in these areas.
7.4.1.2  Section 4(f)
This option has the potential for Section 4(f) impacts under the permanent incorporation use category because approximately 38 acres would be converted to a new transportation facility.

As discussed in Section 5.1.5, Section 4(f) will be applicable only if federal funds are used for the project. If federal funds are used, FHWA will make a determination as to the applicability of Section 4(f) regarding the Seashore.

7.4.2  Natural Environment Impacts

7.4.2.1  Protected Species
This option could involve lighting impacts to sea turtles.

7.4.2.2  Significant Natural Heritage Area
Approximately 45.96 acres of SNHA would be impacted by 5-Year Option 3.

7.4.2.3  Wetlands
5-Year Option 3 has the potential to impact wetlands west of NC 12.

7.4.3  Constructability
Constructability concerns for this option include the requirement for a permit from NPS and concern about construction materials transport and staging.

7.4.3.1  5-Year Option 3
The factors affecting the constructability of 5-Year Option 3 include the ability to obtain a new easement for NC 12 from NPS, the ability to offset impacts to wetland areas and NCNHP areas, availability of suitable fill for the roadbed, and manner of transporting to and staging of construction materials the project area. The ability to negotiate a new roadway easement from NPS is unknown. The ability to offset impacts to wetlands could present a challenge because NPS has stated that there are no forms of wetland mitigation on Ocracoke Island. The availability of sand fill for the roadbed would be a lesser concern because fill sand suitability criteria for roadbeds is less stringent than beach fill sand. However, the roadbed fill would still need to be transported to the project site through some means; either on trucks using the ferry or on a barge.

7.4.4  Cost
The cost of obtaining beach, berm, and dune sand resources associated with this 5-Year Option 3 is approximately $2.48 million. The associated bridge has a projected cost of approximately $17,200,000 bringing the approximate total cost to $19,700,000.
7.5 Summary

Table 13 and Table 14 summarize potential impacts for the 5-Year and 50-Year alternatives based on the considerations presented in this report. The following summarizes the table and text presented in this section for each group of options.

7.5.1 Beach Nourishment Options

- The nourishment of the beach, berm and dune under 5-Year and 50-Year alternatives will likely have minor potential impact on recreational resources.

- These options have the potential for Section 4(f) impacts. If federal funds are used, FHWA will make a determination as to the applicability of Section 4(f) regarding the Seashore.

- Minor visual resource impacts may occur with these options.

- Minor temporary impacts to protected species, SAVs and EFH. No impact anticipated to Significant Natural Heritage Areas or wetlands.

- The availability of sand for fill both in the short- and long-term, its transport method and permitting concerns are key constructability considerations for these options.

- Costs for these alternatives are expected to range from approximately $14 million to $30 million.

7.5.2 Road and Bridge Options

- Constructability concerns include: the ability to obtain permits from appropriate agencies, the manner of transporting and staging of construction materials, the ability to transport prefabricated bridge parts, and construction methodology. In addition, limitation on construction activities during peak tourist season is also a factor. There are campgrounds near the study area. Construction activities could be limited to minimize impacts to such areas during peak tourist season.

- These options are expected to have moderate impacts to recreation access points.

- These options are likely to enhance bicycle and pedestrian travel.

- Permanent use and potential for constructive and temporary use under Section 4(f).

- Visual impacts range from minor with roadway relocation option to substantial for new bridge options.

- These options are most likely to affect sea turtles, piping plover and red knot. Only the Pamlico Sound Bridge (50-Year Option 1) is expected to impact SAV
and EFH. Impacts to SNHA range from approximately 12 acres to approximately 68 acres.

- The lone 5-Year bridge option has an estimated cost of $76.7 million and the 50-Year options have a range of costs between $188.9 million and $248.5 million.

### 7.5.3 Ferry Options

- Constructability concerns include: land and harbor acquisition, channel development, terminal facility development during concomitant operations, and permitting.

- Travel time to and from the island will be increased with implementation of either of these options. This could affect visitors to the island and delivery of goods and services.

- These options have the potential to reduce access to some recreational opportunities, including bicycle and pedestrian access, if NC 12 is not maintained north of the ferry terminal.

- If federal funds are used and the conversion of the NPS land to develop new transportation facilities alters access there could be a Section 4(f) determination. In addition, the Ocracoke Historic District could be affected by the design of Option 6.

- There could be moderate visual impacts from additional ferry infrastructure and new ferry terminal.

- There is limited potential for impact to protected species, SNHA, or wetlands. Dredging for a new ferry route could disrupt SAV and EFH habitats.

- The total estimated cost for installing, operating, and maintaining a ferry system that would service the current traffic demand over the course of the next 50 years was determined to be approximately $2.03 billion for Option 6 and $2.15 billion for Option 7. These costs also include crew, supporting facilities (including a new shipyard), maintenance, and vessel replacement at 30 years.
<table>
<thead>
<tr>
<th>Potential Impacts</th>
<th>Cost</th>
<th>Human Environment</th>
<th>Natural Environment</th>
<th>Table 13. Comparison of 5-Year Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constructability</strong></td>
<td><strong>Availability of sand resource; transport method concerns; local competition for sand resources; and required permits from NPS. Adherence to NPS Policy guidelines with regard to Beach Nourishment.</strong></td>
<td><strong>Availability of sand resource; transport method concerns; local competition for sand resources; and required permits from NPS. Less sand needed than Option 1.</strong></td>
<td><strong>New easement would require permit from NPS. Concern about construction materials transport and staging.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Travel Convenience</strong></td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td>Possible delays during construction.</td>
<td></td>
</tr>
<tr>
<td><strong>Need for Dredging</strong></td>
<td>1,916,000 cy of sand resources needed. Sand resources expected to come from offshore sites.</td>
<td>139,000 cy of sand resources needed. Sand resources expected to come from existing dredging operations.</td>
<td>256,000 cy of sand resources needed. Sand resources expected to come from existing dredging operations.</td>
<td></td>
</tr>
<tr>
<td><strong>Land Use</strong></td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td>Conversion of 37.6 acres of NPS land for new NC 12 easement.</td>
<td></td>
</tr>
<tr>
<td><strong>Cultural Resources</strong></td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td></td>
</tr>
<tr>
<td><strong>Bike &amp; Pedestrian</strong></td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td></td>
</tr>
<tr>
<td><strong>Section 4(f)</strong></td>
<td>Permanent incorporation impacts are likely to occur with berm and dune nourishment outside of the existing NC 12 easement.</td>
<td>Permanent incorporation impacts are likely to occur with berm and dune nourishment outside of the existing NC 12 easement.</td>
<td>Permanent incorporation of approximately 38 acres for new NC 12 easement.</td>
<td></td>
</tr>
<tr>
<td><strong>Visual Considerations</strong></td>
<td>Minor potential impact based on height increase of dunes over existing conditions.</td>
<td>Minor potential impact based on height increase of dunes over existing conditions.</td>
<td>Minor potential for impacts with vegetation removal.</td>
<td></td>
</tr>
<tr>
<td><strong>Recreation</strong></td>
<td>Minor potential to affect recreation resources. Efforts for beach fill could be performed in tourism off-season.</td>
<td>Minor potential to affect recreation resources. Efforts for beach fill could be performed in tourism off-season.</td>
<td>Loss of access to one parking area, one ORV access, and two dirt roads to the sound.</td>
<td></td>
</tr>
<tr>
<td><strong>Significant Natural Heritage Areas (SNHA)</strong></td>
<td>0 acres</td>
<td>0 acres</td>
<td>45.96 acres</td>
<td>20.83 acres</td>
</tr>
<tr>
<td><strong>Protected Species1</strong></td>
<td>Minor potential temporary impact to sea turtles, but could be minimized if beach fill occurs outside of the nesting season. Minor potential temporary impact to piping plover and red knot during construction.</td>
<td>Minor potential temporary impact to sea turtles, but could be minimized if beach fill occurs outside of the nesting season. Minor potential temporary impact to piping plover and red knot.</td>
<td>Potential lighting impacts to sea turtles.</td>
<td></td>
</tr>
<tr>
<td><strong>Wetlands</strong></td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td>Potential impacts to wetlands west of NC 12.</td>
<td></td>
</tr>
<tr>
<td><strong>SAVs &amp; EFHs</strong></td>
<td>Potential temporary, localized impacts to EFH in offshore area associated with sand extraction from offshore sites. Potential impacts to EFH present in the surf zone sand placement areas.</td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td></td>
</tr>
</tbody>
</table>

1Protected species refers to species listed as threatened or endangered by the USFWS. NPS species refers to species that either are proposed for listing (Rufa red knot) or are species of high concern (American oyster catcher). Because of agency concern for these species, their impacts were considered in this evaluation.
Table 14. Comparison of 50-Year Alternatives

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>$194,750,000</td>
<td>$188,900,000</td>
<td>$234,950,000</td>
<td>$248,450,000</td>
</tr>
<tr>
<td><strong>Constructability</strong></td>
<td>Channel dredging to deliver pre-fabricated bridge components; top down construction; Potential timing constraints for certain construction activities during peak tourist season; New permanent easement outside existing easement would require permit from NPS</td>
<td>Channel dredging to deliver pre-fabricated bridge components; top down construction; Potential timing constraints for certain construction activities during peak tourist season. New permanent easement outside existing easement would require permit from NPS</td>
<td>Channel dredging to deliver pre-fabricated bridge components; top down construction; Potential timing constraints of certain construction activities during peak tourist season. New permanent easement outside existing easement would require permit from NPS</td>
<td>Concern about ability to detour traffic during construction. Concerns about completing all construction activities, including staging, within the existing easement; Potential timing constraints of certain construction activities during peak tourist season</td>
</tr>
<tr>
<td><strong>Travel Convenience</strong></td>
<td>Possible delays during construction.</td>
<td>Possible delays during construction.</td>
<td>Possible delays during construction.</td>
<td>Possible delays during construction.</td>
</tr>
<tr>
<td><strong>Need for Dredging</strong></td>
<td>Channel dredging for construction activity. 1,916,981 cy of sand needed (over 50 years), expected to come from existing dredging operations.</td>
<td>Channel dredging for construction activity. 111,187 cy of sand needed (over 50 years), expected to come from existing dredging operations.</td>
<td>Channel dredging for construction activity. 4,775,825 cy of sand needed (over 50 years), expected to come from existing dredging operations.</td>
<td>111,187 cy of sand needed (over 50 years), expected to come from existing dredging operations.</td>
</tr>
<tr>
<td><strong>Land Use</strong></td>
<td>62.21 acres of NPS land converted to road/bridge use.</td>
<td>59.66 acres of NPS land converted to road/bridge use.</td>
<td>59.56 acres of NPS land converted to road/bridge use.</td>
<td>Temporary land use changes due to new TCE needed outside the existing easement.</td>
</tr>
<tr>
<td><strong>Cultural Resources</strong></td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td>No change anticipated</td>
</tr>
<tr>
<td><strong>Bike &amp; Pedestrian</strong></td>
<td>Potential beneficial impact with use of 8-foot proposed shoulder</td>
<td>Potential beneficial impact with use of 8-foot proposed shoulder</td>
<td>Potential beneficial impact with use of 8-foot proposed shoulder</td>
<td>Potential beneficial impact with use of 8-foot proposed shoulder</td>
</tr>
<tr>
<td><strong>Section 4(f)</strong></td>
<td>Permanent incorporation of approximately 62 acres into new NC 12 easement; potential impact based on change in visual character.</td>
<td>Significant impact to views from beach and upland, less so for sound.</td>
<td>Permanent use of approximately 60 acres for new NC 12 easement.</td>
<td>Visual intrusion could be a constructive use of the Seashore. The final determination will be made by FHWA during the NEPA phase of the project. Potential for temporary use associated with temporary construction easement</td>
</tr>
<tr>
<td><strong>Visual Considerations</strong></td>
<td>Impact to views from Sound and upland, less impact from beach.</td>
<td>Impact to views from Sound and upland, less so for sound.</td>
<td>Minor impacts because of vegetation removal for new road construction.</td>
<td>Impact to views from beach and upland, less so for sound.</td>
</tr>
<tr>
<td><strong>Recreation</strong></td>
<td>Loss of access to one parking area, one ORV access, and two dirt roads to the sound.</td>
<td>Loss of access to one parking area, one ORV access, and two dirt roads to the sound.</td>
<td>Loss of access to one parking area, one ORV access, and two dirt roads to the sound.</td>
<td>Loss of access to one parking area, one ORV access, and two dirt roads to the sound.</td>
</tr>
<tr>
<td><strong>Significant Natural Heritage Areas (SNHA)</strong></td>
<td>32.53 acres</td>
<td>12.7 acres</td>
<td>68.31 acres</td>
<td>12.06 acres</td>
</tr>
<tr>
<td><strong>Protected Species</strong></td>
<td>Potential impact to sea turtles from proximity of construction activities.</td>
<td>Potential impact to sea turtles from proximity of construction activities.</td>
<td>Potential impact to sea turtles from proximity of construction activities.</td>
<td>Potential impact to sea turtles from construction lighting and vehicle headlights. Due to proximity to beach, potential to impact plover and red knot during construction.</td>
</tr>
<tr>
<td><strong>SAVs &amp; EFHs</strong></td>
<td>Potential shadow impacts to SAV habitat. Minor EFH impacts from shadowing.</td>
<td>No change anticipated</td>
<td>No change anticipated</td>
<td>No change anticipated</td>
</tr>
</tbody>
</table>

*Protected species refers to species listed as threatened or endangered by the USFWS. NPS species refers to species that either are proposed for listing (Rufa red knot) or are species of high concern (American oyster catcher). Because of agency concern for these species, their impacts were considered in this evaluation.
### Table 14. Comparison of 50 – Year Alternatives (concluded)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Cost</td>
<td>$41,600,000</td>
<td>$2,030,350,000</td>
<td>$2,148,600,000 (does not include new ferry terminal)</td>
</tr>
<tr>
<td>Constructability</td>
<td>Availability of continued sand resource; Easement from NPS may be needed to place sand within Seashore</td>
<td>Land and harbor space acquisition; dredging and related permitting; channel maintenance. Additional ferry vessels may be needed.</td>
<td>Land acquisition; dredging and related permitting; and channel maintenance. Additional ferry vessels may be needed.</td>
</tr>
<tr>
<td>Travel Convenience</td>
<td>No change anticipated</td>
<td>Longer ferry trip, increased travel time (1 hour 5 minutes).</td>
<td>Longer ferry trip, increased travel time (45 minutes).</td>
</tr>
<tr>
<td>Need for Dredging</td>
<td>4,279,000 cy of sand needed (over 50 years), expected to come from offshore sites.</td>
<td>Dredging will likely be necessary for the new ferry channel. This may disturb SAV and EFH.</td>
<td>Dredging will likely be necessary for the new ferry channel. This may disturb SAV and EFH.</td>
</tr>
<tr>
<td>Land Use</td>
<td>No change anticipated</td>
<td>4.5 acres of land converted to transportation use.</td>
<td>4.5 acres of land converted to transportation use.</td>
</tr>
<tr>
<td>Cultural Resources</td>
<td>No change anticipated</td>
<td>The expansion of the existing ferry terminal could have potential impacts to the Ocracoke Historic District, depending on design.</td>
<td>No change anticipated</td>
</tr>
<tr>
<td>Bike &amp; Pedestrian</td>
<td>No change anticipated</td>
<td>If the ferry terminal is relocated and NC 12 north of the new terminal is not maintained, could impact bike and pedestrian use of northern Ocracoke Island.</td>
<td>No change anticipated</td>
</tr>
<tr>
<td>Section 4(f)</td>
<td>Permanent use likely because berm and dune nourishment would be outside of the existing NC 12 easement.</td>
<td>Access to a 4(f) site would change, since NC 12 would no longer pass through Seashore.</td>
<td>Permanent use of approximately 4.5 acres north of new terminal for new transportation facility. Access changes to Seashore expected with new terminal.</td>
</tr>
<tr>
<td>Visual Considerations</td>
<td>Minor potential to impact based on height increase of dunes over existing conditions in some lower dune areas</td>
<td>Additional ferry infrastructure could cause a moderate change in visual character. Access changes to Seashore expected with new terminal.</td>
<td>New ferry terminal could be viewed from NC 12 and could cause moderate changes to views from the Sound</td>
</tr>
<tr>
<td>Socio Economic</td>
<td>No change anticipated</td>
<td>Longer ferry routes could potentially affect delivery times and costs for goods and services; Depending on whether NC 12 is maintained north of the ferry terminal, public access could be lost to parts of the Seashore.</td>
<td>Longer ferry routes could potentially affect delivery times and costs for goods and services. Depending on how much of NC 12 is maintained north of Ocracoke Village, public access could be lost to parts of the Seashore.</td>
</tr>
<tr>
<td>Significant Natural Heritage Areas (SNHA)</td>
<td>0 acres</td>
<td>0 acres</td>
<td>Unknown because exact location undetermined.</td>
</tr>
<tr>
<td>Protected Species 2</td>
<td>Minor potential to impact sea turtles, but impact minimized if beach fill occurs outside of the nesting season. Minor potential temporary impact to piping plover and red knot during construction.</td>
<td>No change.</td>
<td>Unknown for NCNHP impact. No impacts to sea turtle. Little potential for other NPS species impacts.</td>
</tr>
<tr>
<td>Wetlands</td>
<td>No change anticipated</td>
<td>No change.</td>
<td>Unknown because location is undetermined.</td>
</tr>
<tr>
<td>SAVs &amp; EFHs</td>
<td>Potential impacts to EFH present in the surf zone sand placement areas.</td>
<td>Dredging for new ferry route would potentially disrupt SAV and EFH habitats.</td>
<td>Dredging for new ferry route would potentially disrupt SAV and EFH habitats.</td>
</tr>
</tbody>
</table>

1Protected species refers to species listed as threatened or endangered by the USFWS. NPS species refers to species that either are proposed for listing (Rufa red knot) or are species of high concern (American oyster catcher). Because of agency concern for these species, their impacts were considered in this evaluation.
8.0 Summary of Agency Coordination

8.1 Merger Team Meetings

Aside from NCDOT, the following State and Federal agencies were included in the project Merger Team:

- Albemarle Regional Planning Organization (RPO)
- National Park Service (NPS)
- North Carolina Division of Water Resources (NCDWR)
- North Carolina Division of Coastal Management (NCDCM)
- National Marine Fisheries Service (NMFS)
- North Carolina State Historic Preservation Office (SHPO)
- North Carolina Wildlife Resources Commission (NCWRC)
- United States Army Corps of Engineers (USACE)
- Federal Highway Administration (FHWA)
- United States Environmental Protection Agency (USEPA)
- United States Fish and Wildlife Service (USFWS)

A project scoping meeting was held on May 8, 2014 with the Merger Team. The purpose of this meeting was to show the project to all Merger Team agencies and get their input prior to moving forward. Based on the meeting discussion, the concerns expressed by the agencies present included the following:

- USFWS expressed a preference that any nourishment activities occur outside of the nesting season for protected species known to use the area, including red knot, which is listed as threatened, and piping plover.

- USACE wanted assurance that they would be consulted along with the NPS when decisions start to be made about obtaining sand resources, stating that it would be best to make arrangements for permits with a lead time that considers the potential for regulatory delays and minimizes the need for “emergency actions.” USACE was concerned that beach fill would have the potential to impact sea turtle species if done during nesting season. USACE also commented that sand color would also be a concern because of species preferences in color.

- NCDCM and NMFS wanted to be assured that SAV would be considered in the project feasibility study.
NPS was concerned that sand resources will not be enough for the project because of competition from Dare and Hyde Counties, NCDOT and USACE. NPS was also concerned about wetland impacts, stating that no wetland banking opportunities exist on Ocracoke Island. NPS wants USACE to be involved in the sand resources discussion when sources are sought.

8.2 Individual Agency Coordination Meetings

During the development of this feasibility study, NCDOT held meetings with the National Park Service, Dare County and Hyde County officials.

A meeting was held with the National Park Service at NPS headquarters in Manteo. The April 22, 2014 meeting was to present the project and discuss items that would be important to NPS prior to moving forward. NPS expressed the following concerns at the meeting:

- Process for obtaining sand resources
- The viability of 50 year options
- Impacts to sea turtles, migratory birds and other species of concern.

A joint local officials meeting was held with officials from Dare and Hyde Counties on June 11, 2014 at the Dare County Government Offices in Manteo. The purpose of the meeting was to present the project and discuss items that would be important to local government officials. Local officials had few comments since project alternatives had not yet been determined. The local officials requested to be involved in decisions affecting Ocracoke Village, especially from an economic standpoint. They also had an interest in a rerouted ferry from Hatteras Island coupled with a local transit system.

Since the meeting with the Dare and Hyde County local officials in 2014, NCDOT completed *The Ocracoke-Hatteras Passenger Ferry Feasibility Study* (June 2016). The study recommends two 100-passenger ferries making eight round-trips a day between Hatteras and Ocracoke Village. It also recommends a $15 round-trip toll, as well as a transit loop run by Hyde County, to take visitors from the terminal through Ocracoke Village and to various island attractions, such as Ocracoke Lighthouse and the National Park Service’s Pony Pens.
9.0 **Next Steps**

If this project receives funding and is programmed in the STIP, the next step would be to initiate the NEPA process. Preliminary designs would be developed, a detailed impact assessment would be undertaken, and the information would be recorded in an environmental document. Factors to consider as the project advances to the NEPA study phase include:

**Short-Term Alternatives**

- Natural Environment
  - Beach/dune nourishment sources
  - Protected species impacts
  - Habitat modification
- Constructability
  - Easement requirements
  - Beach/dune nourishment volumes
  - Construction material transport to site, staging (especially for in-easement alternatives)
  - Durability through short-term timeframe
- Recreation
  - Section 4(f) applicability and impacts
  - Access maintenance during construction

**Long-Term Alternatives**

- Costs
  - Ferry acquisition and maintenance
  - New harbor facility development and maintenance
  - Channel development and maintenance
  - Long term nourishment costs
- Constructability
  - Construction methodology
  - Material transport requirements, construction staging within Seashore
  - Permit/ new easement requirements
- Nourishment
  - Costs of template nourishment maintenance
  - Continued availability of suitable sand sources
• Natural Environment
  o Essential Fish Habitat (EFH) and Submerged Aquatic Vegetation (SAV)

• Recreation and Access
  o Section 4(f)- access to NPS recreation facilities (if determined to be applicable)
  o Bike and pedestrian access
  o Off road vehicles (ORV)
  o Economic impact
    • Travel convenience

Investigations and studies that may need to be conducted include:
• Natural environment studies
• Economic impact studies
• Section 4(f) Evaluation
• Detailed sand sediment analysis
• Storm surge analysis to determine bridge height, design
• Offshore surveys to determine sand source availability if nourishment is considered a preferred alternative
• If ferry options are considered likely, studies to determine extent of dredging and potential for shoaling if ferry terminal is moved
• Shoreline studies to determine likelihood of a breach in the study area

If the project moves forward with federal funds, it is important to have an early coordination meeting with NPS and FHWA to determine the applicability of Section 4(f) as it relates to the Cape Hatteras National Seashore.

To help prepare for an emergency situation, potential options include: Stockpiling temporary bridges that can accommodate an appropriate set of spans. This would allow NCDOT to react swiftly in an emergency storm situation. Also, depending on the specific span length ranges of temporary bridges that may be required during the aftermath of a storm event, cored slab units could also be stockpiled for the purposes of constructing emergency temporary bridges.

Stockpiling precast prestressed concrete piles for the purposes of building the foundations for temporary bridges. This would also allow help prepare NCDOT in the event that a temporary bridge is needed during a storm event.
10.0 Works Cited


Conversation notes from NCDOT and PB’s National Park Service Coordination Meeting – in Manteo, NC on April 22, 2014.


NCDOT. Comprehensive Transportation Plan Hyde County. NCDOT, October 2012.


NCDOT. Deposition of Dredge Material at the Hatteras Inlet Ferry Terminal on Ocracoke Island, Hyde County, North Carolina. NCDOT, January 2003.

NCDOT. Essential Fish Habitat Assessment for the Emergency Fill Along Highway 12 in Rodanthe, Dare County, NC. NCDOT (2013).

NCDOT. NCDOT Bid Abstract for Solicitation WPM912-14-B-0004, NCDOT, May 19, 2014.


Traffic Estimate Methodology
Traffic Analysis

2014 Shoreline and Erosion Update

2010 Vulnerability Analysis Update
Traffic Analysis
1.0 Traffic Estimate Scenario Years and Inputs

1.1 Estimated Scenario Years

This traffic estimate is developed for present conditions, five year future conditions, and a future scenario terminating in 2040, which unlike the feasibility study’s 50 year horizon, is 28 years into the future. The reason for the differing horizons is that developing a 50 year estimate exceeds the limits for a standard traffic forecast.

1.2 Inputs

The traffic estimate for this study was developed using existing data. No tube counts or turning movements were performed. The inputs for the analysis include the following:

- Published population and housing data
- Existing average annual daily traffic (AADT)
- Peak hour design percentages
- Truck percentages
- Conversion factors for extrapolating summer traffic volumes
- Consideration of traffic and land use trends over the past 10 years

2.0 Trends and Data Review

In preparing this estimate of future volumes, multiple sources were examined including land use data, roadway traffic data, and ferry data sources.

2.1 Population and Land Use Data

Traffic volume increases result from population growth. Population growth is directly tied to land use development and tourism, if an area is a tourism-based economy. Given this, a review of historical, existing, and forecast population and land use on Ocracoke Island was conducted, with emphasis on peak tourism season numbers.

*Historical Population and Land Use*

Historical population and land use data were gathered from the US Census, Hyde County CAMA Core Land Use Plan (2008) (LUP), and interviews with local planners. This data is presented in the traffic report. This feasibility study summarizes key findings of the analysis. These findings include:

- **Population Growth** – Annual population growth rates between 1970 and 2010 fluctuated slightly, but averaged approximately 1.4 percent growth. Annual growth rates between 2000 and 2010 demonstrated higher growth, averaging approximately 2.1 percent.
- **Housing Unit Use and Growth** – There are currently 983 housing units on Ocracoke Island. Approximately 269 housing units are owner occupied, with the remainder presumably being rental properties. An analysis of the data indicated a decline in owner occupancy and an approximate 3.8 increase in rentals between 2000 and 2010.

**Projected Population and Land Use**

A review of data in the Hyde County LUP indicates the following for Ocracoke Island:

- **Population Growth** – The forecast annual growth rates between 2000 and 2030 show population increase, with an anticipated acceleration in growth between 2010 and 2030.

- **Housing Unit Growth** – Although housing unit growth is anticipated through 2030, the rate is expected to be slower than the pre-2010 timeframe. Hyde County planners indicated that development restrictions associated with environmental conditions (primarily wetlands) and the Cape Hatteras National Seashore substantially limit continued growth in the undeveloped areas in and around Ocracoke Village. Given this constraint, most growth will likely occur as the result of replacing and expanding older structures. However, since more than 65 percent of structures in Ocracoke Village are 50 years old or older, their replacement or expansion may also be limited by the potential for them to be designated as historic structures. Based on the land development restrictions and potential restrictions on structural replacements or expansions, it is reasonable to assume that a maximum annual increase in housing units of 0.5 percent may occur. This assumption is consistent with the Hyde County LUP.

### 2.2 Summer Peak Population

The summer season is the time of greatest population on Ocracoke Island. Summer weekends are the peak times for short term population increase. In general, the summer population makeup is approximately 90 percent tourists and 10 percent permanent residents (Hyde County LUP). Of the 90 percent tourist population, approximately 20 percent are overnight visitors and 70 percent are day trippers. Detailed data are presented in the traffic report. Key findings regarding the summer population include:

- **Seasonal Population Growth** – Similar to the growth of Ocracoke permanent residents, seasonal populations are anticipated to grow. However, the anticipated 2010 to 2030 tourist population growth rate is less than the permanent population growth rate by 0.3 percent.

- **Statistical Distribution of Tourist Population** – Day trippers have historically made up the bulk of the seasonal population increase, and this trend is expected to continue. The growth rate of 0.7 percent for this population is anticipated to continue through 2030.
• **Day Trips** – The number of day trippers spikes on the summer weekends with tourists utilizing the ferry system to access Ocracoke Island, park in limited public parking locations or along NC 12, and enjoy the beach for the day. These volumes indicate that close to 2,000 cars already require parking at certain times (compared with less than 200 public parking spots provided in the National Seashore). The majority of parking on a summer weekend occurs on the beach and along NC 12.

### 2.3 Traffic Data

**Roadways**

As stated earlier, no traffic counts were performed. Additionally, since the project area is relatively remote, some data that would normally be available for urban areas is not available. This information includes published hourly and/or daily traffic counts and summer traffic counts. Instead, historical traffic data were reviewed for this study. Using the historical AADT records, it is possible to get an understanding of historical traffic growth rates. The locations of the NCDOT AADT map count stations used in this analysis are listed in Table -1 and shown graphically in Error! Reference source not found.1-1. The table indicates that:

- The highest AADT volume reported is on Ocracoke Island and occurs in Ocracoke Village near the Silver Lake Ferry terminal. No AADT count stations are located on the north end of Ocracoke Island. Because of this, historical data from the Hatteras Inlet Ferry were extrapolated to establish AADT on the northern part of Ocracoke Island on the segment of NC 12 near the Hatteras Inlet Ferry Terminal.

- NC 12 near the Hatteras Inlet Ferry Terminal on Ocracoke typically has less AADT than NC 12 near the Hatteras Inlet Ferry Terminal on Hatteras Island. This segment also shows a decreasing trend in the years following 2002.

- Traffic volumes on all links fluctuate each year. However, volumes on all sections of NC 12 have generally decreased over the past 10 years. The highest volumes were reported in 2002 (5,300 vpd). Since then, traffic volumes decreased at an annual rate of nearly 5 percent each year.
<table>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NC 12 Near Hatteras Inlet Ferry Terminal on Hatteras Island in Dare County (Count Station 26)</td>
<td>4,200</td>
<td>1,600</td>
<td>3,000</td>
<td>4,100</td>
<td>2,900</td>
<td>3,800</td>
<td>3,100</td>
<td>2,600</td>
<td>2,700</td>
<td>3,200</td>
<td>2,600</td>
</tr>
<tr>
<td>NC 12 just south and east of Ocracoke Village (Count Station 3402)</td>
<td>5,300¹</td>
<td>--</td>
<td>--</td>
<td>2,100</td>
<td>1,600</td>
<td>2,000</td>
<td>1,500</td>
<td>1,100</td>
<td>1,500</td>
<td>1,400</td>
<td>1,200</td>
</tr>
<tr>
<td>NC 12 within Ocracoke Village (Count Station 3411)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1,800</td>
<td>2,300</td>
<td>1,900</td>
<td>1,600</td>
<td>1,500</td>
<td>2,100</td>
<td>2,100</td>
</tr>
<tr>
<td>NC 12 Near Silver Lake Ferry Terminal in Ocracoke Village (Count Station 3410)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>3,000</td>
<td>3,400</td>
<td>3,000</td>
<td>2,500</td>
<td>2,500</td>
<td>--</td>
<td>2,800</td>
</tr>
<tr>
<td>NC 12 on Cedar Island (Count Station 3400)</td>
<td>1,000</td>
<td>880</td>
<td>730</td>
<td>900</td>
<td>740</td>
<td>750</td>
<td>520</td>
<td>700</td>
<td>830</td>
<td>570</td>
<td>600</td>
</tr>
</tbody>
</table>

Source: NCDOT AADT program. Notes: 1.) Largest AADT for years surveyed. General Notes: Grey shading indicates NC 12 segments on Ocracoke Island. Two dashes (--) indicate no data available.
**Ferry Data**

All vehicles accessing Ocracoke Island must use a ferry. Because of this, ferry data are a good indicator of traffic patterns. Daily ferry data were obtained to compare weekend and weekday traffic volumes. Monthly ferry traffic data were obtained from the NCDOT Ferry Division dating back to 1998 for the three ferry routes serving Ocracoke Island. The Hatteras Inlet Ferry and Cedar Island Ferry provide north-south linkage for NC 12. The AADT equivalents for these ferry routes are shown below in Table 2-2. Key findings from the ferry data include:

- The Hatteras Inlet Ferry carries the greatest volume of traffic to and from Ocracoke Island (75 percent and 80 percent during the summer). This usage peaked between the years 2001 and 2002.
- The Swan Quarter Ferry provides east-west access to mainland Hyde County and is the longest ferry route. It, therefore, has a lower percentage of tourism-related trips than the north-south ferries serving NC 12.
- Summer weekend traffic is not substantially higher than summer weekday traffic on Ocracoke Island. Wednesday and Thursday are high volume days for the ferries. Weeklong visitors tend to use the Hatteras Inlet Ferry for trips to Ocracoke Island returning the same day.
- During peak summer conditions, the Hatteras Inlet Ferry has high volume intervals during which not all vehicles can be served by the ferry.
- The Cedar Island Ferry and Swan Quarter Ferry have a familiar tourist pattern of weekly flows with the weekend volumes being greater due to the turnover of rental units.

**Table 2-2. Ferry Route AADT Equivalents**

<table>
<thead>
<tr>
<th>Ferry</th>
<th>Crossing</th>
<th>Connecting</th>
<th>Number of Summer Departures/Crossing Time</th>
<th>2012-2013 AADT Equivalent (vpd)</th>
<th>2012-2013 Summer (vpd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hatteras Inlet Ferry</td>
<td>Hatteras Inlet</td>
<td>NC 12 on Hatteras Island to NC 12 on Ocracoke Island.</td>
<td>30 per day per direction/55 minutes</td>
<td>735</td>
<td>1,486</td>
</tr>
<tr>
<td>Cedar Island Ferry</td>
<td>Pamlico Sound</td>
<td>NC 12 on Ocracoke Island to NC 12 on Cedar Island.</td>
<td>6 per day per direction/2 hours 15 minutes</td>
<td>150</td>
<td>244</td>
</tr>
</tbody>
</table>
3.0 Forecast Methodology

The historical land use, roadway, and ferry data were evaluated and compared with the Hyde County Land Use Plan to estimate both existing 2013 and future 2040 volumes. Due to unique issues specific to developing future traffic estimates in an area subject to high levels of seasonal tourist traffic, the methodology examined multiple issues not typical for a traditional roadway facility.

3.1 Existing Conditions

Establishing existing traffic volumes is a typically standard procedure because existing traffic counts are relatively consistent, both day-to-day and throughout the year. In an area with a high number of seasonal tourists, such as Ocracoke Island, traffic volumes vary significantly based on the time of year, day of the week, the economy, and weather. In addition to variances throughout the year, the annual AADT for NC 12 on Ocracoke Island varies considerably from year to year.

As shown in Table , the AADT on the project segment has fluctuated between 1,200 vpd and 2,100 vpd over the past ten years based upon Count Station 3402 south of the project study area. In addition, 2002 had a reported AADT of 5,300 vpd. To the north of the study area at the Hatteras Ferry terminal, vehicles using the ferry have fluctuated between approximately 700 vpd and 1,200 vpd, with 1,400 vpd recorded in 2002.

Based on a review of the growth rates on both NC 12 and the ferries, it was determined that the best indicator of the baseline volume would be the historical data from 2002 through 2013. The 2002-2013 range was selected because it provides at least 10 years of trends and because 2002 was the earliest year that highway AADT volumes were available to directly compare with the ferry-based AADT equivalents. The traffic analysis further determined that the 85th percentile value of 2,100 vpd is an appropriate estimate for the baseline AADT (see the full traffic report for a detailed description of the analysis). The 85th percentile value was used because it incorporates both the overall reduction in traffic volumes since 2002 (5,300 vpd on Sta. 3402), while also accounting for the fact that the infrastructure is already in place to serve a higher volume than observed since the 2008 recession.
3.2 Future Growth Rate

Despite some downward trends in growth rates for traffic and ferry use over the past 10 years, the land use and tourism infrastructure in place is capable of, and has in the past, supported much higher average annual daily traffic. Therefore, the historical traffic decline is not a prudent single assumption for future growth. Review of housing data (discussed in Section 0) showed a 2.3 percent annual increase in total housing units in Ocracoke Village between 2000 and 2010. However, it is recognized that this growth may be constrained.

Day trippers using the ferry system to access Ocracoke Island are the primary source of summer traffic volumes, both during the week and on weekends. Hyde County anticipates an increase to a maximum of 10,000 day trippers in 2030 (the future year indicated in the Hyde County Land Use Plan). On Saturday July 6, 2013 the ferry system carried 3,600 vehicles and 9,800 passengers. Given that some of the passengers are full time residents, it is estimated that there were 4,400 day trippers who both accessed and left the island (8,800 ferry passengers). If it is assumed that there will be 10,000 day trippers by 2030, an annual increase of 3.1 percent is required. Similarly, it was computed that for 8,000 day trippers in 2030, an annual growth rate of 2.2 percent was required. Based on a combination of these two growth rates, it is estimated that AADT would increase by 2.5 percent per year.
2014 Shoreline and Erosion Update
MEMORANDUM

To: Bill Rice
From: Moffatt & Nichol
Date: 26 June 2014
Subject: Update Shoreline and Erosion for Ocracoke Island

Under the current contracted effort, Moffatt & Nichol (M&N) provides an update to the vulnerability of the stretch of NC12 along Ocracoke Island. This memo provides a summary of the current work by M&N to update the existing shoreline based December 2013 aerials and projected 5-year and 50-year shorelines based on background erosions rates; a discussion of beach fill sources is also presented. This work builds on prior investigations, most recently documented by M&N in the 2010 Draft Vulnerability Analysis & Coastal Engineering Evaluations (VA&CEE).

2013 Shoreline Update

M&N loaded the December 2013 aerial photography into ArcMap and digitized the shoreline, defined by the wet/dry line, at a scale of 1:1,000 (NAD83 US ft). Table 1 identifies the setback distance measured at each of the transects based on the 2013 aerials and compared this shoreline to the shoreline established by the 2009 cross-section surveys presented in the 2010 Vulnerability Analysis & Coastal Engineering Evaluations (VA&CEE). It should be noted that the 2009 shoreline was based on the surveyed Mean High Water Line (MHWL).

The estimated setback distance from the shoreline to the road centerline is most notably changed at stations 585 and 605 where there has been 118 ft and 55 ft of shoreline recession. As identified in the VA&CEE, this reach of the roadway (specifically at station 605) is the most vulnerable to damage and requires regular maintenance to rebuild a protective dune.
Table 1. Setback Distance from the Road Centerline

<table>
<thead>
<tr>
<th>Station</th>
<th>2009 Setback Distance (ft)</th>
<th>2013 Setback Distance (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430</td>
<td>420</td>
<td>397</td>
</tr>
<tr>
<td>475</td>
<td>384</td>
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<td>565</td>
<td>226</td>
<td>197</td>
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<td>585</td>
<td>216</td>
<td>98</td>
</tr>
<tr>
<td>605</td>
<td>124</td>
<td>69</td>
</tr>
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<td>620</td>
<td>145</td>
<td>132</td>
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<td>650</td>
<td>251</td>
<td>163</td>
</tr>
<tr>
<td>685</td>
<td>421</td>
<td>331</td>
</tr>
</tbody>
</table>

Figure 1 and Figure 2 illustrate the cross-section as surveyed at stations 585 and 605 in 2009 (VA&CEE, Draft 2010).

Figure 1. Station 585 cross-section survey performed in 2009
Projected 5 Year and 50 Year Shorelines

Ten survey transects were used as the basis for the 2010 Draft VA&CEE analysis. These transects were imported into ArcMap to define the extents of the project area and the midpoint in between adjacent transects was determined. The midpoint on either side of each transect was used to define the extents for which the erosion rate for that transect was applied. The background erosion rates previously calculated by Professor Overton of North Carolina State University as identified in the Draft VA&CEE (M&N, 2010) were used to approximate the amount of erosion that would occur in 5 years and 50 years (Table 2).

Spatially, the segment of the shoreline to which the erosion rate for each transect was applied (defined by the midpoints on either side of the transect) was shifted landward for both the 5 year and 50 year time periods. The individual segments were then connected at each midpoint location to form a single predicted shoreline position for the 5 year and 50 year time periods. Figures 3 through 6 illustrate the digitized 2013 shoreline and the projected 2018 and 2063 shorelines.
Table 2. 5 Year and 50 Year Erosion Rate Analysis

<table>
<thead>
<tr>
<th>Station</th>
<th>Annual Erosion Rate (ft/yr)</th>
<th>5 Year Erosion (ft)</th>
<th>50 Year Erosion (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>2.9</td>
<td>14.5</td>
<td>145.0</td>
</tr>
<tr>
<td>475+00</td>
<td>5.2</td>
<td>26.0</td>
<td>260.0</td>
</tr>
<tr>
<td>505+00</td>
<td>6.0</td>
<td>30.0</td>
<td>300.0</td>
</tr>
<tr>
<td>540+00</td>
<td>7.5</td>
<td>37.5</td>
<td>375.0</td>
</tr>
<tr>
<td>565+00</td>
<td>8.2</td>
<td>41.0</td>
<td>410.0</td>
</tr>
<tr>
<td>585+00</td>
<td>8.6</td>
<td>43.0</td>
<td>430.0</td>
</tr>
<tr>
<td>605+00</td>
<td>8.6</td>
<td>43.0</td>
<td>430.0</td>
</tr>
<tr>
<td>620+00</td>
<td>9.4</td>
<td>47.0</td>
<td>470.0</td>
</tr>
<tr>
<td>650+00</td>
<td>8.3</td>
<td>41.5</td>
<td>415.0</td>
</tr>
<tr>
<td>685+00</td>
<td>3.1</td>
<td>15.5</td>
<td>155.0</td>
</tr>
</tbody>
</table>
Figure 3. Project area with projected shorelines
Figure 4. Shorelines – Southwest Reach
Figure 6. Shorelines – Northeast Reach
The following discussion of alternatives and dune and beach fill sources and strategies for mitigation of erosion is provided as an excerpt from the 2010 Draft VA&CEE.

Development of Alternatives

Engineering and planning mitigation strategies including beach nourishment, dune nourishment and roadway relocation to reduce the vulnerability of NC12 were reviewed. Key considerations for defining the specific engineering alternatives included: guidelines by the National Parks Service (NPS), the potential impact to natural resources, the availability of sand resources and anticipated costs for implementation.

The project area lies within the Cape Hatteras National Seashore. Therefore NPS guidelines for emergency roadway repair were taken into consideration. NPS guidelines do not allow for a traditional “beach nourishment” project. The guidelines identify an acceptable emergency fill template with: the maximum crest elevation at +10 ft NAVD 88, a maximum width of 10 ft at the crest; the landward and seaward slopes are identified as 5:1 and 3:1 respectively and the material be placed above MHW. However, based on prior investigations by Moffatt & Nichol (2003, 2004) this template yields minimal benefit for roadway protection. Therefore an attempt is made to define alternatives which afford protection to NC12 while adhering to the spirit of the NPS guidelines.

With consideration to the above, the following alternatives were defined for evaluation and are further described below:

- **Alternative 1: Baseline (Do Nothing)**
- **Alternative 2: Large Scale Beach Nourishment**
- **Alternative 3: Small Scale Dune Nourishment**
- **Alternative 4: Roadway Relocation and Dune Nourishment**

**Alternative 1: Baseline**

The Baseline scenario is, by definition, the “Do Nothing” alternative. The profiles of the existing conditions scenario were taken from the August of 2009 Ocracoke Island survey data provided by McKim & Creed. For this study, the nourishment cycle for the alternatives is assumed to be 4 years; therefore in order to assess the effectiveness of the alternatives, the baseline conditions after 4 years are also evaluated for comparison.

Figure 7 illustrates an example of the baseline conditions and after four years at station 605+00. The profile at the end of four years is translated landward 34.4 ft based on the average annual erosion rate (8.6 ft/year); after four years the frontal dune was predicted to erode as the shoreline recession occurs.
Alternative 2: Large Scale Beach Nourishment

The large scale beach nourishment scenario is defined to maintain a setback of 230 ft and withstand up to a 50-yr return period storm. The template includes nourishment of a dune and berm. As illustrated in Figure 8 the dune crest elevation was established at +15 ft NAVD 88, the landward and seaward slopes are identified as 5:1 and 3:1 respectively. The berm was set at an elevation of +4 ft NAVD88 and extended 230 ft from the center of the roadway to the 1 ft NAVD contour (MHW).

It was assumed that the beach nourishment project would be conducted at a 4 year interval. The template was designed following an iterative method with the application of SBEACH and EST models using the 34 tropical and the 18 extratropical storms. Iterations were performed to achieve a 50-yr return period for dune area loss above the 4 ft NAVD contour equal to 50 % of the total material. The profile at Station 605+00 was used to develop the design template (Figure 8); station 605+00 was selected because it is the most vulnerable profile and a limiting constraint in the nourishment design.

The minimum design template was compared to each of the existing profiles for the length of the project area. At locations where a large quantity of material exists above the 4 ft NAVD (Station 430+00, 475+00, 540+00, 565+00), no additional material is required to achieve the dune and berm template. Material would be required at profile 505+00 and from Stations 585+00 to 685+00.

Figure 7. Alternative 1 – Existing profile and after 4 years at Station 605+00
Table 3 identifies the quantity of material required to achieve the design template and pre-nourishment requirements to hold the existing shoreline in place. Pre-nourishment requirements are estimated as a function of the historical erosion rates. Based on prior studies, it is assumed that 1.37 cy of erosion occurs per 1 lf of shoreline recession. Additionally, a factor of 1.3 is applied to account for an anticipated accelerated rate of erosion post-nourishment.

To achieve the initial design template, approximately 226,600 cy would be required along 14,250 lf of shoreline (Station 490+00 to 522+50 and Station 575+00 to 685+00). In addition, to maintain the proposed template (or existing shoreline) in place for a 4 year period would require approximately 1,227,800 cy; under this scenario the pre-nourishment is assumed to be applied along the entire 25,500 lf of the project area to maintain the existing shoreline position.

![Figure 8. Alternative 2 - Beach Nourishment template at Station 605+00](image-url)
### Alternative 2 – Beach Nourishment Design Template and Pre-nourishment Requirements

<table>
<thead>
<tr>
<th>Station</th>
<th>Background Erosion rate (ft/yr)</th>
<th>Erosion After 4 years [ft]</th>
<th>Template Volume (cy)</th>
<th>Pre-Nourishment Volume (cy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>2.9</td>
<td>11.6</td>
<td>-</td>
<td>46,500</td>
</tr>
<tr>
<td>475+00</td>
<td>5.2</td>
<td>20.8</td>
<td>-</td>
<td>139,000</td>
</tr>
<tr>
<td>505+00</td>
<td>6.0</td>
<td>24.0</td>
<td>33,600</td>
<td>139,000</td>
</tr>
<tr>
<td>540+00</td>
<td>7.5</td>
<td>30.0</td>
<td>-</td>
<td>160,300</td>
</tr>
<tr>
<td>565+00</td>
<td>8.2</td>
<td>32.8</td>
<td>-</td>
<td>131,500</td>
</tr>
<tr>
<td>585+00</td>
<td>8.6</td>
<td>34.4</td>
<td>13,000</td>
<td>122,600</td>
</tr>
<tr>
<td>605+00</td>
<td>8.6</td>
<td>34.4</td>
<td>54,100</td>
<td>107,300</td>
</tr>
<tr>
<td>620+00</td>
<td>9.4</td>
<td>37.6</td>
<td>56,100</td>
<td>150,700</td>
</tr>
<tr>
<td>650+00</td>
<td>8.3</td>
<td>33.2</td>
<td>59,400</td>
<td>192,200</td>
</tr>
<tr>
<td>685+00</td>
<td>3.1</td>
<td>12.4</td>
<td>10,400</td>
<td>38,700</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>226,600</td>
<td>1,227,800</td>
</tr>
</tbody>
</table>

**Alternative 3: Small Scale Dune Nourishment**

The dune nourishment scenario was developed with consideration given to the NPS guideline that restricts the location of placed material to the dune and the portion of the beach profile above MHW. The dune geometry developed under Alternative 2 was also used as the template for this scenario (Figure 9). The dune crest elevation was established at +15 ft NAVD 88, a maximum width of 25 ft at the crest; the landward and seaward slopes are identified as 5:1 and 3:1.

The design template was superimposed onto the existing August 2009 survey profile to assess the volume of material required to construct the dune. At profiles 430+00, 475+00, 540+00, 565+00 and 685+00, no material is required. Additional material is required at stations 505+00, 585+00, 605+00, 620+00 and 650+00.

Table 4 identifies the required material above the 4 ft NAVD contour for the construction of the dune nourishment template in each station. The total volume needed to construct the dune for the dune nourishment scenario is 132,700 cy over 12,500 lf of shoreline (from Station 490+00 to 522+50 and 575+00 to 667+50). There would be adequate material available every 4 years to renourish the dunes, with approximately 220,000 cy estimated to be available from the NC Ferry dredging operations and an additional 80,000 cy of material available from USACE operations.
Figure 9. Alternative 3 - Dune Nourishment template at Station 605+00

Table 4. Alternative 3 – Dune Nourishment Design Template Requirements

<table>
<thead>
<tr>
<th>Station</th>
<th>Required Volume (cy/ft)</th>
<th>Required Volume (cy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>475+00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>505+00</td>
<td>10.46</td>
<td>34,000</td>
</tr>
<tr>
<td>540+00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>565+00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>585+00</td>
<td>12.92</td>
<td>13,000</td>
</tr>
<tr>
<td>605+00</td>
<td>19.44</td>
<td>32,400</td>
</tr>
<tr>
<td>620+00</td>
<td>9.84</td>
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<td>650+00</td>
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<td>22,400</td>
</tr>
<tr>
<td>685+00</td>
<td>-</td>
<td>8,900</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>132,700</td>
</tr>
</tbody>
</table>
**Alternative 4: Roadway Relocation and Dune Nourishment**

Under this scenario, NC 12 would be relocated. The proposed roadway alignment was developed by Parsons Brinkerhoff (PB) by shifting the roadway as far landward as possible, without encroaching on wetlands. Table 5 identifies the proposed roadway realignment setback; from St 565+00 to 620+00, the proposed alignment is 140 ft landward of the existing roadway.

<table>
<thead>
<tr>
<th>Station (ft)</th>
<th>Existing Setback (2013) (ft)</th>
<th>Proposed Setback w/ Roadway Relocation (ft)</th>
<th>Offset (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>397</td>
<td>447</td>
<td>50</td>
</tr>
<tr>
<td>475+00</td>
<td>357</td>
<td>492</td>
<td>135</td>
</tr>
<tr>
<td>505+00</td>
<td>266</td>
<td>406</td>
<td>140</td>
</tr>
<tr>
<td>540+00</td>
<td>271</td>
<td>411</td>
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</tr>
<tr>
<td>565+00</td>
<td>197</td>
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<td>140</td>
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<td>605+00</td>
<td>69</td>
<td>209</td>
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</tr>
<tr>
<td>620+00</td>
<td>132</td>
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<tr>
<td>650+00</td>
<td>163</td>
<td>291</td>
<td>128</td>
</tr>
<tr>
<td>685+00</td>
<td>331</td>
<td>451</td>
<td>120</td>
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</tbody>
</table>

In addition to relocation of the road, a dune would be constructed using a design template similar to that identified in Alternatives 2 & 3 (Figure 10). Figure 10 illustrates the location of the existing and proposed roadway realignments.

For the vulnerability analysis it is conservatively assumed that the additional protection afforded by the existing vegetated dunes would not be accounted for in the SBEACH model. For the simulations, the berm was extended (at an elevation of 4 ft NAVD) to intersect the existing profile (Figure 10).

The initial dune nourishment template in 2010 will require a total of approximately 490,000 cy. A portion of this material will come from the existing dunes (non-vegetated). The additional material would be provided from USACE and NCDOT dredging operations (as noted above, approximately 300,000 cy is available every four years). Every four years the dunes will be rebuilt with material from USACE and NCDOT dredging operations.
Figure 10. Alternative 4 - Roadway relocation and Dune Nourishment profile at Station 605+00

Table 6. Alternative 4 Roadway Relocation – Required Volume (above 4 ft NAVD)

<table>
<thead>
<tr>
<th>Station</th>
<th>Required Volume (cy/ft)</th>
<th>Required Volume (cy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>17.79</td>
<td>40,100</td>
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<td>475+00</td>
<td>30.63</td>
<td>114,900</td>
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<td>505+00</td>
<td>6.61</td>
<td>21,500</td>
</tr>
<tr>
<td>540+00</td>
<td>9.79</td>
<td>29,400</td>
</tr>
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<td>565+00</td>
<td>20.82</td>
<td>46,900</td>
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<td>585+00</td>
<td>26.31</td>
<td>52,700</td>
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<td>605+00</td>
<td>23.41</td>
<td>41,000</td>
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<td>620+00</td>
<td>16.85</td>
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<td>650+00</td>
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<td>48,500</td>
</tr>
<tr>
<td>685+00</td>
<td>32.33</td>
<td>56,600</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32.33</strong></td>
<td><strong>489,600</strong></td>
</tr>
</tbody>
</table>
Dredging Operations - Potential Sand Resources

As previously documented by Moffatt & Nichol (May 2003), the dredging work of the existing channel between the ferry terminals at Ocracoke and Hatteras Islands and crossing Hatteras Inlet, results in a potential source of sediment which is close to the study area. The USACE is responsible for dredging operations between the Hatteras ferry terminal and the Hatteras Inlet channel. The NCDOT Ferry Division is responsible for the remainder of the channel across Hatteras Inlet to the Ocracoke ferry terminal. Figure 11 shows the location of this channel and the division of USACE and NCDOT responsibility for maintenance.

Within the years from 2002 to 2009, a total of 135,000 cy was dredged from Hatteras Channel and Rollinson Channel and placed upland onto Cora June Island by the USACE. An additional approximately 30,000 cy of material was sidecast to either side of the channel during the seven year period (2002 – 2009) (USACE, 2009). Based on communication with USACE staff, the material historically dredged from Hatteras channel is beach compatible. A report by Ardaman and Associates (September 2009) documents the characteristics of material found in Rollinson channel; the material was generally characterized as silt and silty sand that is not beach compatible. Overall, dredging operations by the USACE yield on average approximately 80,000 cy of beach compatible material every four years.

**Figure 11. Dredging Extents - Hatteras/Ocracoke Ferry Channel**

The remainder of the Hatteras/Ocracoke ferry terminal channel is maintained by the NCDOT Ferry Division. Typically the ferry channel from Hatteras Inlet to the Ocracoke terminal is dredged annually; however, dredging quantities and frequencies have varied historically with the occurrence of storm events (Moffatt & Nichol, 2005). The material is dredged using a hydraulic dredge and is typically placed at an upland disposal site adjacent to the Ocracoke ferry terminal (Figure 12). Following major storm events resulting in significant overwash and loss of dunes, this upland material has typically been used to rebuild the small frontal dune system along the Ocracoke Island hotspot.
Figure 12. Upland Disposal Site Adjacent to Ocracoke Ferry Terminal

Figure 13 shows the total annual dredging quantities computed from weekly dredging reports. Based on communication with NCDOT (NCDOT, 2009), reliable dredging records from 2005 to 2010 were not available; records were incomplete or otherwise missing. The average annual dredging quantity from 1975-2004 was computed as approximately 55,000 cy.

Figure 13. NCDOT Ferry Division Historical Dredging Quantities at Hatteras Inlet
Nearshore/Offshore Sediment Sources

A sand resource study developed by the North Carolina Geological Survey (NCGS) (funded by the North Carolina Department of Transportation (NC DOT)), provides nearshore/offshore sediment availability information in the surroundings of the study area. The availability of newer, significantly higher resolution Compressed High Intensity Radar Pulse (CHIRP) seismic, side scan sonar, and bathymetric data were presented as having a potentially significant impact on a reinterpretation of the existing dataset and refining the previously defined potential sand resource target areas.

Twelve potential sand resource areas were identified from the geophysical data. South of Diamond Shoals, five target areas were identified for the fine-grained beaches of Ocracoke, one potential area for the medium-grained scenario applicable to Hatteras, and one compatible for both scenarios (Figure 14 and Table 7). The closest potential target area is Ocracoke 3, sited within 1 to 3 miles of the “hotspot”. Based on the NCGS analysis, approximately 45.8 Million cubic yards (Mcy) of beach compatible material would be available from the Ocracoke 3 area; the material is characterized as fine grain sands which is generally compatible with size sediments on the Ocracoke Island beaches.
Figure 14. Locations of Potential Target Areas Identified in the Southern Portion of the Study Area (NCGS, 2009).

Table 7. Summary Table for Potential Sand Resource Target Areas

<table>
<thead>
<tr>
<th>Potential Target Area</th>
<th>Water Depth Range (ft)</th>
<th>Beach Target</th>
<th>Grain Size</th>
<th>Volume (M cy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hatteras</td>
<td>34.8 - 59.4</td>
<td>Hatteras Island</td>
<td>Medium</td>
<td>113.3</td>
</tr>
<tr>
<td>Hatteras/Ocracoke</td>
<td>51.5 - 56.7</td>
<td>Hatteras &amp; Ocracoke Island</td>
<td>Medium &amp; Fine</td>
<td>6.9</td>
</tr>
<tr>
<td>Ocracoke 1</td>
<td>38.0 - 50.2</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>13.1</td>
</tr>
<tr>
<td>Ocracoke 2</td>
<td>48.5 - 62.3</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>7.9</td>
</tr>
<tr>
<td>Ocracoke 3</td>
<td>32.1 - 54.8</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>45.8</td>
</tr>
<tr>
<td>Ocracoke 4</td>
<td>42.6 - 55.8</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>44.6</td>
</tr>
<tr>
<td>Ocracoke 5</td>
<td>31.5 - 51.5</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>42.3</td>
</tr>
</tbody>
</table>
2010 Vulnerability Analysis Update
Update of Vulnerability Analysis and Coastal Engineering Evaluation for NC12 at Ocracoke Island

April 2010

Prepared for Parsons Brinkerhoff
EXECUTIVE SUMMARY

The objectives of this current study were to: (1) refine the definition of vulnerability and identify methods so that they may be consistently applied by NCDOT; (2) assess the vulnerability of NC12 on Ocracoke Island over a 15 year planning horizon; (3) identify alternatives for reducing the vulnerability of the NC 12 hotspot on Ocracoke Island and (4) evaluate the potential benefits and costs.

Vulnerability of NC12 was defined with respect to (a) maintenance requirements and (b) storm damage. Where the setback from the centerline of the road to MHW was less than 230 ft, the roadway was considered vulnerable to increased maintenance. Vulnerability with respect to storm damage was assessed based on the area of erosion above the +4 ft contour (between the edge of the roadway and the beach) for a series of storm events. The following alternatives were evaluated:

- **Alternative 1: Baseline (Do Nothing)**
- **Alternative 2: Large Scale Beach Nourishment**
- **Alternative 3: Small Scale Dune Nourishment**
- **Alternative 4: Roadway Relocation and Dune Nourishment**

Under existing conditions, the most vulnerable section of NC12 is along Station 585+00 to 620+00; with imminent damage pending along the reach from Station 605+00 to 620+00. Within 4 years, it is estimated that an additional 4500 ft of the roadway will become vulnerable to storm damage. If erosion were to go unmitigated, by 2025 there would be no setback at Stations 605+00 and 630+00; the length of roadway that would require frequent maintenance would increase to 14,500 ft.

Implementation of a Beach Nourishment project (Alternative 2) is a viable but expensive management strategy to protect NC12. To achieve the initial design template 226,600 cy would be placed along 14,250 ft of shoreline. Additionally, to maintain a 230 ft setback, approximately 704,000 cy of pre-nourishment would be required for the initial four year cycle. The total cost of the initial nourishment project is estimated to be between $11 million and $14 million. During the fifteen year planning horizon it is estimated that a total of approximately 4.5 Mcy of material (to maintain at a minimum the design template) would be required at a cost of $54 Million to $67.5 Million.

Dune Nourishment (Alternative 3) was evaluated following general guidelines of the NPS. Under this scenario, approximately 132,000 cy of sand would be placed to build the initial template at total cost of approximately $528,000 to $792,000. To the extent possible, the dune will be rebuilt every four years. This scenario affords only a limited amount of additional protection of NC12 (as compared to the baseline conditions).

If NC12 were relocated (Alternative 4) there would be a substantial reduction in risk of storm damage over the 15 year planning horizon. At the end of the 15 year period, NC12 will be vulnerable to frequent maintenance at Stations 585+00, 605+00 and 620+00; the vulnerability at these location after 15 years will be similar to what it is today under Baseline Conditions. The total cost for Alternative 4, roadway relocation and dune nourishment, was not evaluated as part of this assessment.
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1.0 BACKGROUND

The North Carolina Department of Transportation (NCDOT) sponsored this study to assess the vulnerability of NC12 highway along Ocracoke Island. This work builds on prior investigations by Moffatt & Nichol (May 2003, May 2004 and April 2005).

Prior evaluations completed by Moffatt & Nichol, revealed that a large portion of the NC 12 highway along Ocracoke Island was vulnerable to damage and/or maintenance from the impact of even a high frequency (2-Year) storm event. Approximately 5.4 miles (28,500 linear feet) of NC12 was characterized as a “hotspot” (Figure 1). A critical area of erosion was identified along 2.6 miles of shoreline (13,500 feet from Station 530+00 to 665+00). For this study the project area to be evaluated is defined by 25,500 lf of roadway extending from Station 430+00 to Station 685+00 (Figure 2).

![Figure 1. Location of Ocracoke Island Study Area](image)

In prior investigations Moffatt & Nichol (2003, 2004 and 2005) defined vulnerability and employed an approach that differed slightly from that adopted by Overton and Fisher (June 2005). Moffatt & Nichol defined vulnerability of the roadway to increased maintenance based on the setback of the +4ft contour from the roadway centerline (setback < 150 ft was considered vulnerable); vulnerability to storm damage was evaluated based on the area of dune loss above a specified contour (+3 ft NAVD or +4 ft NAVD). Overton and Fisher (June 2005) defined vulnerability in terms of a setback from the edge of pavement to the MHWL; no volumetric threshold was employed. Additionally, Overton and Fisher defined a design criteria for dune construction that was based on a 50% chance that 50% of the dune may be eroded during a 12 year period.
The objectives of this current study are to: (1) refine the definition of vulnerability and identify methods for evaluating vulnerability so that they may be consistently applied by NCDOT; (2) assess the vulnerability of the “hotspot” area of NC12 on Ocracoke Island through a 15 year planning horizon; (3) identify alternatives for reducing the vulnerability of the NC 12 hotspot on Ocracoke Island (including dune/beach nourishment and roadway relocation) and (4) evaluate the potential benefits and costs offered by each alternative.

2.0 DATA COLLECTION

Survey
Topographic and hydrographic surveys were performed along 10 transect lines in August of 2009 by McKim & Creed from Station 430+00 to 685+00 (Figure 2). The upland survey transects extended from approximately 200 feet landward of NC 12 seaward to an elevation of approximately -5 ft NAVD. An offshore hydrographic survey was completed, extending the profiles to a depth of approximately -30 ft NAVD. Upland and nearshore survey data was combined to develop profiles for each of the 10 stations as illustrated in Appendix A.

Figure 3 presents a comparison between the 2009 and 2003 surveys; as illustrated at Station 540+00, both the crest elevation and width of the frontal dune has been increased since 2003.
Update of Vulnerability Analysis and Coastal Engineering Evaluation for NC12 at Ocracoke Island

Figure 3. Survey Comparison 2004 and 2009 at Station 540+00

Setback
For this study the setback will be defined as the distance from where Mean High Water (MHW) intersects the shoreline to the center of the roadway (Figure 4). The profile at station 620+00 illustrates “typical” conditions of the project area with a limited setback (Figure 5); there is an artificially constructed dune with a crest elevation of 14 ft NAVD dropping to an elevation of approximately 8ft NAVD at a 3:1 slope.

Table 1 summarizes the setback distances from the roadway centerline to MHW based on the 2009 survey for all the profiles. Within the study area, the shoreline is closest to the highway along stations 605+00 to 620+00, where the existing setback is less than 150 feet.
Figure 4. Plan View Illustrating Setback of Roadway Centerline from the MHW at station 620+00

Figure 5. Example Profile at Station 620+00 Based on 2009 Survey
Table 1. Setback Distance based on 2009 Survey

<table>
<thead>
<tr>
<th>Transect</th>
<th>Distance (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>420</td>
</tr>
<tr>
<td>475+00</td>
<td>384</td>
</tr>
<tr>
<td>505+00</td>
<td>295</td>
</tr>
<tr>
<td>540+00</td>
<td>287</td>
</tr>
<tr>
<td>565+00</td>
<td>226</td>
</tr>
<tr>
<td>585+00</td>
<td>216</td>
</tr>
<tr>
<td>605+00</td>
<td>124</td>
</tr>
<tr>
<td>620+00</td>
<td>145</td>
</tr>
<tr>
<td>650+00</td>
<td>251</td>
</tr>
<tr>
<td>685+00</td>
<td>421</td>
</tr>
</tbody>
</table>

Background Erosion Rates
Historical shoreline erosion rates were evaluated for the project area by Professor Overton of North Carolina State University (2009). Prior estimates of the long term shoreline erosion rates along Ocracoke Island were updated by including the most recent shoreline delineation (2008) in the shoreline database. Table 2 summarizes the estimated average historical erosion rates for the project area. The highest erosion rates (8.6 to 9.4 feet/year) correspond to the area with the least setback distance from Station 585+00 to 620+00.

Table 2. Estimated Average Annual Erosion Rates

<table>
<thead>
<tr>
<th>Station</th>
<th>Erosion Annual rate (ft/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>2.9</td>
</tr>
<tr>
<td>475+00</td>
<td>5.2</td>
</tr>
<tr>
<td>505+00</td>
<td>6.0</td>
</tr>
<tr>
<td>540+00</td>
<td>7.5</td>
</tr>
<tr>
<td>565+00</td>
<td>8.2</td>
</tr>
<tr>
<td>585+00</td>
<td>8.6</td>
</tr>
<tr>
<td>605+00</td>
<td>8.6</td>
</tr>
<tr>
<td>620+00</td>
<td>9.4</td>
</tr>
<tr>
<td>650+00</td>
<td>8.3</td>
</tr>
<tr>
<td>685+00</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Current Dredging Operations - Potential Sand Resource
As previously documented by Moffatt & Nichol (May 2003), the dredging work of the existing channel between the ferry terminals at Ocracoke and Hatteras Islands and crossing Hatteras Inlet, results in a potential source of sediment which is close to the study area. The USACE is responsible for dredging operations between the Hatteras ferry terminal and the Hatteras Inlet channel. The NCDOT Ferry
Division is responsible for the remainder of the channel across Hatteras Inlet to the Ocracoke ferry terminal. Figure 6 shows the location of this channel and the division of USACE and NCDOT responsibility for maintenance.

Within the past seven years, a total of 135,000 cy was dredged from Hatteras Channel and Rollinson Channel and placed upland onto Cora June Island by the USACE. An additional approximately 30,000 cy of material was sidecast to either side of the channel during the seven year period (2002 – 2009) (USACE, 2009). Based on communication with USACE staff, the material historically dredged from Hatteras channel is beach compatible. A report by Ardaman and Associates (September 2009) documents the characteristics of material found in Rollinson channel; the material was generally characterized as silt and silty sand that is not beach compatible. Overall, dredging operations by the USACE yield on average approximately 80,000 cy of beach compatible material every four years.

![Figure 6. Dredging Extents – Hatteras/Ocracoke Ferry Channel](image)

The remainder of the Hatteras/Ocracoke ferry terminal channel is maintained by the NCDOT Ferry Division. Typically the ferry channel from Hatteras Inlet to the Ocracoke terminal is dredged annually; however, dredging quantities and frequencies have varied historically with the occurrence of storm events (Moffatt & Nichol, 2005). The material is dredged using a hydraulic dredge and is typically placed at an upland disposal site adjacent to the Ocracoke ferry terminal (Figure 7). Following major storm
events resulting in significant overwash and loss of dunes, this upland material has typically been used to rebuild the small frontal dune system along the Ocracoke Island hotspot.

Figure 7. Upland Disposal Site Adjacent to Ocracoke Ferry Terminal

Figure 8 shows the total annual dredging quantities computed from weekly dredging reports. Based on communication with NCDOT (NCDOT, 2009), reliable dredging records from 2005 to 2010 were not available; records were incomplete or otherwise missing. The average annual dredging quantity from 1975-2004 was computed as approximately 55,000 cy.

Figure 8. NCDOT Ferry Division Historical Dredging Quantities at Hatteras Inlet
Nearshore/Offshore Sediment Sources
A sand resource study developed by the North Carolina Geological Survey (NCGS) (funded by the North Carolina Department of Transportation (NC DOT)), provides nearshore/offshore sediment availability information in the surroundings of the study area. The availability of newer, significantly higher resolution Compressed High Intensity Radar Pulse (CHIRP) seismic, side scan sonar, and bathymetric data were presented as having a potentially significant impact on a reinterpretation of the existing dataset and refining the previously defined potential sand resource target areas.

Twelve potential sand resource areas were identified from the geophysical data. South of Diamond Shoals, five target areas were identified for the fine-grained beaches of Ocracoke, one potential area for the medium-grained scenario applicable to Hatteras, and one compatible for both scenarios (Figure 9 and Table 3). The closest potential target area is Ocracoke 3, sited within 1 to 3 miles of the “hotspot”. Based on the NCGS analysis, approximately 45.8 Million cubic yards (Mcy) of beach compatible material would be available from the Ocracoke 3 area; the material is characterized as fine grain sands which is generally compatible with size sediments on the Ocracoke island beaches.

Figure 9. Locations of Potential Target Areas Identified in the Southern Portion of the Study Area (NCGS, 2009).
Table 3. Summary Table for Potential Sand Resource Target Areas

<table>
<thead>
<tr>
<th>Potential Target Area</th>
<th>Water Depth Range (ft)</th>
<th>Beach Target</th>
<th>Grain Size</th>
<th>Volume (Mcy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hatteras</td>
<td>34.8 - 59.4</td>
<td>Hatteras Island</td>
<td>Medium</td>
<td>113.3</td>
</tr>
<tr>
<td>Hatteras/Ocracoke</td>
<td>51.5 - 56.7</td>
<td>Hatteras &amp; Ocracoke Island</td>
<td>Medium &amp; Fine</td>
<td>6.9</td>
</tr>
<tr>
<td>Ocracoke 1</td>
<td>38.0 - 50.2</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>13.1</td>
</tr>
<tr>
<td>Ocracoke 2</td>
<td>48.5 - 62.3</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>7.9</td>
</tr>
<tr>
<td>Ocracoke 3</td>
<td>32.1 - 54.8</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>45.8</td>
</tr>
<tr>
<td>Ocracoke 4</td>
<td>42.6 - 55.8</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>44.6</td>
</tr>
<tr>
<td>Ocracoke 5</td>
<td>31.5 - 51.5</td>
<td>Ocracoke Island</td>
<td>Fine</td>
<td>42.3</td>
</tr>
</tbody>
</table>

Water Levels and Storm Surge
For this study, the Cape Hatteras fishing pier tide gage (Station 8654400) served as the basis for water levels at the project site (Table 4).

Table 4. Tidal Elevations

<table>
<thead>
<tr>
<th>Datum</th>
<th>Feet Above MLLW</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN HIGHER HIGH WATER (MHHW)</td>
<td>3.46</td>
</tr>
<tr>
<td>MEAN HIGH WATER (MHW)</td>
<td>3.11</td>
</tr>
<tr>
<td>NORTH AMERICAN VERTICAL DATUM-1988 (NAVD)</td>
<td>2.06</td>
</tr>
<tr>
<td>MEAN SEA LEVEL (MSL)</td>
<td>1.61</td>
</tr>
<tr>
<td>MEAN TIDE LEVEL (MTL)</td>
<td>1.61</td>
</tr>
<tr>
<td>MEAN LOW WATER (MLW)</td>
<td>0.12</td>
</tr>
<tr>
<td>MEAN LOWER LOW WATER (MLLW)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Storm Data
The database of 34 tropical and 18 extratropical storms developed in prior investigations (Moffatt & Nichol 2003 and 2005) was employed for this study to evaluate erosion and vulnerability. Under prior investigations a time series of water level elevation, wave height and winds was compiled for each event. Summary characteristics for the storms are provided in Appendix B.
3.0 APPROACH

Definition of Vulnerability & Methods for Evaluation
For this study, vulnerability of NC12 was redefined with respect to (a) maintenance requirements and (b) storm damage as described below. It should be noted that the approach and the alternatives to be evaluated were revised from the original scope based on a meeting held between the NCDOT and its project consultants (NCDOT Team Meeting, November 2010).

Maintenance Requirements
Maintenance requirements are considered excessive when NC12 becomes vulnerable to repetitive overwash and sand deposits. Potential for increased maintenance is evaluated based on a single parameter – the setback distance of the roadway centerline from the MHWL. Consistent with previous studies done for NCDOT by Fisher and Overton (1991, 2005), when the setback is less than 230 ft the roadway is by definition considered vulnerable to increased maintenance. The projected shoreline position was evaluated based on the assumption that the average historical shoreline recession rate (Table 2) is representative of the erosion that will occur over the 15 year planning horizon.

Storm Damage
Vulnerability with respect to storm damage (damage to or undermining of the road) is evaluated following general methods outlined in prior studies by Moffatt & Nichol (2003, 2004 and 2005). Storm damage was assessed based on the area of erosion above the +4 ft contour (between the edge of the roadway and the beach) for a series of storm events. Volumes are computed before and after a storm in order to determine the material loss due to the wave climate generated by the storm. If the dune area loss above the 4 ft NAVD contour is more than 50% of the total material, then the profile is considered vulnerable to that storm. For this study it is assumed that an acceptable level of risk of storm damage is a 50-yr return period storm event.

The SBEACH (Storm-induced BEAch CHange) cross-shore sediment transport model was used to calculate erosion under storm water levels and wave action. SBEACH was run for 34 tropical and 18 extratropical storms as identified in Appendix B. Each storm was run for two tide conditions (high and low). Survey data, storm data (water elevation, wave height and winds) and sediment grain size characteristics were input variables in the SBEACH analysis. Assumptions for SBEACH model input parameters are identified in Appendix B.

The Empirical Simulation Technique (EST) model was applied to assess the recurrence interval (probability of erosion), following methods previously employed by Moffatt & Nichol (2003, 2004 and 2005). EST is a statistical analysis package used for simulating multiple life-cycle sequences of stochastic multivariate systems. The model employs a “boot-strap” technique in which random sampling of a finite length database is used to generate a larger database of events. The EST model uses input and response parameters to generate life-cycle simulations of events with the corresponding impacts. Input parameters were defined to include: (1) tide condition, (2) storm duration, (3) maximum storm surge elevation, (4) maximum significant wave height, (5) maximum wave period, (6) maximum water elevation on beach, and (7) maximum wave runup. The response parameters are based on the SBEACH...
model output. For this study, the response variables are defined as (a) dune area eroded above the 4 ft NAVD-88 contour and (b) the percentage of total material above the 4 ft NAVD-88 contour that eroded.

**Development of Alternatives**

Engineering and planning mitigation strategies including beach nourishment, dune nourishment and roadway relocation to reduce the vulnerability of NC12 were reviewed. Key considerations for defining the specific engineering alternatives included: guidelines by the National Parks Service (NPS), the potential impact to natural resources, the availability of sand resources and anticipated costs for implementation.

The project area lies within the Cape Hatteras National Seashore. Therefore NPS guidelines for emergency roadway repair were taken into consideration. NPS guidelines do not allow for a traditional “beach nourishment” project. The guidelines identify an acceptable emergency fill template with: the maximum crest elevation at +10 ft NAVD 88, a maximum width of 10 ft at the crest; the landward and seaward slopes are identified as 5:1 and 3:1 respectively and the material be placed above MHW. However, based on prior investigations by Moffatt & Nichol (2003, 2004) this template yields minimal benefit for roadway protection. Therefore an attempt is made to define alternatives which afford protection to NC12 while adhering to the spirit of the NPS guidelines.

With consideration to the above, the following alternatives were defined for evaluation and are further described below:

- Alternative 1: Baseline (Do Nothing)
- Alternative 2: Large Scale Beach Nourishment
- Alternative 3: Small Scale Dune Nourishment
- Alternative 4: Roadway Relocation and Dune Nourishment

**Alternative 1: Baseline**

The Baseline scenario is, by definition, the “Do Nothing” alternative. The profiles of the existing conditions scenario were taken from the August of 2009 Ocracoke Island survey data provided by McKim & Creed, as illustrated in Appendix A. For this study, the nourishment cycle for the alternatives is assumed to be 4 years; therefore in order to assess the effectiveness of the alternatives, the baseline conditions after 4 years are also evaluated for comparison.

Figure 10 illustrates an example of the baseline conditions and after four years at station 605+00. The profile at the end of four years is translated landward 34.4 ft based on the average annual erosion rate (8.6 ft/year); after four years the frontal dune will erode as the shoreline recession occurs.
Figure 10. Alternative 1 – Existing profile and after 4 years at Station 605+00

Alternative 2: Large Scale Beach Nourishment

The large scale beach nourishment scenario is defined to maintain a setback of 230 ft and withstand up to a 50-yr return period storm. The template includes nourishment of a dune and berm. As illustrated in Figure 11 the dune crest elevation was established at +15 ft NAVD 88, the landward and seaward slopes are identified as 5:1 and 3:1 respectively. The berm was set at an elevation of +4 ft NAVD88 and extended 230 ft from the center of the roadway to the 1 ft NAVD contour (MHW).

It was assumed that the beach nourishment project would be conducted at a 4 year interval. The template was designed following an iterative method with the application of SBEACH and EST models using the 34 tropical and the 18 extratropical storms. Iterations were performed to achieve a 50-yr return period for dune area loss above the 4 ft NAVD contour equal to 50 % of the total material. The profile at Station 605+00 was used to develop the design template (Figure 11); station 605+00 was selected because it is the most vulnerable profile and a limiting constraint in the nourishment design.

The minimum design template was compared to each of the existing profiles for the length of the project area. At locations where a large quantity of material exists above the 4 ft NAVD (Station 430+00, 475+00, 540+00, 565+00), no additional material is required to achieve the dune and berm template. Material would be required at profile 505+00 and from Stations 585+00 to 685+00.
Table 5 identifies the quantity of material required to achieve the design template and pre-nourishment requirements to hold the existing shoreline in place. Pre-nourishment requirements are estimated as a function of the historical erosion rates. Based on prior studies, it is assumed that 1.37 cy of erosion occurs per 1 lf of shoreline recession. Additionally, a factor of 1.3 is applied to account for an anticipated accelerated rate of erosion post-nourishment.

To achieve the initial design template, approximately 226,600 cy would be required along 14,250 lf of shoreline (Station 490+00 to 522+50 and Station 575+00 to 685+00). In addition, to maintain the proposed template (or existing shoreline) in place for a 4 year period would require approximately 1,227,800 cy; under this scenario the pre-nourishment is assumed to be applied along the entire 25,500 lf of the project area to maintain the existing shoreline position.

![Figure 11. Alternative 2 - Beach Nourishment template at Station 605+00](image)
Table 5. Alternative 2 –Beach Nourishment Design Template and Pre-nourishment Requirements

<table>
<thead>
<tr>
<th>Station</th>
<th>Background Erosion rate (ft/yr)</th>
<th>Erosion Rate After 4 years [ft]</th>
<th>Template Volume (cy)</th>
<th>Pre-Nourishment Volume (cy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>2.9</td>
<td>11.6</td>
<td>-</td>
<td>46,500</td>
</tr>
<tr>
<td>475+00</td>
<td>5.2</td>
<td>20.8</td>
<td>-</td>
<td>139,000</td>
</tr>
<tr>
<td>505+00</td>
<td>6.0</td>
<td>24.0</td>
<td>33,600</td>
<td>139,000</td>
</tr>
<tr>
<td>540+00</td>
<td>7.5</td>
<td>30.0</td>
<td>-</td>
<td>160,300</td>
</tr>
<tr>
<td>565+00</td>
<td>8.2</td>
<td>32.8</td>
<td>-</td>
<td>131,500</td>
</tr>
<tr>
<td>585+00</td>
<td>8.6</td>
<td>34.4</td>
<td>13,000</td>
<td>122,600</td>
</tr>
<tr>
<td>605+00</td>
<td>8.6</td>
<td>34.4</td>
<td>54,100</td>
<td>107,300</td>
</tr>
<tr>
<td>620+00</td>
<td>9.4</td>
<td>37.6</td>
<td>56,100</td>
<td>150,700</td>
</tr>
<tr>
<td>650+00</td>
<td>8.3</td>
<td>33.2</td>
<td>59,400</td>
<td>192,200</td>
</tr>
<tr>
<td>685+00</td>
<td>3.1</td>
<td>12.4</td>
<td>10,400</td>
<td>38,700</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>226,600</td>
<td>1,227,800</td>
</tr>
</tbody>
</table>

Alternative 3: Small Scale Dune Nourishment

The dune nourishment scenario was developed with consideration given to the NPS guideline that restricts the location of placed material to the dune and the portion of the beach profile above MHW. The dune geometry developed under Alternative 2 was also used as the template for this scenario (Figure 12). The dune crest elevation was established at +15 ft NAVD 88, a maximum width of 25 ft at the crest; the landward and seaward slopes are identified as 5:1 and 3:1.

The design template was superimposed onto the existing August 2009 survey profile to assess the volume of material required to construct the dune. At profiles 430+00, 475+00, 540+00, 565+00 and 685+00, no material is required. Additional material is required at stations 505+00, 585+00, 605+00, 620+00 and 650+00.

Table 6 identifies the required material above the 4 ft NAVD contour for the construction of the dune nourishment template in each station. The total volume needed to construct the dune for the dune nourishment scenario is 132,700 cy over 12,500 lf of shoreline (from Station 490+00 to 522+50 and 575+00 to 667+50). As identified in Section 2.0, there would be adequate material available every 4 years to renourish the dunes, with approximately 220,000 cy estimated to be available from the NC Ferry dredging operations and an additional 80,000 cy of material available from USACE operations.
Table 6. Alternative 3 – Dune Nourishment Design Template Requirements

<table>
<thead>
<tr>
<th>Station</th>
<th>Required Volume (cy/ft)</th>
<th>Required Volume (cy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>475+00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>505+00</td>
<td>10.46</td>
<td>34,000</td>
</tr>
<tr>
<td>540+00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>565+00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>585+00</td>
<td>12.92</td>
<td>13,000</td>
</tr>
<tr>
<td>605+00</td>
<td>19.44</td>
<td>32,400</td>
</tr>
<tr>
<td>620+00</td>
<td>9.84</td>
<td>22,000</td>
</tr>
<tr>
<td>650+00</td>
<td>5.03</td>
<td>22,400</td>
</tr>
<tr>
<td>685+00</td>
<td>-</td>
<td>8,900</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>132,700</td>
</tr>
</tbody>
</table>
**Alternative 4: Roadway Relocation and Dune Nourishment**

Under this scenario, NC 12 would be relocated. The proposed roadway alignment was developed by Parsons Brinkerhoff (PB) by shifting the roadway as far landward as possible, without encroaching on wetlands. Table 7 identifies the proposed roadway realignment setback; from St 565+00 to 620+00, the proposed alignment is 140 ft landward of the existing roadway.

**Table 7. Alternative 4 Roadway Relocation – Proposed Setback**

<table>
<thead>
<tr>
<th>Station</th>
<th>Existing Setback</th>
<th>Proposed Setback w/ Roadway Location</th>
<th>Offset</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>417</td>
<td>467</td>
<td>50</td>
</tr>
<tr>
<td>475+00</td>
<td>379</td>
<td>514</td>
<td>135</td>
</tr>
<tr>
<td>505+00</td>
<td>289</td>
<td>429</td>
<td>140</td>
</tr>
<tr>
<td>540+00</td>
<td>280</td>
<td>420</td>
<td>140</td>
</tr>
<tr>
<td>565+00</td>
<td>218</td>
<td>358</td>
<td>140</td>
</tr>
<tr>
<td>585+00</td>
<td>208</td>
<td>348</td>
<td>140</td>
</tr>
<tr>
<td>605+00</td>
<td>116</td>
<td>256</td>
<td>140</td>
</tr>
<tr>
<td>620+00</td>
<td>135</td>
<td>270</td>
<td>135</td>
</tr>
<tr>
<td>650+00</td>
<td>243</td>
<td>371</td>
<td>128</td>
</tr>
<tr>
<td>685+00</td>
<td>418</td>
<td>538</td>
<td>120</td>
</tr>
</tbody>
</table>

In addition to relocation of the road, a dune would be constructed using a design template similar to that identified in Alternatives 2 & 3 (Figure 13). Figure 14 illustrates the location of the existing and proposed roadway realignments.

For the vulnerability analysis it is conservatively assumed that the additional protection afforded by the existing vegetated dunes would not be accounted for in the SBEACH model. For the simulations, the berm was extended (at an elevation of 4 ft NAVD) to intersect the existing profile (Figure 13).

The initial dune nourishment template in 2010 will require a total of approximately 490,000 cy. A portion of this material will come from the existing dunes (non-vegetated). The additional material would be provided from USACE and NCDOT dredging operations (as noted above, approximately 300,000 cy is available every four years). Every four years the dunes will be rebuilt with material from USACE and NCDOT dredging operations.
Figure 13. Alternative 4 - Roadway relocation and Dune Nourishment profile at Station 605+00

Table 8. Alternative 4 Roadway Relocation – Required Volume (above 4 ft NAVD)

<table>
<thead>
<tr>
<th>Station</th>
<th>Required Volume (cy/ft)</th>
<th>Required Volume (cy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>17.79</td>
<td>40,100</td>
</tr>
<tr>
<td>475+00</td>
<td>30.63</td>
<td>114,900</td>
</tr>
<tr>
<td>505+00</td>
<td>6.61</td>
<td>21,500</td>
</tr>
<tr>
<td>540+00</td>
<td>9.79</td>
<td>29,400</td>
</tr>
<tr>
<td>565+00</td>
<td>20.82</td>
<td>46,900</td>
</tr>
<tr>
<td>585+00</td>
<td>26.31</td>
<td>52,700</td>
</tr>
<tr>
<td>605+00</td>
<td>23.41</td>
<td>41,000</td>
</tr>
<tr>
<td>620+00</td>
<td>16.85</td>
<td>38,000</td>
</tr>
<tr>
<td>650+00</td>
<td>14.91</td>
<td>48,500</td>
</tr>
<tr>
<td>685+00</td>
<td>32.33</td>
<td>56,600</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>489,600</td>
</tr>
</tbody>
</table>
Figure 14. Proposed Roadway Realignment
5.0 EVALUATION OF ALTERNATIVES

Alternative 1: Baseline Conditions
The vulnerability of NC12 to storm damage and maintenance was evaluated at each of the ten profiles for existing conditions and after four years of shoreline recession.

Maintenance Requirements

Table 9 identifies the existing setback of the MHW line and the projected setback based on continued shoreline recession (assuming historical erosion rate) over the 15 year planning horizon. The grey cells indicated that the roadway is vulnerable to frequent maintenance (Setback < 230 ft). Currently, the roadway is vulnerable from station 565+00 through Station 620+00. If recession continues at the historical rate, within 10 years, profiles at Stations 505+00, 540+00 and 650+00 will also become vulnerable to frequent maintenance.

Table 9. Alternative 1 Baseline Conditions - Vulnerability to Maintenance

<table>
<thead>
<tr>
<th>Station</th>
<th>Erosion</th>
<th>Setback Distance from Road to MHW Line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual rate</td>
<td>2010 (ft)</td>
</tr>
<tr>
<td></td>
<td>(ft/yr)</td>
<td></td>
</tr>
<tr>
<td>430+00</td>
<td>2.9</td>
<td>417</td>
</tr>
<tr>
<td>475+00</td>
<td>5.2</td>
<td>379</td>
</tr>
<tr>
<td>505+00</td>
<td>6.0</td>
<td>289</td>
</tr>
<tr>
<td>540+00</td>
<td>7.5</td>
<td>280</td>
</tr>
<tr>
<td>565+00</td>
<td>8.2</td>
<td>218</td>
</tr>
<tr>
<td>585+00</td>
<td>8.6</td>
<td>208</td>
</tr>
<tr>
<td>605+00</td>
<td>8.6</td>
<td>116</td>
</tr>
<tr>
<td>620+00</td>
<td>9.4</td>
<td>135</td>
</tr>
<tr>
<td>650+00</td>
<td>8.3</td>
<td>243</td>
</tr>
<tr>
<td>685+00</td>
<td>3.1</td>
<td>418</td>
</tr>
</tbody>
</table>

Storm Damage

Table 10 presents the results of the volumetric vulnerability analysis upon application of SBEACH and EST. The grey cells indicate that the road is going to be vulnerable to less than a 50-year storm event. Under existing conditions, at stations 505+00, 585+00, 605+00, 620+00, the road is vulnerable to storm damage (<50 year return period storm event). The portion of NC12 along Stations 605+00 and 620+00 is vulnerable to damage in a 2-Year or 3-Year storm event; with continued shoreline recession, in four years, damage to this section of the roadway will be imminent. After four years, NC12 will be vulnerable to storm damage at additional locations including profiles 565+00 and 650+00.
Table 10. Alternative 1 Baseline Conditions – Vulnerability to Storm Damage (Recurrence Interval)

<table>
<thead>
<tr>
<th>Station</th>
<th>Beginning of Cycle (Years)</th>
<th>After 4 years (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>475+00</td>
<td>85</td>
<td>75</td>
</tr>
<tr>
<td>505+00</td>
<td>38</td>
<td>18</td>
</tr>
<tr>
<td>540+00</td>
<td>150</td>
<td>120</td>
</tr>
<tr>
<td>565+00</td>
<td>78</td>
<td>44</td>
</tr>
<tr>
<td>585+00</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>605+00</td>
<td>3</td>
<td>&lt;1</td>
</tr>
<tr>
<td>620+00</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td>650+00</td>
<td>55</td>
<td>37</td>
</tr>
<tr>
<td>685+00</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

Figure 15 provides an example of pre and post storm conditions illustrating the simulated profile change at station 565+00 if a storm were to make landfall at low tide with characteristics (i.e. significant wave height, surge, duration) comparable to those experienced during Hurricane Isabel.

Figure 15. Alternative 1 -Existing Conditions pre and post storm profiles at Station 605+00
Alternative 2: Beach Nourishment

As described in Section 4.0 above, the beach and dune nourishment template for this alternative was designed following an iterative method of trial and error to achieve a minimum level of protection from storm damage and to minimize maintenance requirements. By design, the minimum setback will be 230 ft and at a minimum the risk of storm damage will be a 50-year return period event.

It was identified in Section 2.0 (Development of Alternatives) that 226,600 cy would be placed along 14,250 ft of shoreline to achieve the fill template. In addition, to maintain the proposed template in place for a 4 year period would require an additional 1,227,800 cy of pre-nourishment along 25,500 ft of shoreline. This is identified as Scenario A in Table 11.

To reduce pre-nourishment requirements the scenario could be modified. Rather than hold the existing or design template in place, pre-nourishment could be performed only as required to maintain a 230 ft setback. Where the roadway is not projected to be at risk within the 4 year nourishment cycle, pre-nourishment would not be performed. For the initial project cycle approximately 704,000 cy of pre-nourishment would be required over 11,000 ft (552+50 to 662+50); this is identified as Scenario B in Table 11. During subsequent cycles within the planning horizon, as the shoreline recedes, additional reaches will require pre-nourishment. The length of the shoreline requiring pre-nourishment requirement would increase; for example in 2018 and 2022, approximately 1M cy of pre-nourishment would be required over 17,750 ft (Table 11). A total of approximately 3.6 Mcy would be required in pre-nourishment over the planning horizon through 2025.

Table 11. Alternative 2: Beach Nourishment Design Template and Pre-nourishment Requirements

| Station | Initial Required Material for Template 2010 (cy) | Pre-Nourishment Volume | | | |
|---------|-----------------------------------------------|------------------------|---|---|---|---|
|         |                                               | Scenario A – Maintain Template | Scenario B – Minimum Vulnerability | Every 4 years (cy) | 2010 (cy) | 2014 (cy) | 2018 (cy) | 2022 (cy) |
|         |                                               | Every 4 years (cy) | 2010 (cy) | 2014 (cy) | 2018 (cy) | 2022 (cy) |
| 430+00 | -                                              | 46,500                | 0          | 0          | 0          | 0          |
| 475+00 | -                                              | 139,000               | 0          | 0          | 0          | 0          |
| 505+00 | 33,600                                          | 139,000               | 0          | 0          | 139,000    | 139,000    |
| 540+00 | -                                              | 160,300               | 0          | 160,300    | 160,300    | 160,300    |
| 565+00 | -                                              | 131,500               | 131,500    | 131,500    | 131,500    | 131,500    |
| 585+00 | 13,000                                          | 122,600               | 122,600    | 122,600    | 122,600    | 122,600    |
| 605+00 | 54,100                                          | 107,300               | 107,300    | 107,300    | 107,300    | 107,300    |
| 620+00 | 56,100                                          | 150,700               | 150,700    | 150,700    | 150,700    | 150,700    |
| 650+00 | 59,400                                          | 192,200               | 192,200    | 192,200    | 192,200    | 192,200    |
| 685+00 | 10,400                                          | 38,700                | 0          | 0          | 0          | 0          |
| Total  | 226,600                                         | 1,227,800             | 704,300    | 864,600    | 1,003,600  | 1,003,600  |
| Total 2010 - 2025 | 226,600                                         | 4.9 Mcy               | 3.6 Mcy    | | |
Figure 16 illustrates the predicted response of the beach nourishment template at Station 605+00 after construction if a storm comparable to Hurricane Isabel were to strike at low tide.

![Figure 16. Alternative 2 - Beach Nourishment pre and post storm profiles at Station 605+00](image)

**Figure 16. Alternative 2 - Beach Nourishment pre and post storm profiles at Station 605+00**

**Alternative 3: Dune Nourishment Maintenance**

The vulnerability of NC12 to increased maintenance is the same as the existing conditions scenario (Table 9).

**Storm Damage**

The vulnerability of the dune nourishment scenario was evaluated at two different time frames - (a) beginning of the dune nourishment (2010) and (b) after 4 years, at the end of the nourishment cycle. Table 12 presents the results of the storm damage analysis. Similar to the baseline scenario, at profiles 505+00, 585+00, 605+00, 620+00 the road is vulnerable to storm damage (<50 year). At Stations 605+00 and 620+00, immediately after nourishment, there is a likelihood that the road will be damaged in less than a 15-Year return period event; at this location at the end of the 4 year nourishment cycle there is little protection from storm damage. At the end of the cycle station 565+00 also becomes vulnerable to storm damage.
As shoreline recession continues, the setback will be reduced (Table 9). The size of the dune that may be rebuilt will therefore be limited based on the area available between NC12 right of way and the MHW line. To the extent possible, the dune will be rebuilt every four years.

Table 12. Alternative 3: Dune Nourishment – Vulnerability to Storm Damage (Recurrence Interval)

<table>
<thead>
<tr>
<th>Station</th>
<th>2010 (Years)</th>
<th>2014 (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>475+00</td>
<td>85</td>
<td>75</td>
</tr>
<tr>
<td>505+00</td>
<td>44</td>
<td>19</td>
</tr>
<tr>
<td>540+00</td>
<td>150</td>
<td>120</td>
</tr>
<tr>
<td>565+00</td>
<td>78</td>
<td>44</td>
</tr>
<tr>
<td>585+00</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>605+00</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>620+00</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>650+00</td>
<td>58</td>
<td>51</td>
</tr>
<tr>
<td>685+00</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

Figure 17 illustrates the simulated response if the dune nourishment template after 2010 were impacted by a storm comparable to Hurricane Isabel.

Figure 17. Alternative 3 - Dune Nourishment pre and post storm profiles at Station 605+00 (2010)
Alternative 4: Roadway relocation with Dune Nourishment

Table 13 presents the projected setback (assuming the historical erosion rate) and vulnerability to maintenance over the 15 year planning horizon. At the end of the 15 year period, Stations 585+00, 605+00 and 620+00, NC12 will be vulnerable to frequent maintenance; the vulnerability in 2015 will be similar to existing conditions at these locations.

Table 13. Alternative 4: Roadway Relocation - Vulnerability to Maintenance

<table>
<thead>
<tr>
<th>Station</th>
<th>Erosion</th>
<th>Distance from Road to MHW Line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual rate (ft/yr)</td>
<td>2010 (ft)</td>
</tr>
<tr>
<td>430+00</td>
<td>2.9</td>
<td>467</td>
</tr>
<tr>
<td>475+00</td>
<td>5.2</td>
<td>514</td>
</tr>
<tr>
<td>505+00</td>
<td>6.0</td>
<td>429</td>
</tr>
<tr>
<td>540+00</td>
<td>7.5</td>
<td>420</td>
</tr>
<tr>
<td>565+00</td>
<td>8.2</td>
<td>358</td>
</tr>
<tr>
<td>585+00</td>
<td>8.6</td>
<td>348</td>
</tr>
<tr>
<td>605+00</td>
<td>8.6</td>
<td>256</td>
</tr>
<tr>
<td>620+00</td>
<td>9.4</td>
<td>270</td>
</tr>
<tr>
<td>650+00</td>
<td>8.3</td>
<td>371</td>
</tr>
<tr>
<td>685+00</td>
<td>3.1</td>
<td>538</td>
</tr>
</tbody>
</table>

Storm Damage

The vulnerability to storm damage was evaluated post-construction (2010), and at every 4 years thereafter. As noted above, starting in 2014 it was assumed that the material available from dredging by the USACE and NCDOT would be placed to rebuild the dunes as may be required. The results are identified in Table 14. In 2010 under the profile at station 620+00, even after roadway relocation and dune construction, will be vulnerable to storm damage. Under this scenario, with the exception of the section of roadway at near profiles 605+00 and 620+00, the roadway will not be vulnerable to storm damage during the 15 year planning horizon.
Table 14. Alternative 4: Roadway Relocation - Vulnerability to Storm Damage (Recurrence Interval)

<table>
<thead>
<tr>
<th>Station</th>
<th>2010 (Years)</th>
<th>2014 (Years)</th>
<th>2018 (Years)</th>
<th>2022 (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430+00</td>
<td>62</td>
<td>61</td>
<td>58</td>
<td>56</td>
</tr>
<tr>
<td>475+00</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>505+00</td>
<td>77</td>
<td>75</td>
<td>75</td>
<td>72</td>
</tr>
<tr>
<td>540+00</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>565+00</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>585+00</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>605+00</td>
<td>83</td>
<td>57</td>
<td>41</td>
<td>25</td>
</tr>
<tr>
<td>620+00</td>
<td>43</td>
<td>30</td>
<td>24</td>
<td>13</td>
</tr>
<tr>
<td>650+00</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>94</td>
</tr>
<tr>
<td>685+00</td>
<td>150</td>
<td>144</td>
<td>140</td>
<td>140</td>
</tr>
</tbody>
</table>

Figure 18 illustrates the simulated response of the dune nourishment and roadway relocation project if it were impacted by a storm similar to Hurricane Isabel at low tide.

Figure 18. Roadway Relocation with Dune Nourishment Typical Cross Section – Pre and Post Storm Activity – Station 605+00 (After Construction)
6.0 OPINION OF PROBABLE COSTS FOR BEACH AND DUNE NOURISHMENT

An opinion of probable costs was developed for beach and dune nourishment scenarios (Alternatives 2 & 3) based on the volume of material to be placed and the potential borrow sources to be utilized for each alternative.

Alternative 2 consists of dredging nearshore borrow areas to obtain material for beach nourishment. It is assumed that the offshore dredging would utilize either a medium or large hopper dredge, given the potential haul distances. In developing the opinion of probable costs for Alternative 2, the planning level unit cost for beach nourishment is estimated to be $12 to $15 per cubic yard of material; this is based on similar projects which have been undertaken in the region. This assumes that a large scale (>500,000 cy) project will be undertaken and includes mobilization and demobilization.

For Alternative 2, to meet the initial design template, 226,600 cy would be placed along 14,250 lf of shoreline. Additionally, pre-nourishment material will be placed. If the pre-nourishment is limited to quantities required to maintain a 230 ft setback, approximately 704,000 cy would be required for the initial four year cycle. The total cost of the initial nourishment project is estimated to cost between $11 million to $14 million, including the additional costs for mobilization / demobilization. During the fifteen year planning horizon it is estimated that a total of approximately 4.5 Mcy of material would be required at a total estimated cost on the order of $54 Million to $67.5 Million, including the additional costs for mobilization / demobilization.

Under Alternative 3, approximately 132,000 cy of material from the stockpile adjacent to the Ocracoke Ferry Terminal to build the initial dune profile in 2010. The cost for transport and placement of the material along the critical area extent is estimated at approximately $6 to $8 per cubic yard of material, yielding a total cost of approximately $528,000 to $792,000 for the initial project. The amount of material required and cost for periodically rebuilding the dune throughout the planning period was not evaluated.

The total cost for Alternative 4, roadway relocation and dune nourishment, was not evaluated as part of this assessment.
7.0 SUMMARY AND CONCLUSIONS
For this study, vulnerability of NC12 was defined with respect to (a) maintenance requirements and (b) storm damage. Where the setback from the centerline of the road to MHW line was less than 230 ft, the roadway was considered vulnerable to increased maintenance. The projected shoreline position was evaluated based on the assumption that the average historical shoreline recession rate is representative of the erosion that will occur over the 15 year planning horizon. Vulnerability with respect to storm damage was assessed based on the area of erosion above the +4 ft contour (between the edge of the roadway and the beach). If the dune area loss above the 4 ft NAVD contour was more than 50 % of the total material, then the profile is considered vulnerable to that storm. For this study it was assumed that an acceptable level of risk is defined by a 50-yr return period storm event.

Key considerations for defining the specific engineering alternatives included: guidelines by the National Parks Service (NPS), the potential impact to natural resources, the availability of sand resources and anticipated costs for implementation. The following alternatives were evaluated:

- **Alternative 1: Baseline (Do Nothing)**
- **Alternative 2: Large Scale Beach Nourishment**
- **Alternative 3: Small Scale Dune Nourishment**
- **Alternative 4: Roadway Relocation and Dune Nourishment**

Table 15 and Table 16 summarize the vulnerability with respect to maintenance requirements. Table 17 presents the results of the storm damage vulnerability.

Under existing conditions, the most vulnerable section of NC12 is along Station 585+00 to 620+00 where the road is vulnerable to maintenance (<230 ft setback) and storm damage (<50 year). Within 4 years, it is estimated that an additional 4500 lf of the roadway will become vulnerable to storm damage (Table 17). If erosion were to go unmitigated (at rates greater than 9 ft/year), by 2025 there would be no setback at Stations 605+00 and 630+00; the length of roadway that would require frequent maintenance would increase to approximately 14,500 lf.

Implementation of a Large Scale Beach Nourishment Project (Alternative 2) is a viable but expensive management strategy to protect NC12. Under this scenario 226,600 cy would be placed along 14,250 lf of shoreline to achieve the initial design template. Additionally, to maintain a 230 ft setback, approximately 704,000 cy of pre-nourishment would be required for the initial four year cycle. The total cost of the initial nourishment project is estimated to cost between $11 million and $14 million. During the fifteen year planning horizon an additional 4.5 Mcy of material would be required, to maintain the design template, at an estimated cost of $54 Million to $67.5 Million.

Dune Nourishment (Alternative 3) was evaluated following general guidelines of the NPS. Under this scenario, approximately 132,000 cy of sand would be placed to build the initial template, equating to an average of 10.6 cy/lf at total cost of approximately $528,000 to $792,000. To the extent possible, the dune will be rebuilt every four years. The amount of material required and cost to rebuild the dune over
the planning period was not quantified as part of this study. This scenario affords only a limited amount of additional protection of NC12 (as compared to the baseline conditions).

If NC12 were relocated (Alternative 4) there would be a substantial reduction in risk of storm damage over the 15 year planning horizon. At the end of the 15 year period, NC12 will be vulnerable to frequent maintenance at Stations 585+00, 605+00 and 620+00; the vulnerability at these location after 15 years will be similar to what it is today under Baseline Conditions. Under this scenario, only the profiles at stations 605+00 and 620+00 will be vulnerable to storm damage in 2025. The total cost for Alternative 4, roadway relocation and dune nourishment, was not evaluated as part of this assessment.

Table 15. Summary of Vulnerability Based on Setback - 2010

<table>
<thead>
<tr>
<th>Station</th>
<th>Distance from Road to MHW Contour (year 2010)</th>
<th>Alt 1 - Base Line</th>
<th>Alt 2 - Beach Nourishment</th>
<th>Alt 3 - Dune Nourishment</th>
<th>Alt 4 - Roadway Relocation &amp; Dune Nourishment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(ft)</td>
<td>(ft)</td>
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Table 16. Summary of Vulnerability Based on Setback - 2025

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<tr>
<th>Station</th>
<th>Background Erosion Rate (ft/yr)</th>
<th>Distance from Road to MHW Contour (year 2025)</th>
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<td>95</td>
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Table 17. Summary of Vulnerability Based on Potential Volumetric Erosion

<table>
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<tr>
<th>Station</th>
<th>Alt 1 - Baseline Conditions</th>
<th>Alt 2 - Beach Nourishment</th>
<th>Alt 3 - Dune Nourishment</th>
<th>Alt 4 - Roadway Relocation &amp; Dune Nourishment</th>
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<tbody>
<tr>
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<td>Estimated Recurrence Interval</td>
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<td>2014 (years)</td>
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<td>505+00</td>
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<td>150</td>
<td>150</td>
<td>&gt; 50</td>
<td>150</td>
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7.0 REFERENCES


Fisher and Overton, June 2005. Bonner Bridge Replacement Parallel Bridge Corridor with NC12 Maintenance, Shoreline Change and Stabilization Analysis.


NCDOT Ferry Terminal, 2009. Communication with Norris Reed. of NC Ferry Division

NCDOT, November 2010. Meeting notes NC12 project team meeting. Participants included: NCDOT Project Manager Beth Smyre, Dr. Margery Overton and representatives from Moffatt & Nichol, PB, and URS.


APPENDIX A – AUGUST 2009 SURVEY
Station 430

Elevation (ft NAVD88)

Distance Offshore (ft)

August 2009  MHWL  NC12 Centerline
Station 475

Elevation (ft NAVD88) vs Distance Offshore (ft)

- August 2009
- MHWL
- NC12 Centerline
Station 605

Elevation (ft NAVD88) vs. Distance Offshore (ft)

- August 2009
- MHWL
- NC12 Centerline
Station 620

Elevation (ft NAVD88)

Distance Offshore (ft)

August 2009  MHWL  NC12 Centerline
APPENDIX B – SBEACH MODEL INPUT PARAMETERS
<table>
<thead>
<tr>
<th>Storm Name</th>
<th>HURDAT Storm #</th>
<th>Date</th>
<th>SBEACH Duration (hr)</th>
<th>Peak Storm Surge (ft NAVD)</th>
<th>Peak Wave Height (ft)</th>
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<tr>
<td>No Name</td>
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Table B-2. Extratropical Storms for SBEACH Analysis

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<th>Storm Date</th>
<th>Storm Class</th>
<th>Maximum Storm Surge Elevation (ft NAVD)</th>
<th>Maximum Significant Wave Height (ft)</th>
<th>SBEACH Duration (hr)</th>
<th>SBEACH Duration (days)</th>
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SBEACH input parameters

- Transport Rate Coefficient \( (m^4/N) = 1.75\times10^{-6} \)
- Overwash transport parameter = 0.005
- Coefficient for slope-dependent term \( (m^2/N) = 0.002 \)
- Transport rate decay coefficient multiplier = 0.5
- Water temperature in Degrees C = 20

**Grain Size Distribution**

- Profile 430 = 0.29 mm
- Profile 475 = 0.28 mm
- Profile 505 = 0.28 mm
- Profile 540 = 0.27 mm
- Profile 565 = 0.27 mm
- Profile 585 = 0.27 mm
- Profile 605 = 0.27 mm
- Profile 620 = 0.25 mm
- Profile 650 = 0.24 mm
- Profile 685 = 0.22 mm
ENIRONMENTAL SCREENING FORM (ESF)

Updated Sept 2015 per NPS NEPA Handbook

A. PROJECT INFORMATION

Project Title: Emergency Actions to Protect Southdock NCDOT facilities
PEPC Project Number: 86628
PMIS Number:
Project Type: Construction Permit (CONP)
Project Location:
   County, State: Hyde, North Carolina
Project Leader: Sabrina Henry

B. PROJECT DESCRIPTION

The North Carolina Department of Transportation (NCDOT) is in need to stabilize the point adjacent to the "hairpin" turn at Southdock, on the north end of Ocracoke Island. This area is eroding rapidly and needs to be protected to prevent the point from compromising the ferry basin and the stacking lanes which in turn could cause disruption of service or safety issue for the travelling public. This area is in need of emergency repair to protect and keep the integrity of the basin and ferry stacking lanes and allow continued safe travel of park visitors.

The NPS and its cooperators will see to provide a safe and healthful environment for visitors and employees and the NPS will work together with other federal, state and local agencies to carry out this responsibility (2006 Management Policies Sec 8.2.5). Director's Order 50C Public Risk Management Program also outlines the park's role in employee and public safety and risk management. If the area around the point is not protected and erodes away, this would eliminate a safe harbor for the NCDOT ferries while docked loading/unloading traffic. This could cause damage to the vessels, damage to traveling public's vehicles, and would increase the likelihood of injury to the public and crews onboard the vessels during strong wind events. Increased rough condition in the basin could damage marine assets such as ramp and gantries and dolphins which in turn could cause delays/cancellation of Ferry schedules. Ocracoke Island uses this ferry route to transport medical emergencies by ambulance. Additional fire and law enforcement service response to Ocracoke is quicker from Hatteras than from Swan Quarter (one hour verses three hours). NC Highway 12 continues from Hatteras Island through the Pamlico Sound to Ocracoke Island and both NCDOT Highway and Ferry Divisions are responsible for maintaining the facilities at the Southdock ferry terminal as part of the NC highway system.

Over the last several years this area has been continually eroding and due to constraints in state funding only minor temporary projects to the site have recently occurred (PEPC# 72104 & 79274). A long-term groin project is currently being analyzed in an environmental review process by contractors (Moffatt & Nichols) for NCDOT. However, until the NEPA can be completed and groins installed, a temporary solution to protect the area from further shoreline loss is needed immediately.

NCDOT, along with Moffatt & Nichols, are working on a proposed plan to install sheet pile to protect this critical area. The new sheet pile will be installed in the basin along the existing dilapidated sheet pile.
Also, NCDOT is proposing to install new sheet pile along the inlet side to protect the eroding dune line. Attached are the drawings for new sheet pile, an aerial view of the eroding area with proposed installment of new sheet pile and an emergency declaration to protect the existing point.

NCDOT is proposing to install approximately 990' of new sheet pile to protect the eroding area. NCDOT will need to grade the area between the existing sheet pile in the basin and the inlet side so a crane can be able to move along the point to install the new sheet pile all while on land. This area in the past has not had any environmental concerns with nesting shorebirds nor sea turtle nesting.

There will be no in water work. The sheet pile will be installed from land and will be placed as close to the high water mark as reasonably possible.

### C. RESOURCE IMPACTS TO CONSIDER:

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<th>Potential Issues &amp; Impacts</th>
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<td></td>
</tr>
<tr>
<td>Biological</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Wildlife and/or Wildlife Habitat</td>
<td></td>
<td></td>
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<tr>
<td>including terrestrial and aquatic species</td>
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<tr>
<td>Cultural</td>
<td>None</td>
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<tr>
<td>Archeological Resources</td>
<td></td>
<td></td>
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<tr>
<td>Cultural</td>
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<tr>
<td>Cultural Landscapes</td>
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<td>Prehistoric/historic structures</td>
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<td>Category</td>
<td>Impact</td>
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<tr>
<td>-----------------------------------------------</td>
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</tr>
<tr>
<td>Geological Geologic Processes</td>
<td>None</td>
<td></td>
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<tr>
<td>Lightscape Lightscapes</td>
<td>None</td>
<td></td>
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<tr>
<td>Other Human Health and Safety</td>
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<tr>
<td>Socioeconomic Land Use</td>
<td>None</td>
<td></td>
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<tr>
<td>Socioeconomic Minority and low-income populations, size, migration patterns, etc.</td>
<td>None</td>
<td></td>
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<tr>
<td>Socioeconomic Socioeconomic</td>
<td>None</td>
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<tr>
<td>Soundscape Soundscape</td>
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<td>Viewshed Viewsheds</td>
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<td>Visitor Use and Experience Recreation Resources</td>
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<tr>
<td>Visitor Use and Experience Visitor Use and Experience</td>
<td>None</td>
<td></td>
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<tr>
<td>Water Floodplains Potential</td>
<td>Issue: Facility within a 100 year floodplain</td>
<td></td>
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<tr>
<td>Water Marine or Estuarine Resources</td>
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<tr>
<td>Water Water Quality or Quantity</td>
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<td></td>
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<tr>
<td>Water Wetlands</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

**Impact:** Ignoring the importance of protecting this shoreline feature (which seems pretty great) the only floodplain element that could/should be considered is the impact to floodplain values, and I think those are pretty limited - probably just energy dissipation since it looks like there is no habitat to speak of. In terms of treatment options, sheet piling is probably one of the most problematic (from a floodplain value aspect), but it is only a temporary treatment, so its very short-term impacts could be reasonably dismissed and no SOF needed.
<table>
<thead>
<tr>
<th>Wilderness</th>
<th>None</th>
</tr>
</thead>
</table>

D. ESF ADDENDUM QUESTIONS:

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Notes</th>
</tr>
</thead>
</table>
Other Compliance/Consultations Form

Park Name: Cape Hatteras National Seashore
PEPC Project Number: 86628
Project Title: Emergency Actions to Protect Southdock NCDOT facilities
Project Type: Construction Permit (CONP)
Project Location:
  County, State: Hyde, North Carolina
Project Leader: Sabrina Henry

ESA

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1. Is project in 100- or 500-year floodplain or flash flood hazard area?</td>
<td>Y</td>
<td></td>
<td>Exempt from compliance with executive order: Yes Statement of findings approval date:</td>
</tr>
<tr>
<td>A.2. Is project in wetlands?</td>
<td>N</td>
<td></td>
<td>Exempt from compliance with executive order: Statement of findings approval date:</td>
</tr>
<tr>
<td>B. COE Section 404 permit needed?</td>
<td>Y</td>
<td></td>
<td>Issue Date: Expiration Date: Request Date:</td>
</tr>
</tbody>
</table>

Data Entered By: Tracy Ziegler Date: Mar 22, 2019

ESA Mitigations

No ESA mitigations are associated with this project.

Floodplains/Wetlands/§404 Permits
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Does this project occur in or adjacent to Designated, Recommended, Proposed, Study, Eligible, or Potential Wilderness?</td>
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<td></td>
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<td>D. Would the project or any of its alternatives adversely affect (directly or indirectly) Designated, Recommended, Proposed, Study, Eligible, or Potential Wilderness? (If Yes, Minimum Requirements Analysis required)</td>
<td></td>
<td></td>
</tr>
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<td>E. Does the project or any of its alternatives involve the use of any of the Wilderness Act Section 4(c) prohibited uses: commercial</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FloodPlains & Wetlands Mitigations

No FloodPlains & Wetlands mitigations are associated with this project.

Wilderness

NDCOT are responsible for getting a CAMA and 404 Permit for this project. Per 3/14/19 email from M.Martin WASO hydrologist: dismiss this action from further floodplain compliance since the only floodplain element that could/should be considered is the impact to floodplain values, and are pretty limited (energy dissipation only, no habitat). In terms of treatment options, sheet piling is probably one of the most problematic (from a floodplain value aspect), but it is only a temporary treatment, so its very short-term impacts could be reasonably dismissed.

Data Entered By: Sabrina Henry Date: Mar 18, 2019
enterprise, permanent road, temporary road, motor vehicles, motorized equipment, motorboats, landing of aircraft, mechanical transport, structure, or installation? (If Yes, Minimum Requirements Analysis required)

If the answer to D or E above is "Yes" then a Minimum Requirements Analysis is required. Describe the status of this analysis in the column to the right.

Other Information:

<table>
<thead>
<tr>
<th>Data Entered By:</th>
<th>Sabrina Henry</th>
<th>Date:</th>
<th>Mar 18, 2019</th>
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</thead>
</table>

Other Permits/Laws *Questions A & B are no longer used.*

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Wild and scenic river concerns exist?</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>D. National Trails concerns exist?</td>
<td></td>
<td>N</td>
</tr>
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<td>E. Air Quality consult with State needed?</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>F. Consistent with Architectural Barriers, Rehabilitation, and Americans with Disabilities Acts or not Applicable? (If N/A check Yes)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>G. Other:</td>
<td></td>
<td></td>
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</tbody>
</table>

Other Information:

<table>
<thead>
<tr>
<th>Data Entered By:</th>
<th>Tracy Ziegler</th>
<th>Date:</th>
<th>Mar 18, 2019</th>
</tr>
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</table>
Other Compliance/Consultations Form

**Park Name:** Cape Hatteras National Seashore  
**PEPC Project Number:** 86628  
**Project Title:** Emergency Actions to Protect Southdock NCDOT facilities  
**Project Type:** Construction Permit (CONP)  
**Project Location:**  
  - **County, State:** Hyde, North Carolina  
**Project Leader:** Sabrina Henry

**ESA**

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<thead>
<tr>
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<th>No</th>
<th>Details</th>
</tr>
</thead>
</table>
| A.1. Is project in 100- or 500-year floodplain or flash flood hazard area? | Y   | N  | Exempt from compliance with executive order: Yes  
Statement of findings approval date: |
| A.2. Is project in wetlands?                                  | N   | N  | Exempt from compliance with executive order:  
Statement of findings approval date: |
| B. COE Section 404 permit needed?                             | Y   | N  | Issue Date:  
Expiration Date:  
Request Date: |

**ESA Mitigations**

_No ESA mitigations are associated with this project._

Floodplains/Wetlands/§404 Permits

<table>
<thead>
<tr>
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| A.1. Is project in 100- or 500-year floodplain or flash flood hazard area? | Y   | N  | Exempt from compliance with executive order: Yes  
Statement of findings approval date: |
| A.2. Is project in wetlands?                                  | N   | N  | Exempt from compliance with executive order:  
Statement of findings approval date: |
| B. COE Section 404 permit needed?                             | Y   | N  | Issue Date:  
Expiration Date:  
Request Date: |
**FloodPlains & Wetlands Mitigations**

No FloodPlains & Wetlands mitigations are associated with this project.

**Wilderness**

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Other Information:

NDCOT are responsible for getting a CAMA and 404 Permit for this project. Per 3/14/19 email from M.Martin WASO hydrologist: dismiss this action from further floodplain compliance since the only floodplain element that could/should be considered is the impact to floodplain values, and are pretty limited (energy dissipation only, no habitat). In terms of treatment options, sheet piling is probably one of the most problematic (from a floodplain value aspect), but it is only a temporary treatment, so its very short-term impacts could be reasonably dismissed.
enterprise, permanent road, temporary road, motor vehicles, motorized equipment, motorboats, landing of aircraft, mechanical transport, structure, or installation? (If Yes, Minimum Requirements Analysis required)

If the answer to D or E above is "Yes" then a Minimum Requirements Analysis is required. Describe the status of this analysis in the column to the right.

Other Information:

| Data Entered By: | Sabrina Henry | Date: | Mar 18, 2019 |

Other Permits/Laws Questions A & B are no longer used.

<table>
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<tr>
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</tr>
<tr>
<td>G. Other:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other Information:

| Data Entered By: | Tracy Ziegler | Date: | Mar 18, 2019 |
ASSESSMENT OF ACTIONS HAVING AN EFFECT ON HISTORIC PROPERTIES

A. DESCRIPTION OF UNDERTAKING

1. Park: Cape Hatteras National Seashore

2. Project Description:

Project Name: Emergency Actions to Protect Southdok NCDOT facilities
Prepared by: Jami Lanier  Date Prepared: 03/18/2019  Telephone: 252-475-9021
PEPC Project Number: 86628
Locations:
    County, State: Hyde, NC
Describe project:
The North Carolina Department of Transportation (NCDOT) is in need to stabilize the point adjacent to the "hairpin" turn at Southdok, on the north end of Ocracoke Island. This area is eroding rapidly and needs to be protected to prevent the point from compromising the ferry basin and the stacking lanes which in turn could cause disruption of service or safety issue for the travelling public. This area is in need of emergency repair to protect and keep the integrity of the basin and ferry stacking lanes and allow continued safe travel of park visitors.

The NPS and its cooperators will see to provide a safe and healthful environment for visitors and employees and the NPS will work together with other federal, state and local agencies to carry out this responsibility (2006 Management Policies Sec 8.2.5). Director's Order 50C Public Risk Management Program also outlines the park's role in employee and public safety and risk management. If the area around the point is not protected and erodes away, this would eliminate a safe harbor for the NCDOT ferries while docked loading/unloading traffic. This could cause damage to the vessels, damage to traveling public's vehicles, and would increase the likelihood of injury to the public and crews onboard the vessels during strong wind events. Increased rough condition in the basin could damage marine assets such as ramp and gantries and dolphins which in turn could cause delays/cancellation of Ferry schedules. Ocracoke Island uses this ferry route to transport medical emergencies by ambulance. Additional fire and law enforcement service response to Ocracoke is quicker from Hatteras than from Swan Quarter (one hour verses three hours). NC Highway 12 continues from Hatteras Island through the Pamlico Sound to Ocracoke Island and both NCDOT Highway and Ferry Divisions are responsible for maintaining the facilities at the Southdok ferry terminal as part of the NC highway system.

Over the last several years this area has been continually eroding and due to constraints in state funding only minor temporary projects to the site have recently occurred (PEPC# 72104 & 79274). A long-term groin project is currently being analyzed in an environmental review process by contractors (Moffatt & Nichols) for NCDOT. However, until the NEPA can be completed and groins installed, a temporary solution to protect the area from further shoreline loss is needed immediately.

NCDOT, along with Moffatt & Nichols, are working on a proposed plan to install sheet pile to protect this critical area. The new sheet pile will be installed in the basin along the existing dilapidated sheet pile.

Also, NCDOT is proposing to install new sheet pile along the inlet side to protect the eroding dune line. Attached are the drawings for new sheet pile, an aerial view of the eroding area with proposed installment of new sheet pile and an emergency declaration to protect the existing point.
NCDOT is proposing to install approximately 990' of new sheet pile to protect the eroding area. NCDOT will need to grade the area between the existing sheet pile in the basin and the inlet side so a crane can be able to move along the point to install the new sheet pile all while on land. This area in the past has not had any environmental concerns with nesting shorebirds nor sea turtle nesting.

There will be no in water work. The sheet pile will be installed from land and will be placed as close to the high water mark as reasonably possible.

**Area of potential effects (as defined in 36 CFR 800.16(d))**
Ocracoke/Hatteras Ferry South Dock stacking lanes on NC12, Ocracoke Island.

**3. Has the area of potential effects been surveyed to identify historic properties?**

   No
   X Yes

   **Source or reference:** Cape Hatteras NS Historic Resource Study 1985; RASP Survey 2006

**4. Potentially Affected Resource(s):**

*Archeological Resources Affected:* No

*Historical Structures/Resources Affected:* No

*Cultural Landscapes Affected:* No

*Ethnographic Resources Affected:* No

**5. The proposed action will: (check as many as apply)**

   No Destroy, remove, or alter features/elements from a historic structure
   No Replace historic features/elements in kind
   No Add non-historic features/elements to a historic structure
   No Alter or remove features/elements of a historic setting or environment (inc. terrain)
   No Add non-historic features/elements (inc. visual, audible, or atmospheric) to a historic setting or cultural landscape
   No Disturb, destroy, or make archeological resources inaccessible
   No Disturb, destroy, or make ethnographic resources inaccessible
   No Potentially affect presently unidentified cultural resources
   No Begin or contribute to deterioration of historic features, terrain, setting, landscape elements, or archeological or ethnographic resources
   No Involve a real property transaction (exchange, sale, or lease of land or structures)
   Other (please specify):

**6. Supporting Study Data:**
(Attach if feasible; if action is in a plan, EA or EIS, give name and project or page number.)

**B. REVIEWS BY CULTURAL RESOURCE SPECIALISTS**
The park 106 coordinator requested review by the park's cultural resource specialist/advisors as indicated by check-off boxes or as follows:

[ X ] 106 Advisor
Name: Beth Byrd
Date: 03/18/2019

Check if project does not involve ground disturbance [ ]
Assessment of Effect: ___No Potential to Cause Effect ___X_No Historic Properties Affected ___No Adverse Effect ___Adverse Effect ___X_Streamlined Review

Recommendations for conditions or stipulations:
Doc Method: Streamlined Review (PA)
Streamlined Activity:
3. Repair/Resurfacing/Removal of Existing, Roads, Trails and Parking Areas

[ X ] Archeologist
Name: John Cornelison
Date: 03/20/2019

Check if project does not involve ground disturbance [ ]
Assessment of Effect: ___No Potential to Cause Effect ___No Historic Properties Affected ___X_No Adverse Effect ___Adverse Effect ___X_Streamlined Review

Recommendations for conditions or stipulations:
Doc Method: Streamlined Review (PA)
Streamlined Activity:
3. Repair/Resurfacing/Removal of Existing, Roads, Trails and Parking Areas

[ X ] Historical Landscape Architect
Name: Susan Hitchcock
Date: 03/25/2019

Check if project does not involve ground disturbance [ ]
Assessment of Effect: ___No Potential to Cause Effect ___X_No Historic Properties Affected ___No Adverse Effect ___Adverse Effect ___X_Streamlined Review

Recommendations for conditions or stipulations:
Doc Method: Streamlined Review (PA)
Streamlined Activity:
4. Health and Safety Activities

No Reviews From: Curator, Historical Architect, Historian, Other Advisor, Anthropologist

C. PARK SECTION 106 COORDINATOR'S REVIEW AND RECOMMENDATIONS

1. Assessment of Effect:

________ No Potential to Cause Effects
X No Historic Properties Affected

No Adverse Effect

Adverse Effect

2. Documentation Method:

[ ] A. Standard 36 CFR Part 800 Consultation
Further consultation under 36 CFR Part 800 is needed.

[ X ] B. Streamlined Review Under the 2008 Servicewide Programmatic Agreement (PA)
The above action meets all conditions for a streamlined review under section III of the 2008 Servicewide PA for Section 106 compliance.

Applicable Streamlined Review Criteria
(Specify 1-16 of the list of streamlined review criteria.)


[ ] C. Undertaking Related to Park Specific or Another Agreement
The proposed undertaking is covered for Section 106 purposes under another document such as a park, region or statewide agreement established in accord with 36 CFR 800.7 or 36 CFR 800.14.

[ ] D. Combined NEPA/NHPA Process
Process and documentation required for the preparation of an EA/FONSI or an EIS/ROD to comply with Section 106 is in accord with 36 CFR 800.8.c.

[ ] E. Memo to Project File

3. Consultation Information

SHPO Required: No
SHPO Sent: 
SHPO Received: 

THPO Required: 
THPO Sent: 
THPO Received: 

SHPO/THPO Notes:

Advisory Council Participating: No
Advisory Council Notes: 
Additional Consulting Parties: No

4. Stipulations and Conditions: Following are listed any stipulations or conditions necessary to ensure that the assessment of effect above is consistent with 36 CFR Part 800 criteria of effect or to avoid or reduce potential adverse effects.

5. Mitigations/Treatment Measures: Measures to prevent or minimize loss or impairment of historic/prehistoric properties: (Remember that setting, location, and use may be relevant.)

No Assessment of Effect mitigations identified,
6. Assessment of Effect Notes:

D. RECOMMENDED BY PARK SECTION 106 COORDINATOR:

Compliance Specialist:  
NHPA Specialist  
Jami Lanier  

Date: 4-17-19

E. SUPERINTENDENT'S APPROVAL

The proposed work conforms to the NPS Management Policies and Cultural Resource Management Guideline, and I have reviewed and approve the recommendations, stipulations, or conditions noted in Section C of this form.

Deputy Superintendent:  
Signature  
Mark Dowdle  

Date: 4/17/2019
Categorical Exclusion Form

Project: Emergency Actions to Protect Southdock NCDOT facilities
PEPC Project Number: 86628

Description of Action (Project Description):

The North Carolina Department of Transportation (NCDOT) is in need to stabilize the point adjacent to the "hairpin" turn at Southdock, on the north end of Ocracoke Island. This area is eroding rapidly and needs to be protected to prevent the point from compromising the ferry basin and the stacking lanes which in turn could cause disruption of service or safety issue for the travelling public. This area is in need of emergency repair to protect and keep the integrity of the basin and ferry stacking lanes and allow continued safe travel of park visitors.

The NPS and its cooperators will see to provide a safe and healthful environment for visitors and employees and the NPS will work together with other federal, state and local agencies to carry out this responsibility (2006 Management Policies Sec 8.2.5). Director’s Order 50C Public Risk Management Program also outlines the park’s role in employee and public safety and risk management. If the area around the point is not protected and erodes away, this would eliminate a safe harbor for the NCDOT ferries while docked loading/unloading traffic. This could cause damage to the vessels, damage to traveling public’s vehicles, and would increase the likelihood of injury to the public and crews onboard the vessels during strong wind events. Increased rough condition in the basin could damage marine assets such as ramp and gantries and dolphins which in turn could cause delays/cancellation of Ferry schedules. Ocracoke Island uses this ferry route to transport medical emergencies by ambulance. Additional fire and law enforcement service response to Ocracoke is quicker from Hatteras than from Swan Quarter (one hour versus three hours). NC Highway 12 continues from Hatteras Island through the Pamlico Sound to Ocracoke Island and both NCDOT Highway and Ferry Divisions are responsible for maintaining the facilities at the Southdock ferry terminal as part of the NC highway system.

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NCDOT is proposing to install approximately 990′ of new sheet pile to protect the eroding area. NCDOT will need to grade the area between the existing sheet pile in the basin and the inlet side so a crane can be able to move along the point to install the new sheet pile all while on land. This area in the past has not had any environmental concerns with nesting shorebirds nor sea turtle nesting.

There will be no in water work. The sheet pile will be installed from land and will be placed as close to the high water mark as reasonably possible.
Project Locations:

Location
County: Hyde       State: NC

Mitigation(s):

- The permittee is responsible to provide a revegetation plan to restore disturbed areas to the Special Use Coordinator for NPS approval.
- Permittee must present all final site plans including staging areas to Special Use Coordinator.
- Special Use Coordinator must notify the management team, RM staff and all park district staff in writing, at least 2 weeks in advance of project, when projected start and end dates of project are.
- The permittee is responsible to provide a pre-construction meeting (at least 2 weeks in advance) with the contractor, park management team, Safety Officer, Environmental Protection Specialist, Cultural Program Manager and district leads. Permittee must coordinate with Special Use Coordinator Carmen Panteleo (Carmen_panteleo@nps.gov) to set up meeting.
- Site plans need to be submitted to Environmental Protection Specialist, Sabrina Henry (Sabrina_henry@nps.gov) and approved prior to project implementation.
- Equipment used at the site shall be pressure cleaned and free of weeds, seed, debris, and mud to prevent the introduction and/or spread of exotic, invasive plants.
- Restore existing landscape and vegetation to original condition. Recontouring and revegetation of disturbed areas would take place following the project. Efforts would strive to reconstruct the natural contour, spacing, abundance, and diversity of native plant species using approved native species.
- Only NPS/park approved native plant species shall be used.
- Sheet piles are a temporary installation (~1 year) and will be removed upon NPS request. If sheet piles are required for long term protection then NCDOT is responsible for completing NEPA analysis to determine appropriate alternatives and long-term effects of shoreline hardening.

CE Citation: C.19 Construction or rehabilitation in previously disturbed or developed areas, required to meet health or safety regulations, or to meet requirements for making facilities accessible to the handicapped.

CE Justification:

2006 Management Policies Sec. 8.2.5 and DO 50C outlines NPS policy and guidance to provide for public and employee safety and reduce risk.

Decision: I find that the action fits within the categorical exclusion above. Therefore, I am categorically excluding the described project from further NEPA analysis. No extraordinary circumstances apply.

Signature
Deputy Superintendent: [Signature]  
Date: 4/17/2019  
Mark Dowdle
**Extraordinary Circumstances:**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Have significant impacts on public health or safety?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>B. Have significant impacts on such natural resources and unique geographic characteristics as historic or cultural resources; park, recreation, or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands (Executive Order 11990); floodplains (Executive Order 11988); national monuments; migratory birds; and other ecologically significant or critical areas?</td>
<td>No</td>
<td>Short term action. Mitigation will include that the sheet pile be removed within a year.</td>
</tr>
<tr>
<td>C. Have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources (NEPA section 102(2)(E))?</td>
<td>No</td>
<td>Alternative uses are the installation of groins in which separate NEPA is being conducted as a long-term protection measure.</td>
</tr>
<tr>
<td>D. Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks?</td>
<td>No</td>
<td>Short term action. Mitigation will include that the sheet pile be removed within a year.</td>
</tr>
<tr>
<td>E. Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects?</td>
<td>No</td>
<td>Several coastal environments in the OBGS contain sheet pile to protect shorelines from erosional processes.</td>
</tr>
<tr>
<td>F. Have a direct relationship to other actions with individually insignificant, but cumulatively significant, environmental effects?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>G. Have significant impacts on properties listed or eligible for listing on the National Register of Historic Places, as determined by either the bureau or office?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>H. Have significant impacts on species listed or proposed to be listed on the List of Endangered or Threatened Species, or have significant impacts on designated Critical Habitat for these species?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>I. Violate a federal, state, local or tribal law or requirement imposed for the protection of the environment?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>J. Have a disproportionately high and adverse effect on low income or minority populations (EO 12898)?</td>
<td>No</td>
<td></td>
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<tr>
<td>K. Limit access to and ceremonial use of Indian sacred sites on federal lands by Indian religious practitioners or adversely affect the physical integrity of such sacred sites (EO 130007)?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>L. Contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species (Federal Noxious Weed Control Act and Executive Order 13112)?</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
Categorical Exclusion Form

Project: Emergency Actions to Protect Southdock NCDOT facilities  
PEPC Project Number: 86628

Description of Action (Project Description):

The North Carolina Department of Transportation (NCDOT) is in need to stabilize the point adjacent to the "hairpin" turn at Southdock, on the north end of Ocracoke Island. This area is eroding rapidly and needs to be protected to prevent the point from compromising the ferry basin and the stacking lanes which in turn could cause disruption of service or safety issue for the travelling public. This area is in need of emergency repair to protect and keep the integrity of the basin and ferry stacking lanes and allow continued safe travel of park visitors.

The NPS and its cooperators will see to provide a safe and healthful environment for visitors and employees and the NPS will work together with other federal, state and local agencies to carry out this responsibility (2006 Management Policies Sec 8.2.5). Director's Order 50C Public Risk Management Program also outlines the park's role in employee and public safety and risk management. If the area around the point is not protected and erodes away, this would eliminate a safe harbor for the NCDOT ferries while docked loading/unloading traffic. This could cause damage to the vessels, damage to traveling public’s vehicles, and would increase the likelihood of injury to the public and crews onboard the vessels during strong wind events. Increased rough condition in the basin could damage marine assets such as ramp and gantries and dolphins which in turn could cause delays/cancellation of Ferry schedules. Ocracoke Island uses this ferry route to transport medical emergencies by ambulance. Additional fire and law enforcement service response to Ocracoke is quicker from Hatteras then from Swan Quarter (one hour versus three hours). NC Highway 12 continues from Hatteras Island through the Pamlico Sound to Ocracoke Island and both NCDOT Highway and Ferry Divisions are responsible for maintaining the facilities at the Southdock ferry terminal as part of the NC highway system.

Over the last several years this area has been continually eroding and due to constraints in state funding only minor temporary projects to the site have recently occurred (PEPC# 72104 & 79274). A long-term groin project is currently being analyzed in an environmental review process by contractors (Moffatt & Nichols) for NCDOT. However, until the NEPA can be completed and groins installed, a temporary solution to protect the area from further shoreline loss is needed immediately.

NCDOT, along with Moffatt & Nichols, are working on a proposed plan to install sheet pile to protect this critical area. The new sheet pile will be installed in the basin along the existing dilapidated sheet pile.

Also, NCDOT is proposing to install new sheet pile along the inlet side to protect the eroding dune line. Attached are the drawings for new sheet pile, an aerial view of the eroding area with proposed installment of new sheet pile and an emergency declaration to protect the existing point.

NCDOT is proposing to install approximately 990' of new sheet pile to protect the eroding area. NCDOT will need to grade the area between the existing sheet pile in the basin and the inlet side so a crane can be able to move along the point to install the new sheet pile all while on land. This area in the past has not had any environmental concerns with nesting shorebirds nor sea turtle nesting.

There will be no in water work. The sheet pile will be installed from land and will be placed as close to the high water mark as reasonably possible.
Project Locations:

Location
County: Hyde State: NC

Mitigation(s):

- The permittee is responsible to provide a revegetation plan to restore disturbed areas to the Special Use Coordinator for NPS approval.
- Permittee must present all final site plans including staging areas to Special Use Coordinator.
- Special Use Coordinator must notify the management team, RM staff and all park district staff in writing, at least 2 weeks in advance of project, when projected start and end dates of project are.
- The permittee is responsible to provide a pre-construction meeting (at least 2 weeks in advance) with the contractor, park management team, Safety Officer, Environmental Protection Specialist, Cultural Program Manager and district leads. Permittee must coordinate with Special Use Coordinator Carmen Pantele (Carmen_pantaleo@nps.gov) to set up meeting.
- Site plans need to be submitted to Environmental Protection Specialist, Sabrina Henry (Sabrina_henry@nps.gov) and approved prior to project implementation.
- Equipment used at the site shall be pressure cleaned and free of weeds, seed, debris, and mud to prevent the introduction and/or spread of exotic, invasive plants.
- Restore existing landscape and vegetation to original condition. Recontouring and revegetation of disturbed areas would take place following the project. Efforts would strive to reconstruct the natural contour, spacing, abundance, and diversity of native plant species using approved native species.
- Only NPS/park approved native plant species shall be used.
- Sheet piles are a temporary installation (~1 year) and will be removed upon NPS request. If sheet piles are required for long term protection then NCDOT is responsible for completing NEPA analysis to determine appropriate alternatives and long-term effects of shoreline hardening.

CE Citation: C.19 Construction or rehabilitation in previously disturbed or developed areas, required to meet health or safety regulations, or to meet requirements for making facilities accessible to the handicapped.

CE Justification:

2006 Management Policies Sec. 8.2.5 and DO 50C outlines NPS policy and guidance to provide for public and employee safety and reduce risk.

Decision: I find that the action fits within the categorical exclusion above. Therefore, I am categorically excluding the described project from further NEPA analysis. No extraordinary circumstances apply.

Signature
Deputy Superintendent: Mark Dowdle
Date: 4/17/2015
### Extraordinary Circumstances:

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</th>
<th>Notes</th>
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<tbody>
<tr>
<td>If implemented, would the proposal...</td>
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<td>removed within a year.</td>
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</tbody>
</table>
SUP Request: Emergency Action for Shoreline Protection at South dock on Ocracoke

5 messages

Henry, Sabrina <sabrina_henry@nps.gov>  
Wed, Mar 13, 2019 at 4:28 PM
To: NPS CAHA Management Team <caha_management_team@nps.gov>, Jami Lanier <jami_p_lanier@nps.gov>, Nicholas Sweeney <nicholas_sweeney@nps.gov>, William Thompson <william_p_thompson@nps.gov>, Edward Fuller <ed_fuller@nps.gov>, John Fox <john_fox@nps.gov>, Robert Kremser <robert_kremser@nps.gov>, Jin Prugsawan <jin_prugsawan@nps.gov>

All,

NCDOT has requested an emergency action to install sheet pile as a wall to protect the bulkhead of the South dock ferry basin from further shoreline erosion. Attached is the SUP application along with the conceptual drawing of the proposed structure. A long-term groin project is currently being analyzed in an environmental review process by contractors for NCDOT. However, in the meantime a temporary solution to protect the area from further shoreline loss is this proposed sheet pile wall.

If you have any questions or concerns please let me know by Friday March 15.

Sabrina S. Henry
Environmental Protection Specialist | National Park Service | Cape Hatteras NS | Fort Raleigh NHS | Wright Brothers NMEM | office: 252-475-9019 cell: 252-423-1541 | sabrina_henry@nps.gov

2 attachments

SUP Southdock Stacking Lanes.pdf  
1546K

Ocracoke_psh4_190313.pdf  
462K

Vandzura, Daniel <boone_vandzura@nps.gov>  
Wed, Mar 13, 2019 at 4:51 PM

https://mail.google.com/mail/u/0?ik=224d9d30ae&view=pt&search=all&permthid=thread-a%3Ar-6707265030794241672&almp=msgr-a%3Ar19323440... 1/3
I fully support this plan.

Boone Vandzura
Chief Ranger

Outer Banks Group - Cape Hatteras NS
Fort Raleigh NHS / Wright Brothers NM

1401 National Park Drive
Manteo, NC 27954
252-475-9010 office
252-475-8307 cell

Coming to the Beach? Watch the video “Break the Grip of the Rip” at: http://oceanoday.noaa.gov/ripcurrent/

Get Rip Current Forecast daily at: http://www.weather.gov/beach/mhx

Blizzard Merrill, Sarah <sarah_blizzard_merrill@nps.gov> Wed, Mar 13, 2019 at 4:51 PM
To: "Henry, Sabrina" <sabrina_henry@nps.gov>
Cc: "Pantaleo, Carmen" <carmen_pantaleo@nps.gov>, Dave Hallac <david_hallac@nps.gov>

Hi Sabrina,

Has NCDOT given you a proposed timeline? I didn’t see request dates in the application.

Carmen - I suggest giving them several extra weeks or a month or two beyond any requested timeline to take into account delays due to contracting, weather, etc.

Dave - if you haven’t, will you please share with Carmen the emergency declaration information?

Carmen - I suggest including some information about this emergency declaration in the permit and also saving any related documents in the permit folder for our administrative record. That way, we will be able to easily understand the circumstances of this permit in the future.

Thanks,

Sarah

Sarah Blizzard Merrill
Management Analyst | Outer Banks Group
Cape Hatteras NS | Fort Raleigh NHS | Wright Brothers NMEM
1401 National Park Dr. Manteo, NC 27954
Office: 252-475-9033
Mobile: 252-475-0685
Email: Sarah_Blizzard_Merrill@nps.gov

On Wed, Mar 13, 2019 at 4:28 PM Henry, Sabrina <sabrina_henry@nps.gov> wrote:

[Quoted text hidden]

Henry, Sabrina <sabrina_henry@nps.gov> Thu, Mar 14, 2019 at 8:55 AM
To: "Blizzard Merrill, Sarah" <sarah_blizzard_merrill@nps.gov>
Cc: "Pantaleo, Carmen" <carmen_pantaleo@nps.gov>, Dave Hallac <david_hallac@nps.gov>

https://mail.google.com/mail/u/0?ik=224d9d30e&view=pt&search=all&permthid=thread-a%3Ar-6707265030794241672&simp!={msg-a%3Ar19323440... 2/3
Sarah and Carmen,

Attached is the emergency declaration. I will be meeting with NCDOT tomorrow morning and find out more about the timeline and other project specifics. They still need to order the sheet pile so this installation won’t happen within the next week or so but as soon as they can get the material.

I will also put this project in PEPC so I will be sure to add Carmen to the IDT so he can track where we are at and for any mitigation/conditions identified for this action.

Sabrina

~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Sabrina S. Henry
Environmental Protection Specialist | National Park Service | Cape Hatteras NS | Fort Raleigh NHS | Wright Brothers NMEM | office: 252-475-9019 cell: 252-423-1541 |sabrina_henry@nps.gov

[Quoted text hidden]

03-13-2019 Declaration of Emergency Southdock_Ocracoke - Bid Waiver.pdf
330K

Pantaleo, Carmen <carmen_pantaleo@nps.gov> Thu, Mar 14, 2019 at 12:19 PM
To: "Henry, Sabrina" <sabrina_henry@nps.gov>
Cc: "Blizzard Merrill, Sarah" <sarah_blizzard_merrill@nps.gov>, Dave Hallac <david_hallac@nps.gov>

I contacted Lance and at this time he is waiting on how long the sheet pile will have to be and then see what the lead time will be to get it onsite. So, he currently can’t give us a start date until he has that information. He will keep us posted and updated once he gets that information. I mentioned to him that I will be in training next week and off-site and to contact Sabrina or Sarah if he has any updates.

Carmen Pantaleo
Special Park Uses Coordinator
Outer Banks Group
1401 National Park Drive
Manteo, NC 27954
Office: (252) 475-9034
Cell: (252) 473-7668

My hours are 8:00 - 4:30 Monday - Friday

FIND YOUR PARK

The three great essentials to achieve anything worth while are: Hard work, Stick-to-itiveness, and Common sense.
~Thomas A. Edison

[Quoted text hidden]
APPLICATION FOR Sporting Events/Special Events
Outer Banks Group
Cape Hatteras NS, Fort Raleigh NHS, and Wright Brothers NMEM
1401 National Park Drive
Manteo, NC 27954
(252) 473-2111

Please supply the information requested below. Attach additional sheets, if necessary, to provide required information. A nonrefundable processing fee of $200 must accompany this application unless the requested use is an exercise of a First Amendment right. You must allow sufficient time for the park to process your request; check with the park for guidelines. You will be notified of the status of the application and the necessary steps to secure your final permit. Your permit may require the payment of cost recovery charges and proof of liability insurance naming the United States of America an additional insured.

* Enter either a Social Security Number OR a tax ID number; we do not require both.

<table>
<thead>
<tr>
<th>Applicant Name</th>
<th>Company/Organization Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lance Winslow</td>
<td>NCDOT</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Social Security Number*</th>
<th>Tax Identification Number*</th>
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<table>
<thead>
<tr>
<th>Street Address</th>
<th>Street Address</th>
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<tbody>
<tr>
<td>159 Lucinda Lane</td>
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<table>
<thead>
<tr>
<th>City</th>
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<tr>
<td>Powells Point</td>
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<td>27966</td>
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<table>
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<tr>
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<table>
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<tr>
<th>Cell Phone Number</th>
<th>Telephone Number</th>
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<tbody>
<tr>
<td>252-333-7673</td>
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</table>

<table>
<thead>
<tr>
<th>Fax Number</th>
<th>Email Address</th>
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<tbody>
<tr>
<td></td>
<td><a href="mailto:lwinslow@ncdot.gov">lwinslow@ncdot.gov</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description of Proposed Activity (attach diagram and/or additional pages, if necessary)</th>
</tr>
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</table>

The North Carolina Department of Transportation is in need to stabilize the point adjacent to the "hairpin" turn at Southdock, on the north end of Ocracoke Island. This area is eroding rapidly and needs to be protected to prevent the point from compromising the ferry basin and the stacking lanes which in turn could cause disruption of service for the travelling public. This area is in need of emergency repair to protect and keep the integrity of the basin and ferry stacking lanes.

NCDOT along with Moffatt & Nichols are working on a proposed plan to install sheet pile to protect this critical area. The new sheet pile will be installed in the basin along the existing dilapidated sheet pile. Also, NCDOT is proposing to install new sheet pile along the inlet side to protect the eroding dune line. Attached are the drawing for new sheet pile, a aerial view of the eroding area with proposed installation of new sheet pile and an emergency declaration to protect the existing point.

NCDOT is proposing to install approximately 990' of new sheet pile to protect the eroding area. NCDOT will need to grade the area between the existing sheet pile in the basin and the inlet side so a crane can be able to move along the point to install the new sheet pile. This area in the past has not had any environmental concerns with nesting shorebirds or sea turtle nesting.
Requested Location
Southdock, North end of Ocracoke

<table>
<thead>
<tr>
<th>Set-Up Begins</th>
<th>Activity Begins</th>
<th>Activity Ends</th>
<th>Removal Completed</th>
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<tr>
<td>Date</td>
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<td>AM/PM</td>
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Maximum Number of Participants (Best Estimate): 10

Support equipment (list all equipment; attach additional pages if necessary)
Crane, bulldozer, 18 wheelers and trailers.

List support personnel including addresses and telephones; attach additional pages if necessary

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Cell Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lance Winslow</td>
<td>159 Lucinda Lane</td>
<td>252-333-7673</td>
</tr>
</tbody>
</table>
### Applicant Name
Lance Winslow

<table>
<thead>
<tr>
<th>Individual in charge of activity onsite who is authorized to make decisions related to the permitted activity:</th>
<th>Lance Winslow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is this an exercise of First Amendment Rights?</td>
<td>[ ] Yes [ ] No</td>
</tr>
<tr>
<td>Have you visited the requested area?</td>
<td>[ ] Yes [ ] No</td>
</tr>
<tr>
<td>Have you obtained a permit from the National Park Service in the past? (If yes, provide a list of permit dates and locations on a separate page.)</td>
<td>[ ] Yes [ ] No</td>
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<tr>
<td>Do you plan to advertise or issue a press release before the event?</td>
<td>[ ] Yes [ ] No</td>
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<tr>
<td>Will you distribute printed material?</td>
<td>[ ] Yes [ ] No</td>
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<tr>
<td>Is there any reason to believe there will be attempts to disrupt, protest or prevent your event? (If yes, please explain on a separate page.)</td>
<td>[ ] Yes [ ] No</td>
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<tr>
<td>Do you intend to solicit donations or offer items for sale? (These activities may require an additional permit.)</td>
<td>[ ] Yes [ ] No</td>
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*You are encouraged to attach additional pages with information useful in evaluating your permit request including: staging, sound systems, parking plan, security plans, sanitary facilities, crowd control, emergency medical plan, use of any building, site clean-up, etc.*

*The applicant by his or her signature certifies that all the information given is complete and correct, and that no false or misleading information or statements have been given.*

<table>
<thead>
<tr>
<th>Printed Name</th>
<th>Lance Winslow</th>
</tr>
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<tbody>
<tr>
<td>Title</td>
<td>Asst. Director of Marine Asset Management</td>
</tr>
<tr>
<td>Signature</td>
<td>[Signature]</td>
</tr>
<tr>
<td>Date</td>
<td>3-13-19</td>
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### NOTICES

**IMPORTANT NOTICE TO APPLICANT**

This is an application only, and does not serve as permission to conduct any special activity in the park. The information provided will be used to determine whether a permit will be issued. Send the completed application along with the application fee in the form of a [park to select payment methods accepted: cashier’s check, money order or personal check made payable to the National Park Service] to Outer Banks Group at the park address found on the first page of this application.

If your request is approved, a permit containing applicable terms and conditions will be sent to you. The permit must be signed by the responsible person and returned to the park for final approval by the Park Superintendent before the permitted activity may begin.

**Customers Making Payment by Personal Check**

When you provide a check as payment, you authorize us either to use information from your check to make a one-time electronic fund transfer from your account or to process the payment as a check transaction. When we use information from your check to make an electronic fund transfer, funds may be withdrawn from your account as soon as the same day we receive your payment, and you will not receive your check back from your financial institution.

**Privacy Act Statement**

**General:** This information is provided pursuant to Public Law 93-579 (Privacy Act of 1974), December 21, 1984, for individuals completing this application.

**Authority:** The authority to collect information on the attached form is derived from Title 31, United States Code, Section 7701.

**Purposes and Uses:** The information being collected is to allow the park manager to make a value judgment on whether or not to allow the requested use. Information from the application may be transferred to appropriate Federal, State, and local agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

**Effects of Nondisclosure:** It is in your best interest to answer all of the questions. The U.S. Criminal Code, Title 18 U.S.C. 1001, provides that knowingly falsifying or concealing a material fact is a felony that may result in fines of up to $10,000 or 5 years in prison, or both. Deliberately and materially making false or fraudulent statements on this form will be grounds for not granting you a Special Use Permit.

**Information Regarding Disclosure of Your Social Security Number Under Public Law 93-579 Section 7(b):** Your Social Security
Number (SSN) is needed to identify records unique to you. Applicants are required to provide their social security or taxpayer identification number for activities subject to collection of fees and charges by the National Park Service (31 U.S.C. 7701). Although disclosure of your SSN is not mandatory, failure to disclose your SSN may prevent or delay the processing of your application. The authority for soliciting and verifying your SSN is Executive Order 9397. The information gathered through the use of the SSN will be used only as necessary for processing this application and will be carried out in accordance with established regulations and published notices of system of records.

**Paperwork Reduction Act Statement**

We are collecting this information subject to the Paperwork Reduction Act (44 U.S.C. 3501) to provide the park managers the information needed to decide whether or not to allow the requested use. All applicable parts of the form must be completed in order for your request to be considered. You are not required to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

**Estimated Burden Statement**

Public reporting burden for this form is estimated to average 30 minutes per response including the time it takes to read, gather and maintain data, review instructions and complete the form. Direct comments regarding this burden estimate, or any aspects of this form, to the Information Collection Clearance Officer, National Park Service, 12201 Sunrise Valley Drive, Mail Stop 242, Reston, VA 20192. Please do not send your form to this address.
<table>
<thead>
<tr>
<th>Project Number/BILL</th>
<th>Date Processed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permit Number</td>
<td>Prepared By</td>
</tr>
<tr>
<td>Organization Name</td>
<td></td>
</tr>
</tbody>
</table>
DATE: March 13, 2019

TO: File

FROM: T. M. Little, P.E.
Chief Engineer

SUBJECT: Declaration of Emergency
Southdock - Ocracoke

Immediate attention has been requested to repair Southdock at Ocracoke due to rapidly increasing erosion. The ferry basin bulkhead and stacking lanes have incurred significant damage to the pavement. If continued erosion were to cause the existing bulkhead to fail, the entire basin would be impacted.

Due to the impacts of these failures, I have declared an emergency exists and determined it is not feasible nor in the public’s interest, for the Department of Transportation to comply with the statutory bidding requirements in obtaining materials, equipment and/or Contractors assistance in our efforts to restore these structures. This is being done pursuant to the authority granted by G.S. 136-28.1(e).

Instruction has been given to the Division 1 Engineer to immediately proceed to accomplish necessary repairs.

TML/ajs

cc: James H. Trogdon, PE, Secretary of Transportation
    Jerry Jennings, P.E., Division Engineer
    John Rouse, P.E., Western Deputy Chief Engineer
    Ron Hancock, P.E., Deputy Chief Engineer
    Patrick Norman, P.E., Director of Highway Operations
    Kim Padfield, Director of Accounting Operations & Budget
    Joni Robbins, Procurement Director
June 20, 2019

Greg Daisey
Coastal Management – Transportation Projects
NCDEQ
DCM – Elizabeth City
401 S. Griffin Street, Suite 300
Elizabeth City, NC 27909

Mr. Daisey,

The North Carolina Department of Transportation (NCDOT) Ferry Division is requesting a major modification of CAMA Permit 224-87 for shoreline stabilization at the Hatteras Southdock Ferry Terminal in Ocracoke NC. A Declaration of Emergency was issued on March 13, 2019 because of the significant damage incurred to the ferry basin bulkhead and stacking lanes due to erosion. The northern shoreline is actively scouring and requires stabilizing before the paved stacking lanes and protective dunes are destroyed. If continued erosion were to cause the existing bulkhead to fail, the entire basin would be impacted causing unsafe conditions for the loading and unloading of the travelling public.

In previous years the north end of the island was permitted to re-nourish the beach adjacent to the hairpin turn. This semi-regular nourishment worked for many years but stopped being a viable option after storms significantly altered the inlet and the replenished shoreline began eroding away in as little as several weeks. In December of 2018 sandbags were installed around the perimeter of the stacking lanes as an effort to protect the lanes from collapsing into the sound but by Spring of 2019 most of the sandbags had been washed away and the asphalt had begun to crumble into the sound.

1000 feet of micropoxy 646 coated steel sheet pile is to be installed from the southeast corner of the active ferry basin, where an existing, dilapidated seawall exists, to a point north of asphalt stacking lanes. The seawall will be installed in front of an existing steel sheet pile seawall on the south side of the site within the ferry basin and then wrap around the north side running parallel to Hatteras Inlet. The basin and sound-side seawalls will be anchored together with galvanized tie rods and reinforced concrete caps that serve as wales. The site will require excavation and earthwork to install the tie rods and reinforced concrete seawall cap. The top 3 feet of existing sheet pile on the basin side will need to be removed to allow for the installation of tie-backs for the new seawall. A grout closure column will be installed at the south intersection of the new and existing seawalls to provide closure and prevent loss of fill material. Sand fill will be transported...
from the dredge spoil site located on the other side of the ferry basin and be placed between the new and existing steel sheet pile. The sound-side seawall will extend along the north side of the Ferry Terminal peninsula and partially extend around the north end of the vehicular stacking lanes without intruding on the inlet hazard area. The seawall at the stacking lanes will be anchored back to a buried steel sheet pile deadman with a galvanized double steel channel wale assembly. A crane will be used to drive the sheet piles with a vibratory hammer from the land. Existing dune and material will be temporarily removed to allow crane access to install sheet pile wall. Material will be stockpiled in the middle of the stacking lanes with proper erosion control devices. After complete installation of the seawall the site would be filled and regraded with sand from the dredge spoil site to match the existing dune elevations and reseeded with proper beach vegetation.

As depicted in the drawings, the NCDOT Ferry Division would like to install temporary sandbags on the end of the sheet pile wall until the groin project is completed. The sandbags are needed to prevent any erosion from occurring from easterly winds. NCDOT proposes to use 3 different sizes of sandbags to fill in the end of the wall to prevent erosion; 2'X5'X15', 3'X3', and 4'X4' sizes would be utilized. The different sized sand bags will be used jointly to seal off the end as depicted in the drawings. The approximate number of sand bags is 40, depending on the depths at the time of placement. The approximate length at the top of the sandbag wall would be 50' with a width of 15', height of 14' and the bottom tapering with elevation. The tie backs would be installed over top of the sandbag wall. The sandbags would be placed in an area located partially within the inlet hazard area.

Please use WBS# 15401.1048012 for any applicable fees. A hard copy of this letter will be mailed to your office in Elizabeth City, NC.

If you have any questions or need any additional information, please contact me.

Sincerely,

[Signature]

Brian Doliber
Environmental Specialist
Ferry Division

252 232 8025    mobile
252 621 6251    office
bedoliber@ncdot.gov

159 Lucinda Lane
Powells Point, NC 27966
# APPLICATION for Major Development Permit

(last revised 12/27/06)

North Carolina DIVISION OF COASTAL MANAGEMENT

## 1. Primary Applicant/ Landowner Information

<table>
<thead>
<tr>
<th>Business Name: Nc Dot</th>
<th>Project Name (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Southdock Shoreline Stabilization Emergency</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicant 1: First Name</th>
<th>MI</th>
<th>Last Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian</td>
<td></td>
<td>Doliber</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicant 2: First Name</th>
<th>MI</th>
<th>Last Name</th>
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</table>

If additional applicants, please attach an additional page(s) with names listed.

<table>
<thead>
<tr>
<th>Mailing Address</th>
<th>PO Box</th>
<th>City</th>
<th>State</th>
<th>ZIP</th>
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</thead>
<tbody>
<tr>
<td>159 Lucinda Lane</td>
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<tr>
<th>ZIP</th>
<th>Country</th>
<th>Phone No.</th>
<th>FAX No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>27923</td>
<td>USA</td>
<td>252 - 232 - 8025 ext.</td>
<td></td>
</tr>
</tbody>
</table>

Email: bcdoliber@ncdot.gov

## 2. Agent/Contractor Information

| Business Name: Nc Dot | |
|-----------------------||

<table>
<thead>
<tr>
<th>Agent/ Contractor 1: First Name</th>
<th>MI</th>
<th>Last Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian</td>
<td></td>
<td>Dolliber</td>
</tr>
</tbody>
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<table>
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<th>Phone No. 1</th>
<th>Phone No. 2</th>
</tr>
</thead>
<tbody>
<tr>
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<td>USA</td>
<td>252 - 232 - 8025 ext.</td>
<td></td>
</tr>
</tbody>
</table>

Email: bcdoliber@ncdot.gov

<Form continues on back>
### 3. Project Location

<table>
<thead>
<tr>
<th>County (can be multiple)</th>
<th>Street Address</th>
<th>State Rd. #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyde</td>
<td>1380 Irvin Garrish Highway</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subdivision Name</th>
<th>City</th>
<th>State</th>
<th>Zip</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ocracoke</td>
<td>NC</td>
<td>27960 -</td>
</tr>
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<table>
<thead>
<tr>
<th>Phone No.</th>
<th>ext.</th>
<th>Lot No.(s) (if many, attach additional page with list)</th>
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</table>

**a. In which NC river basin is the project located?**
- Pamlico Tar

**b. Name of body of water nearest to proposed project**
- Pamlico Sound

**c. Is the water body identified in (b) above, natural or manmade?**
- [ ] Natural
- [ ] Manmade
- [ ] Unknown

**d. Name the closest major water body to the proposed project site.**
- Pamlico Sound

**e. Is proposed work within city limits or planning jurisdiction?**
- [ ] Yes
- [x] No

**f. If applicable, list the planning jurisdiction or city limit the proposed work falls within.**
- N/A

### 4. Site Description

**a. Total length of shoreline on the tract (ft.)**
- 956

**b. Size of entire tract (sq.ft.)**
- 106572

**c. Size of individual lot(s)**
(If many lot sizes, please attach additional page with a list)

**d. Approximate elevation of tract above NHW (normal high water) or NWL (normal water level)**
- [ ] NHW or [ ] NWL

**e. Vegetation on tract**
- Yes. Grasses and low lying shrubbery

**f. Man-made features and uses now on tract**
- Bulkheaded land adjacent to ferry basin. Asphalt stacking lanes for ferry vehicle traffic.

**g. Identify and describe the existing land uses adjacent to the proposed project site.**
- A NC DOT ferry terminal is located directly adjacent to the project site. The terminal includes the ferry basin, small buildings, a restroom facility, and asphalt driving lanes.

**h. How does local government zone the tract?**
- NPS land

**i. Is the proposed project consistent with the applicable zoning?**
(Attach zoning compliance certificate, if applicable)
- [ ] Yes
- [ ] No
- [ ] NA

**j. Is the proposed activity part of an urban waterfront redevelopment proposal?**
- [ ] Yes
- [ ] No

**k. Has a professional archaeological assessment been done for the tract? If yes, attach a copy.**
- [ ] Yes
- [ ] No
- [ ] NA
- **If yes, by whom?**
- NC DOT Environmental Analysis Unit

**l. Is the proposed project located in a National Registered Historic District or does it involve a National Register listed or eligible property?**
- [ ] Yes
- [ ] No
- [ ] NA

*<Form continues on next page>*
m. (i) Are there wetlands on the site? □Yes □No

(ii) Are there coastal wetlands on the site? □Yes □No

(iii) If yes to either (i) or (ii) above, has a delineation been conducted? (Attach documentation, if available) □Yes □No

n. Describe existing wastewater treatment facilities.
   N/A

o. Describe existing drinking water supply source.
   N/A

p. Describe existing storm water management or treatment systems.
   N/A

5. Activities and Impacts

a. Will the project be for commercial, public, or private use? □Commercial □Public/Government □Private/Community

b. Give a brief description of purpose, use, and daily operations of the project when complete.
   The primary purpose of this project is to protect the ferry basin. The sheet pile wall is also expected to help protect the area near the stacking lanes but the future groin project will address erosion in that area in more depth based on information currently being compiled through sampling, surveying and engineering. A shifting channel to the north of the ferry basin and vehicle stacking lanes has caused significant erosion to take place on the north end of the island. This erosion has compromised the integrity of the ferry basin bulkhead and rendered the vehicle stacking lanes unusable while also creating a public safety issue. If the bulkhead were to fail it would impact the entire basin and significantly affect residents and visitors alike. By installing a new sheet pile wall on both the basin and sound sides of the point, the basin would be protected and the erosion along the stacking lane area would be mitigated. A Declaration of Emergency was issued on March 13, 2019 because of the significant damage incurred to the ferry basin bulkhead and stacking lanes due to erosion. The northern shoreline is actively scouring and requires stabilizing before the paved stacking lanes and protective dunes are destroyed.

c. Describe the proposed construction methodology, types of construction equipment to be used during construction, the number of each type of equipment and where it is to be stored.
   In order to begin installing the sheet pile the undisturbed land between the basin and the sound will need to be graded so that a crane can move along the point. 1000 feet of micro-poxy 646 coated steel sheet pile is to be installed from the southeast corner of the active ferry basin, where an existing, dilapidated seawall exists, to a point north of asphalt stacking lanes. The seawall will be installed in front of an existing steel sheet pile seawall on the south side of the site within the ferry basin and then wrap around the north side running parallel to Hatteras Inlet. The basin and sound-side seawalls will be anchored together with galvanized tie rods and reinforced concrete caps that serve as wales. The site will require excavation and earthwork to install the tie rods and reinforced concrete seawall cap. The existing seawall on the basin side requires partial demolition to allow installation of the new seawall. A grout closure column will be installed at the south intersection of the new and existing seawalls to provide closure and prevent loss of fill material. Sand fill will be transported from the dredge spoil site located on the other side of the ferry basin and be placed between the new and existing steel sheet piles. The sound-side seawall will extend along the north side of the Ferry Terminal peninsula and partially extend around the north end of the vehicular stacking lanes without intruding on the inlet hazard area. The seawall at the stacking lanes will be anchored back to a buried steel sheet pile deadman with a galvanized double steel channel wale assembly. After complete installation of the seawall the site shall be filled and regraded with sand from the dredge spoil site to match the existing dune elevations.

   The open end of the seawall to the north of the stacking lanes is to be “filled in” with sand bags to prevent the potential future erosion. A variety sand bag sizes will be used. The dimensions and placement locations can be found in the attached drawings. The sandbags would be placed in an area located partially within the inlet hazard area.

   Equipment: Crane, Tug barge, Bulldozer, any other equipment deemed necessary by the contractor.

d. List all development activities you propose.
   Installation of sheet pile
e. Are the proposed activities maintenance of an existing project, new work, or both? New

f. What is the approximate total disturbed land area resulting from the proposed project? 106572 Sq.Ft or Acres

<table>
<thead>
<tr>
<th>g. Will the proposed project encroach on any public easement, public accessway or other area that the public has established use of?</th>
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<tbody>
<tr>
<td>Yes</td>
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<tr>
<th>h. Describe location and type of existing and proposed discharges to waters of the state.</th>
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<tbody>
<tr>
<td>There are no discharges and will continue to be no discharges</td>
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<table>
<thead>
<tr>
<th>i. Will wastewater or stormwater be discharged into a wetland?</th>
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<tbody>
<tr>
<td>Yes</td>
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<tr>
<th>j. Is there any mitigation proposed?</th>
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<tbody>
<tr>
<td>Yes</td>
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</table>

### Form Continues on Back

#### 6. Additional Information

In addition to this completed application form, (MP-1) the following items below, if applicable, must be submitted in order for the application package to be complete. Items (a) – (f) are always applicable to any major development application. Please consult the application instruction booklet on how to properly prepare the required items below.

<table>
<thead>
<tr>
<th>a. A project narrative.</th>
</tr>
</thead>
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<table>
<thead>
<tr>
<th>b. An accurate, dated work plat (including plan view and cross-sectional drawings) drawn to scale. Please give the present status of the proposed project. Is any portion already complete? If previously authorized work, clearly indicate on maps, plats, drawings to distinguish between work completed and proposed.</th>
</tr>
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<tr>
<th>c. A site or location map that is sufficiently detailed to guide agency personnel unfamiliar with the area to the site.</th>
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<tr>
<th>d. A copy of the deed (with state application only) or other instrument under which the applicant claims title to the affected properties.</th>
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<tr>
<th>e. The appropriate application fee. Check or money order made payable to DENR.</th>
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<tr>
<th>f. A list of the names and complete addresses of the adjacent waterfront (riparian) landowners and signed return receipts as proof that such owners have received a copy of the application and plats by certified mail. Such landowners must be advised that they have 30 days in which to submit comments on the proposed project to the Division of Coastal Management.</th>
</tr>
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<table>
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<tr>
<th>Name</th>
<th>Phone No.</th>
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<table>
<thead>
<tr>
<th>g. A list of previous state or federal permits issued for work on the project tract. Include permit numbers, permittee, and issuing dates.</th>
</tr>
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</table>

<table>
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<tr>
<th>h. Signed consultant or agent authorization form, if applicable.</th>
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<table>
<thead>
<tr>
<th>i. Wetland delineation, if necessary.</th>
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</table>

<table>
<thead>
<tr>
<th>j. A signed AEC hazard notice for projects in oceanfront and inlet areas. (Must be signed by property owner)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>k. A statement of compliance with the N.C. Environmental Policy Act (N.C.G.S. 113A 1-10), if necessary. If the project involves expenditure of public funds or use of public lands, attach a statement documenting compliance with the North Carolina Environmental Policy Act.</th>
</tr>
</thead>
</table>
7. Certification and Permission to Enter on Land

I understand that any permit issued in response to this application will allow only the development described in the application. The project will be subject to the conditions and restrictions contained in the permit.

I certify that I am authorized to grant, and do in fact grant permission to representatives of state and federal review agencies to enter on the aforementioned lands in connection with evaluating information related to this permit application and follow-up monitoring of the project.

I further certify that the information provided in this application is truthful to the best of my knowledge.

Date 06/30/2019                                  Print Name Brian Poliber

Signature  

Please indicate application attachments pertaining to your proposed project.

☒ DCM MP-2 Excavation and Fill Information  ☐ DCM MP-5 Bridges and Culverts
☐ DCM MP-3 Upland Development
☐ DCM MP-4 Structures Information
Form DCM MP-2

EXCAVATION and FILL
(Except for bridges and culverts)

Attach this form to Joint Application for CAMA Major Permit, Form DCM MP-1. Be sure to complete all other sections of the Joint Application that relate to this proposed project. Please include all supplemental information.

Describe below the purpose of proposed excavation and/or fill activities. All values should be given in feet.

<table>
<thead>
<tr>
<th>Access Channel (NLW or NWL)</th>
<th>Canal</th>
<th>Boat Basin</th>
<th>Boat Ramp</th>
<th>Rock Groin</th>
<th>Rock Breakwater</th>
<th>Other (excluding shoreline stabilization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Width</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg. Existing Depth</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Project Depth</td>
<td>NA</td>
<td>NA</td>
<td></td>
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</tr>
</tbody>
</table>

1. EXCAVATION

a. Amount of material to be excavated from below NHW or NWL in cubic yards.

b. Type of material to be excavated.

c. (i) Does the area to be excavated include coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.
   - CW
   - SAV
   - SB
   - WL
   - None
   (ii) Describe the purpose of the excavation in these areas:

   ____________________________________________________________

2. DISPOSAL OF EXCAVATED MATERIAL

a. Location of disposal area.

b. Dimensions of disposal area.

c. (i) Do you claim title to disposal area?
   - Yes  No  NA
   (ii) If no, attach a letter granting permission from the owner.

d. (i) Will a disposal area be available for future maintenance?
   - Yes  No  NA
   (ii) If yes, where?

e. (i) Does the disposal area include any coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.
   - CW
   - SAV
   - SB
   - WL
   - None
   (ii) Describe the purpose of disposal in these areas:

   ____________________________________________________________

f. (i) Does the disposal include any area in the water?
   - Yes  No  NA
   (ii) If yes, how much water area is affected?

   ____________________________________________________________

252-898-2000 : 1-888-4RCOAST : www.nccoastalmanagement.net  revised: 12/26/06
3. SHORELINE STABILIZATION
(if development is a wood groin, use MP-4 - Structures)

a. Type of shoreline stabilization:
   - Bulkhead  □  Riprap  □  Breakwater/Sill  □  Other: ______

b. Length: 1000'
   - Width: 3'

c. Average distance waterward of NHW or NWL: 10

d. Maximum distance waterward of NHW or NWL: 40

f. (i) Has there been shoreline erosion during preceding 12 months?
   - Yes  □  No  □  NA

   (ii) If yes, state amount of erosion and source of erosion amount information.
   - Significant erosion - Over 70' of shoreline has been lost within the past year due to erosion.
   - Source: Photographs and imagery

h. Type of fill material:
   - Sand

e. Type of stabilization material:
   - Micropoxy 646 coated sheet pile

g. Number of square feet of fill to be placed below water level.
   - Bulkhead backfill 3000 cubic yards
   - Riprap NA
   - Breakwater/Sill NA
   - Other NA

i. Source of fill material:
   - Dredge spoil site located adjacent to the ferry basin

4. OTHER FILL ACTIVITIES
(Excluding Shoreline Stabilization)

This section not applicable

5. GENERAL

a. How will excavated or fill material be kept on site and erosion controlled?

All material that is excavated will go to the dredge spoil site located on the opposite side of the ferry basin. All material that is to be used as fill will come from the dredge spoil site located on the opposite side of the ferry basin.

As depicted in the drawings, the NCDOT Ferry Division would like to install temporary sandbags on the end of the sheet pile wall until the groin project is completed. The sandbags are needed to prevent any erosion from occurring from easterly winds. NCDOT proposes to use 3 different sizes of sandbags to fill in the end of the wall to prevent erosion; 2'x3'x5', 3'x3', and 4'x4' sizes would be utilized. The different sized sand bags will be used jointly to seal off the end as depicted in the drawings. The approximate number of sand bags is 40, depending on the depths at the time of placement. The approximate length at the top of the sand bag wall would be 50' with a width of 15', height of 14' and the bottom tapering with elevation. The sandbags would be placed in an area located partially within the inlet hazard area.

b. What type of construction equipment will be used (e.g., dragline, backhoe, or hydraulic dredge)?

Crane, tug barge, excavator, bulldozer, any other equipment deemed necessary by the contractor.
c. (i) Will navigational aids be required as a result of the project? □ Yes □ No □ NA
(ii) If yes, explain what type and how they will be implemented.
NA

06/20/2019
Date

Southdock Shoreline Stabilization Emergency
Project Name

Brian Collier
Applicant Name

Applicant Signature
OCEAN HAZARD AEC NOTICE

Project is in an:  Ocean Erodi ble Area  High Hazard Flood Area  Inlet Hazard Area

Property Owner: National Park Service

Property Address: 1380 Irvin Garrish Highway, Ocracoke, NC 27960

Date Lot Was Platted: N/A

This notice is intended to make you, the applicant, aware of the special risks and conditions associated with development in this area, which is subject to natural hazards such as storms, erosion and currents. The rules of the Coastal Resources Commission require that you receive an AEC Hazard Notice and acknowledge that notice in writing before a permit for development can be issued.

The Commission’s rules on building standards, oceanfront setbacks and dune alterations are designed to minimize, but not eliminate, property loss from hazards. By granting permits, the Coastal Resources Commission does not guarantee the safety of the development and assumes no liability for future damage to the development. Permits issued in the Ocean Hazard Area of Environmental Concern include the condition that structures be relocated or dismantled if they become imminently threatened by changes in shoreline configuration. The structure(s) must be relocated or dismantled within two (2) years of becoming imminently threatened, and in any case upon its collapse or subsidence.

The best available information, as accepted by the Coastal Resources Commission, indicates that the annual long-term average ocean erosion rate for the area where your property is located is 6 + feet per year.

The rate was established by careful analysis of aerial photographs of the coastline taken over the past 50 years.

Studies also indicate that the shoreline could move as much as 5 + feet landward in a major storm.

The flood waters in a major storm are predicted to be about 3 + feet deep in this area.

Preferred oceanfront protection measures are beach nourishment and relocation of threatened structures. Hard erosion control structures such as bulkheads, seawalls, revetments, groins, jetties and breakwaters are prohibited. Temporary sand bags may be authorized under certain conditions.

The applicant must acknowledge this information and requirements by signing this notice in the space below. Without the proper signature, the application will not be complete.

Greg Daisey

Local Permit Officer

401 S. Griffin St., Suite 300; Elizabeth City, NC 27909

Address

DCM – Elizabeth City Office

Locality

(252)264-3901; EXT.249

Phone Number

For more information, contact:

Applicant Signature 06/12/2019 Date

SPECIAL NOTE: This hazard notice is required for development in areas subject to sudden and massive storms and erosion. Permits issued for development in this area expire on December 31 of the third year following the year in which the permit was issued. Shortly before work begins on the project site, the Local Permit Officer must be contacted to determine the vegetation line and setback distance at your site. If the property has seen little change since the time of permit issuance, and the proposed development can still meet the setback requirement, the LPO will inform you that you may begin work. Substantial progress on the project must be made within 60 days of this setback determination, or the setback must be re-measured. Also, the occurrence of a major shoreline change as the result of a storm within the 60-day period will necessitate reassessment of the setback. It is important that you check with the LPO before the permit expires for official approval to continue the work after the permit has expired. Generally, if foundation pilings have been placed and substantial progress is continuing, permit renewal can be authorized. It is unlawful to continue work after permit expiration.

Revised May 2010
BEFORE YOU BUILD

Setting Back for Safety: A Guide to Wise Development Along the Oceanfront

When you build along the oceanfront, you take a calculated risk. Natural forces of water and wind collide with tons of force, even on calm days.

Man-made structures cannot be guaranteed to survive the force of a hurricane. Long-term erosion (or barrier island migration) may take from two to ten feet of the beach each year, and, sooner or later, will threaten oceanfront structures. These are the facts of life for oceanfront property owners.

The Coastal Resources Commission (CRC) has adopted rules for building along the oceanfront. The rules are intended to avoid an unreasonable risk to life and property, and to limit public and private losses from storm and long-term erosion. These rules lessen but do not eliminate the element of risk in oceanfront development.

As you consider building along the oceanfront, the CRC wants you to understand the rules and the risks. With this knowledge, you can make a more informed decision about where and how to build in the coastal area.

The Rules

When you build along the oceanfront, coastal management rules require that the structure be sited to fit safely into the beach environment.

Structures along the oceanfront, less than 5,000 square feet in size, must be behind the frontal dune, landward of the crest of the primary dune, and set back from the first line of stable natural vegetation a distance equal to 30 times the annual erosion rate (a minimum of 60 feet). The setback calculation increases as the size of the structure increases [15A NCAC 7H.0306(a)(2)]. For example: A structure between 5,000 and 10,000 square feet would require a setback from the first line of stable, natural vegetation to a distance equal to 60 times the annual erosion rate (a minimum of 120 feet). The graduated setback continues to increase through structure sizes greater than 100,000 square feet.

The beachfront is an ever-changing landform. The beach and the dunes are natural “shock absorbers,” taking the beating of the wind and waves and protecting the inland areas. By incorporating building setbacks into the regulations, you have a good chance of enjoying the full life of the structure. At first, it seems very inviting to build your dream house as close to the beach as possible, but in five years you could find the dream has become a nightmare as high tides and storm tides threaten your investment.

The Exception

The Coastal Resources Commission recognized that these rules, initially passed in June 1979, might prove a hardship for some property owners. Therefore, they established an exception for lots that cannot meet the setback requirement. The exception allows buildings in front of the current setback, if the following conditions apply:

1) the lot must have been platted as of June 1, 1979, and is not capable of being enlarged by combining with adjoining land under the same ownership;
2) development must be constructed as far back on the property as possible and in no case less than 60 feet landward of the vegetation line;
3) no development can take place on the frontal dune;
4) special construction standards on piling depth and square footage must be met; and
5) all other CAMA, state and local regulations must be met.

The exception is not available in the Inlet Hazard Area.

To determine eligibility for the exception the Local Permit Officer will make these measurements and observations:

_____ required setback from vegetation line
_____ exception setback (maximum feasible)
_____ rear property line setback
_____ max. allowable square footage on lowest floor

The Reasons

After the storm, the house on the dune will be gone. The other house has a much better chance of survival.
DATE: March 13, 2019
TO: File
FROM: T. M. Little, P.E.
      Chief Engineer
SUBJECT: Declaration of Emergency
         Southdock - Ocracoke

Immediate attention has been requested to repair Southdock at Ocracoke due to rapidly increasing erosion. The ferry basin bulkhead and stacking lanes have incurred significant damage to the pavement. If continued erosion were to cause the existing bulkhead to fail, the entire basin would be impacted.

Due to the impacts of these failures, I have declared an emergency exists and determined it is not feasible nor in the public’s interest, for the Department of Transportation to comply with the statutory bidding requirements in obtaining materials, equipment and/or Contractors assistance in our efforts to restore these structures. This is being done pursuant to the authority granted by G.S. 136-28.1(e).

Instruction has been given to the Division 1 Engineer to immediately proceed to accomplish necessary repairs.

TML/ajs

cc: James H. Trogdon, PE, Secretary of Transportation
    Jerry Jennings, P.E., Division Engineer
    John Rouse, P.E., Western Deputy Chief Engineer
    Ron Hancock, P.E., Deputy Chief Engineer
    Patrick Norman, P.E., Director of Highway Operations
    Kim Padfield, Director of Accounting Operations & Budget
    Joni Robbins, Procurement Director
<table>
<thead>
<tr>
<th>Note: Dune Height &amp; Width To Vary. There will be Peaks &amp; Valleys Throughout to Mimic Existing Contours. Done Area to be Sprayed.</th>
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</thead>
<tbody>
<tr>
<td>Varies</td>
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<td>Varies</td>
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</tbody>
</table>

**Dimensions:**
- Length: 15'
- Height: 5'

**Received:**
- Jun 18, 2019
- DCM-Raleigh
HISTORIC ARCHITECTURE AND LANDSCAPES
NO SURVEY REQUIRED FORM

This form only pertains to Historic Architecture and Landscapes for this project. It is not valid for Archaeological Resources. You must consult separately with the Archaeology Group.

PROJECT INFORMATION

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<tr>
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<td></td>
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<td>Fed. Aid No:</td>
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<td>Document Type:</td>
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<td>Funding:</td>
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<tr>
<td>Federal Permit(s):</td>
<td>Yes</td>
</tr>
<tr>
<td>Permit Type(s):</td>
<td>USACE, NPS</td>
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Project Description:
Emergency Seawall Installation at north end of Ocracoke Island: Installation of 900 feet of sheet pile to protect the eroding area (along both the basin and the sound sides of the point) at the South Dock of the ferry on Ocracoke Island. Will also require grading an area to install a crane for use during the construction. For the purposes of this review, the Area of Potential Effects is the area around the ferry dock and the hairpin turn at the north end of the island.

SUMMARY OF HISTORIC ARCHITECTURE AND LANDSCAPES REVIEW

Description of review activities, results, and conclusions:
HPOWeb confirms that there are no NR-listed or eligible properties within the project APE. The project falls within the Cape Hatteras National Seashore which is under the jurisdiction of the National Park Service. Project area was reviewed in in Google Street View and found no historically significant structures or landscapes in the project area. Therefore, no historic properties will be affected by the proposed work and the project is in compliance with Section 106 of the NHPA.

Why the available information provides a reliable basis for reasonably predicting that there are no unidentified significant historic architectural or landscape resources in the project area:
HPO GIS data, Google Street View, and previous surveys by architectural historians are considered valid tools for the purposes of determining the likelihood of impacts to historic resources.
SUPPORT DOCUMENTATION

☒Map(s) ☐Previous Survey Info. ☐Photos ☐Correspondence ☒Design Plans

FINDING BY NCDOT ARCHITECTURAL HISTORIAN

Historic Architecture and Landscapes – NO SURVEY REQUIRED

Mary Pope Furr

6/18/2019

NCDOT Architectural Historian

Date

Vicinity map South Dock of the Ferry on Ocracoke
NO ARCHAEOLOGICAL SURVEY REQUIRED FORM

This form only pertains to ARCHAEOLOGICAL RESOURCES for this project. It is not valid for Historic Architecture and Landscapes. You must consult separately with the Historic Architecture and Landscapes Group.

PROJECT INFORMATION

Project No: Shoreline Stabilization  County: Hyde
WBS No: 15401.1048012  Document: Federal CE
F.A. No:  Funding: X State  □ Federal

Federal Permit Required?  X Yes  □ No  Permit Type: USACE

Project Description: The project involves the stabilization of the shoreline in order to protect the basin in Hyde County, North Carolina. Erosion has compromised the integrity of the ferry basin bulkhead and rendered the vehicle stacking lanes unusable. To mitigate the erosion, installation of a new sheet pile wall on both the sound and basin sides of the point will be constructed. The archaeological Area of Potential Effects (APE) encompasses all areas of potential ground disturbing activity as depicted on the attached GIS mapping.

SUMMARY OF CULTURAL RESOURCES REVIEW

Brief description of review activities, results of review, and conclusions:
Permitting and funding information was reviewed for determining the level of archaeological input required by state and federal laws. Based on the submitted "request for cultural resources review" form, the project is state-funded with federal permit interaction. As such, Section 106 of the National Historic Preservation Act will apply and the United States Army Corps of Engineers (USACE) will serve as the lead federal agency. Next, construction design and other data was examined (when applicable) to define the character and extent of potential impacts to the ground surfaces embracing the project locale.

Once an APE was outlined, a map review and site file search was conducted at the Office of State Archaeology (OSA) on Thursday, June 13, 2019. No NRHP eligible archaeological sites or any other previously documented archaeological sites are located within or adjacent to the APE.

Examination of National Register of Historic Places (NRHP), State Study Listed (SL), Locally Designated (LD), Determined Eligible (DE), and Surveyed Site (SS) properties employing resources available on the NCSHPO website is important in establishing the location of noteworthy historic occupations related to a perspective construction impact area. A cross-check of these mapped resources concluded that none of the above properties with possible contributing archaeological components are situated within or proximal to the APE.

In addition, historic maps of Hyde County were appraised to identify former structure locations, land use patterns, cemeteries, or other confirmation of historic occupation in the project vicinity. Archaeological/historical reference materials were inspected as well. In general, the cultural background review established that no previously recorded archaeological sites, cemeteries, or NRHP listed archaeological sites are located within the APE. Based on cultural-historical factors, the APE is considered to have a low potential for the documentation of archaeological resources.

Further, topographic, geologic, flood boundary, and NRCS soil survey maps were referenced to evaluate pedological, geomorphological, hydrological, and other environmental determinants that may have resulted in past occupation at this location. Aerial and on-ground photographs (NCDOT Spatial Data Viewer) and the Google Street View map application (when amenable) were also examined/utilized for additional assessment of

"No ARCHAEOLOGY SURVEY REQUIRED" form for the Amended Minor Transportation Projects or Qualified in the 2015 Programmatic Agreement.
disturbances, both natural and human induced, which compromise the integrity of archaeological sites. Environmental/impact factors do not suggest a heightened potential for archaeological resource recovery.

*Brief Explanation of why the available information provides a reliable basis for reasonably predicting that there are no unidentified historic properties in the APE:*

The entire project study area is largely disturbed from erosion. There are no existing NRHP eligible archaeological sites within the projects APE, and it is unlikely to contain significant, intact, and preserved archaeological deposits. As currently proposed as a state-funded project with federal permits, no further consultation is advocated. A finding of "no archaeological survey required" is considered appropriate.

This project falls within a North Carolina County in which the Catawba Indian Nation has expressed an interest: Hyde County. It is recommended that you contact each federal agency involved with your project to determine their Section 106 Tribal consultation requirements.

**SUPPORT DOCUMENTATION**

See attached:  
- [x] Map(s)  
- [x] Previous Survey Info  
- [ ] Photos  
- [ ] Correspondence  
- [ ] Photocopy of County Survey Notes  
- [ ] Other:

**FINDING BY NCDOT ARCHAEOLOGIST**

*NO ARCHAEOLOGY SURVEY REQUIRED*

[Signature]
NCDOT  
6-20-2019
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HYDE COUNTY

LOCATION: SEAWALL AT NORTH END OF OCRAKOE ISLAND
NC 12 (IRVING GARRISH HWY) ON OCRAKOE ISLAND

TYPE OF WORK: EMERGENCY SEAWALL INSTALLATION

INDEX OF SHEETS
1 TITLE SHEET
2 GENERAL NOTES
3 EXISTING SITE PLAN
4 CONSTRUCTION SITE PLAN
5 SEAWALL SECTION A-A
6 SEAWALL SECTION B-B
7 SEAWALL SECTION C-C
8 SEAWALL SECTION D-D
9 SEAWALL WORK POINTS
10 SEAWALL DETAIL SHEET 1
11 SEAWALL DETAIL SHEET 2

VICINITY MAP

STRUCTURE

DESIGN DATA
HYDE COUNTY
SOUTHDOCK FERRY TERMINAL
NEW SEAWALL

PROJECT LENGTH
LENGTH OF SEAWALL - 1000FT
### GENERAL NOTES

1. APPLICABLE CODES, MANUALS, AND SPECIFICATIONS:
   - AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, RECENT AMENDMENTS
   - AASHTO GUIDE SPECIFICATIONS FOR BRIDGES VULNERABLE TO COASTAL STORMS
   - AASHTO GUIDE SPECIFICATIONS AND COMMENTARY FOR VEHICLE COLLISION DESIGN OF HIGHWAY BRIDGES, RECENT AMENDMENTS
   - NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, UNIT MANAGEMENT MANUAL, INCLUDING POLICY VOLUME
   - AASHTO BRIDGE POLICY MANUAL
   - AASHTO STRUCTURES MANUAL, UNIT PROJECT SPECIFICATIONS
   - NORTH CAROLINA ENGINEERING UNIT GUIDELINES AND PROCEDURES MANUAL FOR SUBGRADE, SUBBASE, AND BASE MATERIALS
   - NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, NORTH CAROLINA STATE BUILDING CODE
   - FHWA SUBGRADE SAFETY CODE

2. THESE PLANS ARE INCOMPLETE UNLESS ACCOMPANIED BY THE SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS INCLUDED IN THE CONTRACT DOCUMENTS.

3. VERTICAL DATUM:
   - ALL ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAD 88):
     - NAVD = +20.00
     - NAVD = +20.00
     - NAVD = +20.00
     - NAVD = +20.00
   - Design Seismic Elevation:
     - Base Seismic Elevation: EL -12.00
     - Track Seismic Elevation: EL -15.00

4. ENVIRONMENT:
   - HIGHLY CORROSIVE FOR ALL ELEMENTS OF THE SEAWALL

5. DESIGN ASSUMPTIONS:
   - ADEQUATE LOADS
   - RANDOMLY DISTRIBUTED STEEL
   - K = 1.0
   - LIVE LOAD: UNIFORM DISTRIBUTED LIVE LOAD - 20 PSF
   - SUBGRADE CATEGORIES
   - HIGHWAY BRIDGES, 100 YEAR
   - ICE LOAD: NOT APPLICABLE
   - UTILITIES LOAD: NO ALLOWANCE FOR UTILITY LOADS HAS BEEN INCLUDED IN THE DESIGN

6. ALL WELDING METHODS SHALL BE OF STEEL SERIES TO CONFORM WITH AASHTO HIGHWAY WELDING CODE.

7. ALL INFORMATION ON THE EXISTING STRUCTURE SHOWN ON THESE PLANS WAS OBTAINED FROM THE EXISTING DRAWINGS OF THE ORIGINAL CONSTRUCTION AND CONTRACTOR RECONSTRUCTION CONTRACTS, BUT MAY DIFFER FROM ACTUAL CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR VERIFICATION OF ALL CONDITIONS AND EXISTING SEAWALL CONDITION AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES AND INCONVENIENCES BEFORE COMMENCING WITH THE WORK.

### TOTAL BILL OF MATERIALS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEBRIED TOP EXISTING SHEET PILE</td>
<td>SQUARE FEET</td>
<td>1500</td>
</tr>
</tbody>
</table>

| INSTALL ORDER PROVIDED SHEET SEAWALL SHEET PILES HO:O LONG | LINEAR FEET | 561.35 |
| INSTALL ORDER PROVIDED BASE SEAWALL SHEET PILES ISO:O LONG | LINEAR FEET | 411.15 |
| INSTALL ORDER PROVIDED OCEAN SHEET PILES ISO:O LONG | LINEAR FEET | 146.5 |

| GROIN CONNECTORS | EACH | 3 |
| CROSS-SEWN OCEAN BARRIER WALL, CHANNEL PLATES, BOLTS, NUTS, AND WASHERS | POULDS | APPROX | 15000 |
| CROSS-SEWN OCEAN BARRIER WALL, CHANNEL PLATES, BOLTS, NUTS, AND WASHERS | EACH | 61 |
| OCEAN EARTHWORK | LINEAR FEET | 5748.5 |
| REINFORCED CONCRETE SEAWALL | LINEAR FEET | 1000 |

<table>
<thead>
<tr>
<th>PROJECT NO. SOUTHDOCK</th>
<th>STATION</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

### CONCRETE

Concrete shall contain cement and aggregate to conform with all specifications for all applications. (No additional information provided.)

### CONCRETE CHAMBERS

All exposed corners on structures shall be chamfered 3/4.

### REINFORCING STEEL

All reinforcing steel shall be epoxy coated. Dimensions relative to placement of reinforcing are to be observed. Bars shall be staggered at the ends of the members. The dimensions on bar details are to the centers of bars or are drawn to suit as required. Reinforcement is to be provided for steel where indicated on the plans. When bar support pieces are placed on continuous lines, they shall be so placed that the ends of the supporting pieces shall be lagged to lock legs in adjusting pieces.

### DRAWN BY: [Signature]

### CHECKED BY: [Signature]

### DESIGNED BY: [Signature]

### DEPARTMENT OF TRANSPORTATION PUBLIC WORKS

### GENERAL NOTES
FERRY BASIN SIDE

CONTRACTOR SHALL FILL VOID WITH SAND

EXISTING SEALED EL: -5.0 ft

NEW STEEL SHEET PILE SEAWALL LOCATED

DESIGN SCOUR EL: -20.0 ft

TIP OF SEAWALL EL: -46.0 ft

NOTE: ALL TIE ROD COMPONENTS TO BE GALVANIZED.

HATTERAS INLET SIDE

APPROX. LIMITS OF EXCAVATION TO INSTALL TIE ROD AND CONCRETE CAP

APPROXIMATE FINISHED GRADE

VARES (15' to 150')

CONCRETE CAP, TYP. SEE DETAIL A

EL: +5.0 ft

EL: +3.0 ft

EL: +0.0 ft

0.0 NAVGIRB

EXISTING SEALED VARES

NEW STEEL SHEET PILE SEAWALL LOCATED

DESIGN SCOUR EL: -35.0

TIP OF SEAWALL EL: -76.0 ft

SECTION A-A

PROJECT NO. SOUTHDOCK

HYDE COUNTY

STATION:

SEAWALL SECTION A-A

SEAPORT & HARBOUR

DATE OF APPROVAL:

REVISION SHEET NO.

DEPARTMENT OF TRANSPORTATION

NC DEPARTMENT OF TRANSPORTATION

NC, January 15, 2023
FERRY BASIN SIDE

CONTRACTOR SHALL FILL VOID WITH SAND

EXISTING SEABED EL -5.0 +

WSP STEEL SHEET PILE SEAWALL IRRATED

DESIGN SCOUR EL -20.0

TIP OF SEAWALL EL -46.0

HATTERAS INLET SIDE

APPROXIMATE FINISHED GRADE

CONCRETE CAP, TYP, SEE DETAIL A

APPROXIMATE LIMITS OF PILING TO INSTALL TIE RODS AND CONCRETE CAP

EXISTING SEABED VARIES

EXISTING SEABED EL -5.0 +

2/3" GALVANIZED TIE ROOD

NOTE:
ALL TIE ROD COMPONENTS TO BE GALVANIZED.

SEAWALL SECTION B-B

PROJECT NO. SOUTHDock

HYDE COUNTY

STATION:

1/3" GALVANIZED TIE ROOD

TIP OF SEAWALL EL -86.0

DESIGN SCOUR EL -25.0

TIP OF SEAWALL EL -86.0

DEPARTMENT OF TRANSPORTATION

SOUTH DOCK

SECTION B-B

PRELIMINARY PLANS

DRAWN BY: G.WICKLAND DATE: 08/2018
CHECKED BY: M.WINTER DATE: 08/2018
DESIGN ENGINEER OF RECORD: G.WICKLAND DATE: 08/2018

NC LICENSE NO. 148-025

REV

S-5

SHEET NO

4
HISTORIC ARCHITECTURE AND LANDSCAPES
NO SURVEY REQUIRED FORM

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<td>Hyde</td>
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<td>Fed. Aid No:</td>
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**Project Description:**
Emergency Seawall Installation at north end of Ocracoke Island: Installation of 900 feet of sheet pile to protect the eroding area (along both the basin and the sound sides of the point) at the South Dock of the ferry on Ocracoke Island. Will also require grading an area to install a crane for use during the construction. For the purposes of this review, the Area of Potential Effects is the area around the ferry dock and the hairpin turn at the north end of the island.

**SUMMARY OF HISTORIC ARCHITECTURE AND LANDSCAPES REVIEW**

**Description of review activities, results, and conclusions:**
HPOWeb confirms that there are no NR-listed or eligible properties within the project APE. The project falls within the Cape Hatteras National Seashore which is under the jurisdiction of the National Park Service. Project area was reviewed in Google Street View and found no historically significant structures or landscapes in the project area. Therefore, no historic properties will be affected by the proposed work and the project is in compliance with Section 106 of the NHPA.

**Why the available information provides a reliable basis for reasonably predicting that there are no unidentified significant historic architectural or landscape resources in the project area:**
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SUPPORT DOCUMENTATION

☑ Map(s)  ☐ Previous Survey Info.  ☐ Photos  ☐ Correspondence  ☑ Design Plans

FINDING BY NCDOT ARCHITECTURAL HISTORIAN

Historic Architecture and Landscapes -- NO SURVEY REQUIRED

Mary Pope Furr  6/18/2019

NCDOT Architectural Historian  Date

Vicinity map South Dock of the Ferry on Ocracoke
Permit Drawings for South Dock of the Ferry on Ocracoke

Geotechnical Drawings for South Dock of the Ferry on Ocracoke

Historic Architecture and Landscapes NO SURVEY REQUIRED form for Minor Transportation Projects as Qualified in the 2007 Programmatic Agreement.

Page 3 of 3
NO ARCHAEOLOGICAL SURVEY REQUIRED FORM

This form only pertains to ARCHAEOLOGICAL RESOURCES for this project. It is not valid for Historic Architecture and Landscapes. You must consult separately with the Historic Architecture and Landscapes Group.

PROJECT INFORMATION

Project No: Shoreline Stabilization
WBS No: 15401.1048012
County: Hyde
Document: Federal CE
F.A. No:  
Funding: ☑ State ☐ Federal

Federal Permit Required? ☑ Yes ☐ No Permit Type: USACE

Project Description: The project involves the stabilization of the shoreline in order to protect the basin in Hyde County, North Carolina. Erosion has compromised the integrity of the ferry basin bulkhead and rendered the vehicle stacking lanes unusable. To mitigate the erosion, installation of a new sheet pile wall on both the sound and basin sides of the point will be constructed. The archaeological Area of Potential Effects (APE) encompasses all areas of potential ground disturbing activity as depicted on the attached GIS mapping.

SUMMARY OF CULTURAL RESOURCES REVIEW

Brief description of review activities, results of review, and conclusions:
Permitting and funding information was reviewed for determining the level of archaeological input required by state and federal laws. Based on the submitted “request for cultural resources review” form, the project is state-funded with federal permit interaction. As such, Section 106 of the National Historic Preservation Act will apply and the United States Army Corps of Engineers (USACE) will serve as the lead federal agency. Next, construction design and other data was examined (when applicable) to define the character and extent of potential impacts to the ground surfaces embracing the project locale.

Once an APE was outlined, a map review and site file search was conducted at the Office of State Archaeology (OSA) on Thursday, June 13, 2019. No NRHP eligible archaeological sites or any other previously documented archaeological sites are located within or adjacent to the APE.

Examination of National Register of Historic Places (NRHP), State Study Listed (SL), Locally Designated (LD), Determined Eligible (DE), and Surveyed Site (SS) properties employing resources available on the NC SHPO website is important in establishing the location of noteworthy historic occupations related to a perspective construction impact area. A cross-check of these mapped resources concluded that none of the above properties with possible contributing archaeological components are situated within or proximal to the APE.

In addition, historic maps of Hyde County were appraised to identify former structure locations, land use patterns, cemeteries, or other confirmation of historic occupation in the project vicinity. Archaeological/historical reference materials were inspected as well. In general, the cultural background review established that no previously recorded archaeological sites, cemeteries, or NRHP listed archaeological sites are located within the APE. Based on cultural-historical factors, the APE is considered to have a low potential for the documentation of archaeological resources.

Further, topographic, geologic, flood boundary, and NRCS soil survey maps were referenced to evaluate pedological, geomorphological, hydrological, and other environmental determinants that may have resulted in past occupation at this location. Aerial and on-ground photographs (NCDOT Spatial Data Viewer) and the Google Street View map application (when amenable) were also examined/utilized for additional assessment of...
disturbances, both natural and human induced, which compromise the integrity of archaeological sites. Environmental/impact factors do not suggest a heightened potential for archaeological resource recovery.

Brief Explanation of why the available information provides a reliable basis for reasonably predicting that there are no unidentified historic properties in the APE:
The entire project study area is largely disturbed from erosion. There are no existing NRHP eligible archaeological sites within the projects APE, and it is unlikely to contain significant, intact, and preserved archaeological deposits. As currently proposed as a state-funded project with federal permits, no further consultation is advocated. A finding of "no archaeological survey required" is considered appropriate.

This project falls within a North Carolina County in which the Catawba Indian Nation has expressed an interest: Hyde County. It is recommended that you contact each federal agency involved with your project to determine their Section 106 Tribal consultation requirements.

SUPPORT DOCUMENTATION
See attached:  ❑ Map(s)  ❑ Previous Survey Info  ❑ Photos  ❑ Correspondence
❑ Photocopy of County Survey Notes  Other:

FINDING BY NCDOT ARCHAEOLOGIST

NO ARCHAEOLOGY SURVEY REQUIRED

[Signature]
NCDOT

6-20-2019

"No ARCHAEOLOGY SURVEY REQUIRED" form for the Amended Minor Transportation Projects as Qualified in the 2015 Programmatic Agreement.
2 of 2
Brittingham, Cathy

From: Staples, Shane
Sent: Thursday, June 20, 2019 4:52 PM
To: Brittingham, Cathy
Cc: Daisey, Greg; Howell, Jonathan; Deaton, Anne
Subject: RE: CAMA 224-87 Major Modification Request- Southdock Shoreline Stabilization Emergency
Attachments: NCDOT Southdock of Hatteras Ferry Emergency Mod Request #224-07.pdf

Cathy,

I've attached the comment letter stating that NCDMF does not have objections to the project as proposed. While NCDMF discourages the hardening of a shoreline in such a dynamic environment as an inlet we do understand the purpose and need of protection of the ferry basin, roadway, and other upland infrastructure associated with the Southdock of the Hatteras Ferry. NCDMF echoes the concerns made by NCWRC; if changes were to occur that led to a redesign of the project or addition structure was continued eastward of the current project towards the ocean side of the inlet further coordination would be requested.

Thanks,
Shane
Shane Staples
Fisheries Resource Specialist
Division of Marine Fisheries
North Carolina Division of Environmental Quality
252-948-3950 office
Shane.staples@ncdenr.gov
943 Washington Square Mall
Washington, NC 27817

-----Original Message-----
From: Brittingham, Cathy
Sent: Wednesday, June 19, 2019 2:25 PM
To: Staples, Shane <shane.staples@ncdenr.gov>
Cc: Daisey, Greg <Greg.Daisey@ncdenr.gov>; Howell, Jonathan <jonathan.howell@ncdenr.gov>
Subject: FW: CAMA 224-87 Major Modification Request- Southdock Shoreline Stabilization Emergency

Hi Shane,

Attached please find an initial application from the NCDOT Ferry Division for an Emergency Major Modification of CAMA Permit 224-87 to construct an emergency shoreline stabilization project at the Hatteras Southdock Ferry Terminal on Ocracoke Island. Please note that DCM is in the process of notifying NCDOT of some additional required information and edits to the initial application. Due to the emergency situation, however, I did not want to wait to provide you with this initial application. I will forward you any revisions that we receive to the application.

Also attached in WORD please find a request for your agency's comments.

Due to the expedited timeframe of this emergency project, DCM would greatly appreciate receiving your comments as soon as possible.

Please let me, Greg Daisey or Jonathan Howell know if you have any questions or concerns.
MEMORANDUM

TO: Shane Staples, DCM

CC: Greg Daisey, DCM

FROM: Cathy Brittingham, Transportation Project Coordinator

DATE: June 19, 2019

SUBJECT: NCDOT Ferry Division Emergency Major Modification Request, Shoreline Stabilization at the Hatteras South Dock Ferry Terminal on Ocracoke, NC, CAMA Major Permit No. 224-87.

Please indicate below your agency’s position or viewpoint on the proposed project and return this form as soon as possible to Cathy Brittingham via e-mail at cathy.brittingham@ncdenr.gov. If you have any questions regarding the proposed project, please contact Cathy Brittingham at (919) 707-9149 or Greg Daisey at (252) 207-3656. When appropriate, in-depth comments with supporting data are requested.

REPLY

☑ This agency has no objection to the project as proposed.

☐ This agency has no comment on the proposed project.

☐ This agency approves of the project, only if the recommended changes are incorporated. See attached.

☐ This agency objects to the project for reasons described in the attached memo.

Signed [Signature] Date 6/20/19
Brittingham, Cathy

From: Wilson, Travis W.
Sent: Friday, June 14, 2019 9:58 AM
To: Doliber, Brian C; Brittingham, Cathy
Cc: Winslow, Lancelot D; Dalsey, Greg; gary_jordan@fws.gov
Subject: RE: Southdock Emergency Seawall

WRC has reviewed the proposed work and we do not have any objections to the proposed action as shown in the permit drawings. However if for any reason the proposed scope of work is shifted further east toward the beach side of the inlet WRC would need to have additional review and coordination.

I will be out of the office with limited email access until July 1. Unless there are significant changes to this permit application prior to submittal, DCM should accept this email as WRC's response to the permit review.

Travis W. Wilson
Eastern Region Highway Project Coordinator
Habitat Conservation Program

NC Wildlife Resources Commission
1718 Hwy 56 West
Creedmoor, NC 27522
Phone: 919-707-0370
Fax: 919-528-2524
Travis_Wilson@ncwildlife.org
ncwildlife.org

From: Doliber, Brian C
Sent: Thursday, June 13, 2019 2:32 PM
To: Wilson, Travis W. <travis.wilson@ncwildlife.org>
Cc: Winslow, Lancelot D <lwinslow@ncdot.gov>
Subject: Southdock Emergency Seawall

Travis,

I believe DCM has already given you a heads up on this but they wanted us to reach out to you about the Southdock emergency project prior to submitting our application here in a couple days. I have provided a narrative below and attached some of the permit drawings. Please let me know if you have any questions or concerns regarding this project.

Hatteras Southdock Ferry Terminal

A Declaration of Emergency was issued on March 13, 2019 because of the significant damage incurred to the ferry basin bulkhead and stacking lanes due to erosion. The northern shoreline is actively scouring and requires stabilizing before the paved stacking lanes and protective dunes are destroyed. If continued erosion were to cause the existing bulkhead to fail, the entire basin would be impacted.
1000 feet of micropoxy 646 coated steel sheet pile is to be installed from the southeast corner of the active ferry basin, where an existing, dilapidated seawall exists, to a point north of asphalt stacking lanes. The seawall will be installed in front of an existing steel sheet pile seawall on the south side of the site within the ferry basin and then wrap around the north side running parallel to Hatteras Inlet. The basin and sound-side seawalls will be anchored together with galvanized tie rods and reinforced concrete caps that serve as wales. The site will require excavation and earthwork to install the tie rods and reinforced concrete seawall cap. The existing seawall on the basin side requires partial demolition to allow installation of the new seawall. A grout closure column will be installed at the south intersection of the new and existing seawalls to provide closure and prevent loss of fill material. Sand fill will be transported from the dredge spoil site located on the other side of the ferry basin and be placed between the new and existing steel sheet piles. The sound-side seawall will extend along the north side of the Ferry Terminal peninsula and partially extend around the north end of the vehicular stacking lanes without intruding on the inlet hazard area. The seawall at the stacking lanes will be anchored back to a buried steel sheet pile deadman with a galvanized double steel channel wale assembly. After complete installation of the seawall the site would be filled and regraded with sand from the dredge spoil site to match the existing dune elevations.

The open end of the seawall to the north of the stacking lanes is to be “filled in” with sand bags to reduce the potential for future erosion. A variety sand bag sizes will be used. The dimensions and placement locations can be found in the attached drawings. The sandbags would be placed in an area located partially within the inlet hazard area.

Thank you,

Brian Doliber
Environmental Specialist
Ferry Division
252 232 8025  mobile
252 621 6251  office
bcdoliber@ncdot.gov
159 Lucinda Lane
Powells Point, NC 27966
APPROVAL of 401 WATER QUALITY CERTIFICATION and TAR-PAMLICO BUFFER AUTHORIZATION with ADDITIONAL CONDITIONS

Mr. Brian Doliber
NCDOT Ferry Division
159 Lucinda Lane
Powells Point, NC 27966

Dear Mr. Doliber:

You have our approval, in accordance with the conditions listed below, for the following impacts for the purpose of installing 1,000 feet of sheet pile and temporary sand bags as needed for shoreline stabilization at the Southdock Ferry facility in Hyde County.

<table>
<thead>
<tr>
<th>Site</th>
<th>Fill in Open Waters (ac)</th>
<th>Buffer Zone 1 (sq ft)</th>
<th>Buffer Zone 2 (sq ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southdock</td>
<td>0.40</td>
<td>20,420</td>
<td>6,476</td>
</tr>
</tbody>
</table>

The project shall be constructed in accordance with your application dated received June 19, 2019 and supplemental information received June 25, 2019 and June 28, 2019. After reviewing your application, we have decided that these impacts are covered by General Water Quality Certification Number 4134. This certification corresponds to the Nationwide Permit 13 issued by the Corps of Engineers. This approval is also valid for the Tar-Pamlico Riparian Buffer Rules (15A NCAC 2B.0259). In addition, you should acquire any other federal, state or local permits before you proceed with your project including (but not limited to) Sediment and Erosion Control, Non-Discharge and Water Supply Watershed regulations. This approval will expire with the accompanying 404 permit.

This approval is valid solely for the purpose and design described in your application (unless modified below). Should your project change, you must notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If total wetland fills for this project (now or in the future) exceed one acre, or of total impacts to streams (now or in the future) exceed 300 linear feet, compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). Additional buffer impacts may require compensatory mitigation as described in 15A NCAC 2B.0259. For this approval to remain valid, you must adhere to the conditions listed in the attached certification(s) and any additional conditions listed below.

Condition(s) of Certification:

1. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

2. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]
3. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S. or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

4. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]

5. No drill slurry or water that has been in contact with uncured concrete shall be allowed to enter surface waters. This water shall be captured, treated, and disposed of properly. [15A NCAC 02H.0506(b)(3)]

6. NCDOT shall be in compliance with the NCS00250 issued to the NCDOT, including the applicable requirements of the NCG01000.

7. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H.0506(b) and (c)(3) and 15A NCAC 02B.0200]
   a. Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the North Carolina Sediment and Erosion Control Manual, or for linear transportation projects, the NCDOT Sediment and Erosion Control Manual.
   b. All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.
   c. For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the North Carolina Surface Mining Manual. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.
   d. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-1, WS-11, High Quality Waters (HQW), or Outstanding Resource Waters (ORW), then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B.0124, Design Standards in Sensitive Watersheds. [15A NCAC 02H.0506(b)(3) and (c)(3); GC 4135]

8. Erosion control matting in riparian areas shall not contain a plastic or nylon mesh grid which can impinge and entrap small animals. Matting should be secured in place by staples, stakes, or wherever possible live stakes of native trees. Riparian areas are defined as a distance 25 feet from top of stream bank. [15A NCAC 02B.0201]

9. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in disequilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed from wetlands and waters and the natural grade restored within two (2) months of the date that the Division of Energy, Mining and Land Resources (DEMLR) or locally delegated program has released the specific area within the project. [15A NCAC 02H.0506(b)(3) and (c)(3)]

10. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction. (15A NCAC 2B.0259)

11. All stormwater runoff shall be directed as sheetflow through stream buffers at non-erosive velocities, unless otherwise approved by this certification. (15A NCAC 2B.0259)
12. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

13. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

14. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and the "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

15. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H.0507(c) and 15A NCAC 02H.0506(b)(2) and (c)(2)]

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.

The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919) 431-3000, Facsimile: (919) 431-3100

A copy of the petition must also be served on DEQ as follows:

Mr. Bill F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center

This letter completes the review of the Division of Water Resources under Section 401 of the Clean Water Act. If you have any questions, please contact Garey Ward at (252)946-6481 or garey.ward@ncdenr.gov.

Sincerely,

[Signature]
Linda Culpepper, Director
Division of Water Resources

Electronic copy only distribution:
Kyle Barnes, US Army Corps of Engineers, Washington Field Office
Sabrina Henry, National Park Service, sabrina_henry@nps.gov
Greg Daisey, NC Division of Coastal Management
Cathy Brittingham, NC Division of Coastal Management
Garey Ward, NC Division of Water Resources Washington Regional Office
TO: Jonathan Howell, District Manager, DCM

THROUGH: Cathy Brittingham, Transportation Project Coordinator, DCM

FROM: Greg Daisey, Transportation Project Field Representative, DCM

SUBJECT: Comments & Recommendations – Emergency Modification to CAMA Major Permit No. 224-87- Proposed Emergency Shoreline Stabilization adjacent to the Southdock Ferry Facility located on Ocracoke Island, Hyde County, NC.

DATE: June 21, 2019

The following are my comments and recommendations regarding the above mentioned proposal. The request is for the installation of approximately 1000 linear feet of sheet pile bulkhead, including supporting elements, for emergency shoreline stabilization at the Hatteras Southdock Ferry Terminal on Ocracoke Island, Hyde County, NC. Based upon my review I have no objection to the issuance of this permit for proposed activities outside the Inlet Hazard Area of Environmental Concern, but offer the following conditions:

1. Nothing in this permit authorizes any activity which has not received approval from NPS for work within the Cape Hatteras National Seashore. The proposed work shall not commence until the permittee has been issued a Special Use Permit from the NPS, if one is required, and a copy of the Special Use Permit is received by DCM.

2. This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required, including any approvals that may be required for the use of the proposed borrow area(s).

3. Any existing temporary erosion control structures within the project area that are no longer necessary shall be removed in their entirety, including the removal of remnants of all portions of any damaged temporary erosion control structures.

4. All fill material, including that used to fill the sandbags, shall be clean and free of any pollutants, except in trace quantities.
5 The permittee shall exercise all available precautions in the day-to-day operations of the facility to prevent waste from entering the adjacent waters and wetlands.

6 All fill material shall be clean and free of any pollutants except in trace quantities.

7 Live concrete shall not be allowed to contact waters of the State or water that will enter waters of the State.

8 The installation of the sheet pile shall be accomplished by pile driving and/or the use of a vibratory hammer. Should the permittee and/or its contractor desire to utilize another type of pile installation, additional authorization from the N.C. Division of Coastal Management (DCM) shall be required.

9 All construction access shall be through the use of the existing high ground areas.

10 Construction staging areas shall be located only in upland areas, and not in wetlands or waters of the State.

11 The temporary placement and double handling of any excavated or fill material within waters or vegetated wetlands is not authorized.

12 This project shall conform to all requirements of the N.C. Sedimentation Pollution Control Act and NCDOT’s Memorandum of Agreement with the Division of Land Resources.

13 Appropriate sedimentation and erosion control devices, measures, or structures shall be implemented to ensure that eroded materials do not enter adjacent wetlands, watercourses, and property (e.g. silt fence, diversion swales or berms, etc.).

14 In order to protect water quality, runoff from construction shall not visibly increase the amount of suspended sediments in adjacent waters.

15 If it is determined that additional permanent and/or temporary impacts are necessary that are not shown on the attached work plan drawings or described in the authorized permit application, a permit modification and/or additional authorization from DCM shall be required. In addition, any changes in the approved plan may also require a permit modification and/or additional authorization from DCM. The permittee shall contact a representative of DCM prior to commencement of any such activity for this determination and any permit modification.

16 No attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work following completion of construction and demolition activities.
17 During construction, the permittee shall make every attempt to not impede navigation in the project vicinity. If this is not possible, then adequate notice shall be provided to the public that navigation will be limited during construction. The notice shall include an estimate of the amount of time that the limited navigation will occur.

18 The permittee shall install and maintain at his expense any signal lights or signals prescribed by the U.S. Coast Guard, through regulation or otherwise, on the authorized facilities. At minimum, permanent reflectors shall be attached to the structure in order to make it more visible during hours of darkness or inclement weather.

19 The bulkhead shall be structurally tight so as to prevent seepage of fill materials through the structure.

20 The bulkhead shall be solid and constructed of treated wood, concrete slabs, metal or vinyl sheet piles or other suitable materials approved by DCM.

21 The bulkhead shall be in place prior to any backfilling activities.

22 In accordance with commitments made by the permittee, the source of backfill material shall be sand from the dredge spoil site located on the west side of the Southdock Ferry Basin.

23 In accordance with commitments made by the permittee, after installation of the authorized sheet pile bulkhead is complete, the site shall be filled and regraded with sand from the authorized dredge spoil site to match the existing dune elevations and reseeded with proper beach vegetation.

24 The permittee and/or his contractor shall contact the DCM Transportation Project Field Representative in Elizabeth City at (252) 264-3901 to request a pre-construction conference prior to project initiation.

25 This Major Modification shall be attached to the original of Permit No. 224-87, which was issued on 11/20/87, as well as all subsequent modifications, renewals and letters of refinement, and copies of all documents shall be readily available on site when a Division representative inspects the project for compliance.

26 All conditions and stipulations of the active permit remain in force under this Major Modification unless altered herein.

**NOTE:** This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.
Based upon my review I recommend the proposed temporary erosion control structures depicted on the workplan drawings within the Inlet Hazard Area of Environmental Concern be denied due to the following:

1. The proposed temporary erosion control structures constitute development under the Rules of the Coastal Resources Commission (CRC) in an area classified by the N.C. Administrative Code as an Inlet Hazard Area of Environmental Concern.

2. The proposed placement and design of the temporary erosion control structures does not conform to the requirements of 15A NCAC 07H 0308(a)(2), including but not necessarily limited to the requirement that permittable temporary erosion control structures shall be limited to sandbags placed landward of mean high water and parallel to the shore, and that sandbags used to construct temporary erosion control structures shall be tan in color and three to five feet wide and seven to 15 feet long when measured flat. Base width of the temporary erosion control structure shall not exceed 20 feet, and the total height shall not exceed six feet, as measured from the bottom of the lowest bag.
STATE OF NORTH CAROLINA
Department of Environmental Quality
and
Coastal Resources Commission

Permit
for

X Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118

X Excavation and/or filling pursuant to NCGS 113-229

Issued to N.C. DOT Ferry Division, 159 Lucinda Lane, Powells Point, NC 27966

Authorizing development in Hyde County at the Hatteras Southdock Ferry Terminal at the north end of Ocracoke Island, as requested in the permittee's application dated 6/20/19, including the attached workplan drawings (9), as described in Condition No. 2 below & attached AEC Hazard Notice dated 6/13/19.

This permit, issued on June 21, 2019, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

1) Unless specifically altered herein, this Major Modification authorizes the installation of approximately 1,000 linear feet of sheet pile bulkhead, including supporting elements and sandbags, for emergency shoreline stabilization at the Hatteras Southdock Ferry Terminal, as depicted on the attached workplan drawings.

2) All work authorized by this permit shall be carried out in accordance with the following attached workplan drawings (9), except as modified herein: (1) dated 6/20/19, (1) dated received 6/13/19 and (7) dated 5/22/19.

(See attached sheets for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

December 31, 2022

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signature of Permittee

Signed by the authority of the Secretary of DEQ and the Chair of the Coastal Resources Commission.

Braxton C. Davis, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.
ADDITIONAL CONDITIONS

3) In keeping with 15A NCAC 07H .0308(a)(2)(L) of the rules of the Coastal Resources Commission, the sandbags used to construct the temporary erosion control structure shall be tan in color and 3 to 5 feet wide and 7 to 15 feet long when measured flat with a base width that does not exceed 20 feet and a total height not exceeding 6 feet, as measured from the bottom of the lowest bag.

4) No portion of the authorized temporary erosion control structure shall be located more than 20 feet waterward of the road right-of-way.

5) In keeping with 15A NCAC 07H .0308(a)(2)(A) of the rules of the Coastal Resources Commission, the temporary erosion control structure shall be limited to sandbags placed landward of mean high water and parallel to the shore.

6) This Major Modification does not authorize any activity which has not received approval from the National Park Service (NPS) for work within the Cape Hatteras National Seashore. The NPS issued Special Use Permit #USA19-5700-003 on April 19, 2019, however, due to changes in the project since that time, the proposed work shall not commence until the permittee has been issued an updated Special Use Permit from the NPS, if one is required, and a copy is received by DCM.

7) No open water areas shall be filled, even temporarily, outside of the areas indicated on the attached workplan drawings.

8) Placement of the authorized sheet pile bulkhead shall adhere to the alignment and dimensions as depicted on the attached workplan drawings.

9) The installation of the authorized sheet pile bulkhead shall be accomplished by driving and/or the use of a vibratory hammer. Should the permittee and/or its contractor propose to utilize another type of installation, such as jetting, additional authorization from DCM shall be required.

10) The authorized sheet pile bulkhead shall be in place prior to any backfilling activities. It shall be structurally tight so as to prevent seepage of fill materials through the structures.

11) In accordance with commitments made by the permittee, the source of backfill material shall be sand from the dredge spoil site located on the west side of the Southdock Ferry Basin.

12) All fill material shall be clean and free of any pollutants, except in trace quantities. No unconfined backfill material shall be discharged into waters of the State.

13) Uncured concrete shall not be allowed to contact waters of the State or water that will enter waters of the State.

14) The permittee and/or its contractor shall provide for proper storage and handling of all oils, chemicals, etc., necessary to carry out the project.

15) The temporary placement and double handling of any excavated or fill material within waters or vegetated wetlands is not authorized. This condition also applies to the authorized demolition of the top 3 feet of existing sheet pile on the basin side of the project area.
ADDITIONAL CONDITIONS

16) If the permittee and/or its contractor determines that new mooring points will be necessary for the proposed tug barges that may be used for construction access, then the permittee shall submit final plans for the mooring points, including specific location(s) and design(s) prior to their installation.

17) New dredging in any manner, including “kicking” with boat propellers is not authorized, without permit modification.

18) Construction staging areas shall be located only in upland areas, and not in wetlands or waters of the State.

19) Any existing temporary erosion control structures within the project area that are no longer necessary shall be removed in their entirety, including the removal of remnants of all portions of any damaged temporary erosion control structures.

20) Any waste materials or debris associated with construction, demolition, or other activities shall be disposed of at an approved upland site or shall be recycled in an environmentally appropriate manner provided appropriate authorizations from any relevant state, federal, or local authorities are obtained.

21) Development authorized by this permit shall only be conducted on lands owned by the N.C. Department of Transportation (NCDOT) and/or its right-of-ways and/or easements and/or similar legal instruments.

22) This project shall conform to all requirements of the N.C. Sedimentation Pollution Control Act and the N.C. Department of Transportation’s (NCDOT’s) Memorandum of Agreement with the N.C. Division of Energy, Mineral and Land Resources.

23) If it is determined that additional permanent and/or temporary impacts are necessary that are not shown on the attached work plan drawings or described in the authorized permit application, a permit modification and/or additional authorization from DCM shall be required. In addition, any changes in the approved plan may also require a permit modification and/or additional authorization from DCM. The permittee shall contact a representative of DCM prior to commencement of any such activity for this determination and any permit modification.

24) The permittee shall install and maintain at its expense any signal lights or signals prescribed by the U.S. Coast Guard, through regulation or otherwise, on the authorized facilities. At a minimum, permanent reflectors shall be attached to the structure in order to make it more visible during hours of darkness or inclement weather.

25) This Major Modification does not eliminate the need to obtain any additional permits, approvals or authorizations that may be required. This includes authorization, if required, from the N.C. Division of Water Resources, the U.S. Army Corps of Engineers, and/or the National Park Service.

26) This Major Modification shall be attached to the original of Permit No. 224-87, which was issued on 11/20/87, as well as all subsequent modifications, renewals and letters of refinement, and copies of all documents shall be readily available on site when a Division representative inspects the project for compliance.
ADDITIONAL CONDITIONS

27) All conditions and stipulations of the active permit remain in force under this Major Modification unless altered herein.

NOTE: In accordance with G.S. 113A-118(f), the permit fee for this emergency action was waived.
June 26, 2019

Via E-Mail
Ms. Renee Cahoon, Chairman, North Carolina Coastal Resources Commission
c/o Mary Lucasse, Esq.
Special Deputy Attorney General
North Carolina Department of Justice
E-Mail: mlucasse@ncdoj.gov

Re: Request for Emergency Variance Hearing

Dear Ms. Cahoon:

Pursuant to N.C.G.S. § 143-318.12(f) and 15A N.C.A.C. 7J.0701, we respectfully request on behalf of our client, the N.C. Department of Transportation ("NCDOT"), that the Coastal Resources Commission ("CRC") grant NCDOT an expedited hearing in connection with an emergency variance petition. We would request that this matter be heard at the July 17-18, 2019 CRC meeting in Beaufort, NC.

The petition for an emergency variance will be submitted in the near future and concerns CAMA major permit 224-87 as recently modified on June 21, 2019 for the installation of a steel sheet pile bulkhead and other shoreline stabilization activities at the Hatteras Southdock Ferry Terminal in Ocracoke, NC. The petition will seek a variance from CRC rules pertaining to the physical specifications of sandbags. The purpose of the requested design of the sandbag structure is to act as a temporary groin system and prevent further erosion from occurring from easterly winds while NCDOT and the National Park Service complete a NEPA analysis of a proposed long-
term groin project. The proposed design of the sandbags will protect the material behind the sheet pile wall. Otherwise, the area behind the sheet pile wall will not be stabilized and the material will be lost.

The ferry basin bulkhead and stacking lanes have incurred significant pavement damage, due to a shifting channel and erosion that has rapidly increased. The erosion has rendered the vehicle stacking lanes unusable, which in turn has caused a disruption of service and a safety issue for the traveling public. If continuing erosion causes the bulkhead to fail it would impact the entire ferry basin and significantly affect residents and visitors. Ferries are the primary means of access to and from Ocracoke Island. The Southdock Terminal is the only ferry terminal located at the northern end of Ocracoke Island. It is used by the only ferry that provides vehicle transportation to Hatteras Island and the northern coast. There are two other vehicle ferries located at the southern end of the island, however these ferries provide transportation to Cedar Island and Swan Quarter. These ferries do not run as frequently and are significantly longer trips.¹ There is also a passenger-only ferry which runs between southern Ocracoke and Hatteras Island, but it makes only three round trips per day and cannot carry vehicles. Many local residents of Ocracoke and Hatteras depend on the Hatteras Island Ferry to get to their jobs as well as for medical care. The Hatteras Island Ferry also serves as an emergency and hurricane evacuation route for Ocracoke Island and Hatteras Island.

NCDOT and the public at large are facing “unexpected circumstances that require immediate consideration by the [CRC].” N.C.G.S. § 143-318.12(f). The variance that NCDOT seeks is for the purpose of stabilizing the northern shoreline, that is actively scouring, before the

¹ The Hatteras Island vehicle ferry makes over 30 departures per day and takes 1 hour. The Cedar Island Ferry makes 5 departures per day and takes 2 hours and 15 minutes. The Swan Quarter Ferry makes 4 departures per day and takes 2 hours and 40 minutes.
paved stacking lanes and protective dunes are destroyed. If the area around the point is not protected and erodes away, this would eliminate a safe harbor for the NCDOT ferries while docked loading/unloading traffic. This area is in need of emergency repair to allow continued safe travel of the public. Delay in the consideration of NCDOT’s variance petition will affect efforts to restore the area and thereby have a direct effect on the public’s safety and welfare.

It is our understanding that the CRC’s next meeting is on July 17-18, 2019 and we respectfully ask that the CRC to hear the emergency variance petition at that time. Please contact us with any questions or concerns. We appreciate your consideration.

Respectfully submitted,

Mollie L. Cozart
Assistant Attorney General

cc: (via e-mail)
Christine Goebel, Esq., NCDEQ
Mr. Lancelot D. Winslow, NCDOT
June 26, 2019

By email to mlucasse@ncdoj.gov
Renee Cahoon, Chair of the CRC
c/o Mary Lucasse, CRC Counsel
Special Deputy Attorney General
North Carolina Department of Justice

RE: Request by NC DOT for expedited variance of CRC-VR-19-07

The following is DCM Staff’s ("Staff") response to the June 26, 2019 request by the NC Department of Transportation ("Petitioner") to have an expedited hearing on its variance petition seeking authorization for temporary shoreline stabilization at the Hatteras Southdock Ferry Terminal in Ocracoke, NC. Staff does not oppose the request for an expedited hearing if it is pursuant to the schedule and conditions set forth below.

Staff’s primary concern is ensuring that the schedule affords sufficient time for the variance process to be adequately completed (i.e. for the parties to agree on stipulated facts, to complete Staff’s recommendation, and to compile all appropriate materials for the Commission’s review). Staff understands the Chair’s latest deadline for the delivery of this variance packet is Friday, July 12, 2019. With this in mind, if the Chair grants the request for an expedited hearing based on the Petitioner’s assertions, Staff believes it can adequately prepare for the matter to be heard at the July CRC meeting and deliver a complete variance packet by Friday, July 12, 2019, provided that Staff and Petitioner have reached agreement on stipulated facts by Tuesday, July 9, 2019.

Thank you for your consideration and please contact me if you have further questions.

Sincerely,

Christine A. Goebel
Assistant Attorney General

cc: Mollie Cozart, Asst. AG and Petitioner’s Co-counsel, via email
Scott Slusser, Special Deputy AG and Petitioner’s Co-counsel, via email
Braxton C. Davis, DCM Director, via email
Angela Willis, DCM Director’s Assistant, via email
Ms. Renee Cahoon, via Ms. Mary Lucasse
June 26, 2019
Page 2

Debra Wilson, DCM WiRO DM, via email
Doug Huggett, DCM Major Permits Manager, via email
North Carolina Coastal Resources Commission

March 28, 2019

Via e-mail
Mollie Cozart, Assistant AG
NCDOJ - Transportation Division
1505 Mail Service Center
Raleigh, NC 27699-1505

Re: GRANT of Request for Expedited Hearing for Variance CRC-VR-19-07

Dear Ms. Cozart:

I have reviewed the June 26, 2019 letter submitted on behalf of Petitioner NC Department of Transportation seeking an expedited hearing on the variance request (forthcoming) seeking authorization for temporary shoreline stabilization at the Hatteras Southdock at the Ferry Terminal in Ocracoke, North Carolina. I have also reviewed the response submitted by counsel for North Carolina Division of Coastal Resources stating it did not object to the request.

Based on the information provided and taking that information at face value, I note Petitioners have described an urgent need to install a sandbag structure to act as a temporary groin system and prevent further erosion from occurring during easterly winds. This will protect the Southdock while Petitioner and the National Park Service complete a NEPA analysis of a proposed long-term groin project.

Given the information provided, I am granting Petitioner’s request to be placed on the agenda for the Commission’s regularly scheduled July 17, 2019 meeting even though Petitioner’s request for a variance was not received by the date required for it to be considered at that meeting.

This decision is limited to the finding that an expedited timeframe for placing the variance request on the agenda is justified and should not be read by anyone as an indication of how the Coastal Resources Commission will ultimately decide Petitioner’s request for a variance. The grant of the request is subject to the following schedule and conditions:

- DCM and Petitioner shall reach agreement on stipulated facts by Tuesday, July 9, 2019
- The variance packet shall be provided to the CRC by Friday, July 12, 2019

If you have any questions regarding this schedule or my decision, please direct them to Commission Counsel, Mary L. Lucasse at (919) 716-6069 or mlcuasse@ncdoj.gov.

Sincerely,

M. Renee Cahoon, Chair

cc: Christine A. Goebel, Counsel for DCM
    Braxton C. Davis, DCM Director, via email
    Angela Willis, DCM Director’s Assistant, via email
June 27, 2019

VIA CERTIFIED MAIL-RETURN RECEIPT REQUESTED
National Park Service
Cape Hatteras National Seashore
Attn: Sabrina S. Henry
1401 National Park Drive
Manteo, NC 27954

Re: CAMA Variance Request by NC Department of Transportation
159 Lucinda Lane, Powells Point, NC 27966

Dear Ms. Henry,

This is to notify you that the N.C. Department of Transportation is applying for a variance from the North Carolina Coastal Resources Commission to allow for the installation of a temporary erosion control system that is aligned and structured in a manner that acts as a temporary groin system to prevent any erosion from occurring from easterly winds while NCDOT and the National Park Service complete the NEPA analysis of the proposed long-term groin project. The proposed design and placement of the temporary sandbags for which the variance is sought will protect the material behind the recently permitted sheet pile wall. Otherwise, the area behind the sheet pile wall will not be stabilized and the material will be lost.

The variance is expected to be heard at the July 17-18, 2019 meeting of the Coastal Resources Commission. If you wish to receive further information concerning the variance, you may contact me. If you wish to make further comments on the variance, you may direct your
comments to the North Carolina Division of Coastal Management, 943 Washington Square Mall, Washington NC 27889. You may also contact a Division of Coastal Management representative at (252) 946-6481. If you have any questions or comments regarding this communication, please do not hesitate to contact me at (919) 707-4480. Thank you very much for your time and consideration in this matter.

Respectfully,

Mollie L. Cozart
Assistant Attorney General
Attorney for the NCDOT
RETURN RECEIPT (ELECTRONIC)

NATIONAL PARK SERVICE
CAPE HATTERAS NATIONAL SEASHORE
ATTN SABRINA S HENRY
1401 NATIONAL PARK DR
MANTEO, NC 27954-9451
NCDOT variance request (CRC-19-07)

Jonathan Howell
District Manager
Washington District
Division of Coastal Management

NC Coastal Resources Commission
Meeting on July 17, 2019

Department of Environmental Quality
Vicinity Map of Southdock Ferry Terminal, Hyde County
Southdock Ferry Terminal

6/15/18
Project Site
Looking West

Photo taken by NCDOT

12/5/18
Existing Bulkhead and Ferry Docking Facility
(ref. CAMA Major Permit #224-87)

Photo taken by DCM staff on 7/8/2019
Proposed Project Area

Proposed Sheet Pile

Photo taken by DCM staff on 7/8/2019
Shoreline at Project Site

Proposed Project Area

Photo taken by DCM staff on 7/8/2019
Proposed Project Area

Photo by NCDOT

1/23/19
Shoreline at Project Location – Facing East

Photo taken by DCM staff on 7/8/2019
Stacking Lanes

2/1/18  3/13/18
Petitioner's Project Drawings
(f) To grant a variance, the Commission must affirmatively find each of the four factors listed in G.S. 113A-120.1(a).

(1) that unnecessary hardships would result from strict application of the development rules, standards, or orders issued by the Commission;

(2) that such hardships result from conditions peculiar to the petitioner's property such as location, size, or topography;

(3) that such hardships did not result from actions taken by the petitioner; and

(4) that the requested variance is consistent with the spirit, purpose and intent of the Commission's rules, standards or orders; will secure the public safety and welfare; and will preserve substantial justice.