US Army Corps
of Engineers

Philadelphia District

DELAWARE BAY COASTLINE
DELAWARE AND NEW JERSEY
ROOSEVELT INLET - LEWES BEACH
COASTAL STORM RISK MANAGEMENT PROJECT
SUSSEX COUNTY, DE

ENVIRONMENTAL ASSESSMENT (EA)

SEPTEMBER 2017

PREPARED BY:

U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT

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DELAWARE BAY COASTLINE
DELAWARE AND NEW JERSEY
ROOSEVELT INLET - LEWES BEACH
COASTAL STORM RISK MANAGEMENT (CSRM) PROJECT
SUSSEX COUNTY, DE
FINDING OF NO SIGNIFICANT IMPACT (FONSI)

The Federal CSRM project for Lewes Beach requires a modification to the authorized plan to include truck hauling sand obtained from existing commercial quarries as an alternate sand source in addition to the existing approved dredging methods. The authorized plan at Lewes Beach consists of a terminal groin on the Lewes side of Roosevelt Inlet, and a 100-foot wide berm at an elevation of +8.0 feet NAVD for a total project length of 1,400 feet, which includes a 500-ft. taper along the eastern end of the project. This plan includes suitable beachfill with periodic nourishment to ensure the integrity of the design. Existing sand sources for the beachfill are obtained from dredging the Roosevelt Inlet Federal navigation channel and from Borrow Area A. This plan was previously evaluated in the 1997 Final Feasibility Report and Environmental Assessment and FONSI. Initial construction of the project was completed in 2004.

In accordance with the National Environmental Policy Act of 1969, as amended, the Philadelphia District prepared an Environmental Assessment (EA) to evaluate the use of truck hauling sand from existing commercial sand quarries as an alternate sand source.

The EA concludes that the proposed modification to the project, if implemented, would not likely jeopardize the continued existence of any species or the critical habitat of any fish, wildlife or plant, which is designated as endangered or threatened pursuant to the Endangered Species Act of 1973 as amended by P.L. 96-159.

The EA also concludes that the project can be conducted in a manner, which should not violate Delaware's Surface Water Quality Standards. Pursuant to Section 401 of the Clean Water Act, a 401 Water Quality Certificate (WQC) was received from the Delaware Department of Natural Resources in 2011, and modified to include truck haul fill in 2017.

Based on the information developed during preparation of the Environmental Assessment, and the application of appropriate measures to minimize project impacts, it was determined in accordance with Section 307(c) of the Coastal Zone Management Act of 1972 that the modification to the existing plan complies with and can be conducted in a manner that is consistent with the approved Coastal Zone Management Program of Delaware. The existing Federal consistency determination for this project was modified to include truck haul beachfill in 2017.

The project area affected by truck hauling of beachfill from an existing commercial quarry does not include known properties listed on, or eligible for listing on the National Register of Historic Places (NRHP); therefore, the proposed project will have no effect on historic properties eligible for or listed on the NRHP.

The proposed truck haul placement of sand from an existing commercial quarry will not significantly affect the quality of the human environment; therefore, an Environmental Impact Statement is not required.

28Sept2017
Date

Kristen N. Dahle
Lieutenant Colonel, Corps of Engineers
District Engineer

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1.0 INTRODUCTION

This document is being issued pursuant to 33 CFR 230.10(a) and is intended to present and evaluate new information for the Delaware Bay Coastline – Delaware & New Jersey – Roosevelt Inlet and Lewes Beach Coastal Storm Risk Management (CSRM) Project, which is an existing Federal project that was first constructed in 2004. The information in this document evaluates changes in the project construction that were not evaluated in the previously published National Environmental Policy Act (NEPA) document, which is the Final Feasibility Report and Environmental Assessment (EA)/Finding of No Significant Impact (FONSI) dated May,1997. The new information evaluates the need to deliver sand to the project area using a "truck haul" method, which was not evaluated in USACE (1997). To minimize duplication, only items involving the changes in the plan as previously proposed are addressed in this document. Items covered previously in the Final Feasibility Report and EA are incorporated by reference and are referenced herein as USACE (1997), unless otherwise specified.

The project is located along the Delaware Bay in the municipality of Lewes, Sussex County, Delaware (Figures 1 and 2). USACE (1997) evaluated alternative plans of improvement formulated on storm damage reduction benefits and reduced Federal maintenance dredging benefits. The authorized plan consists of berm and dune restoration utilizing sandy beachfill (dredged from Roosevelt Inlet Federal Navigation Channel and/or Borrow Area A) (Figure 2) with periodic nourishment, and the construction of a terminal groin on the Lewes side of Roosevelt Inlet.

The authorized project area extends along the shoreline of Lewes, from the eastern jetty (terminal groin) at Roosevelt Inlet a distance of 900 lineal feet eastward, with a 500 foot-long transition ("taper") into the beach area of Lewes beyond the project limit. The total project length is thus 1,400 feet. Roosevelt Inlet is a Federal navigation project and forms the junction between Delaware Bay, the Broadkill River, and the Lewes and Rehoboth Canal. The municipality of Lewes is bisected by the Lewes and Rehoboth Canal. The area northeast of the canal and adjoining Delaware Bay is commonly known as Lewes Beach, while the area to the southwest is Lewes. Cottages and beach houses line the beach for nearly two miles.

The project design features include a minimum 100-ft wide berm (with a 75-foot wide dune on top), which may be considerably wider with a construction template that includes sacrificial advanced nourishment at an elevation of +8.0 ft. NAVD. The design template also includes a dune with a top crest width of 25 feet at an elevation of +14.0 ft. NAVD and the construction of a 550 ft. long terminal groin with a 160 ft. stone revetment tie in along the Lewes side of Roosevelt Inlet.

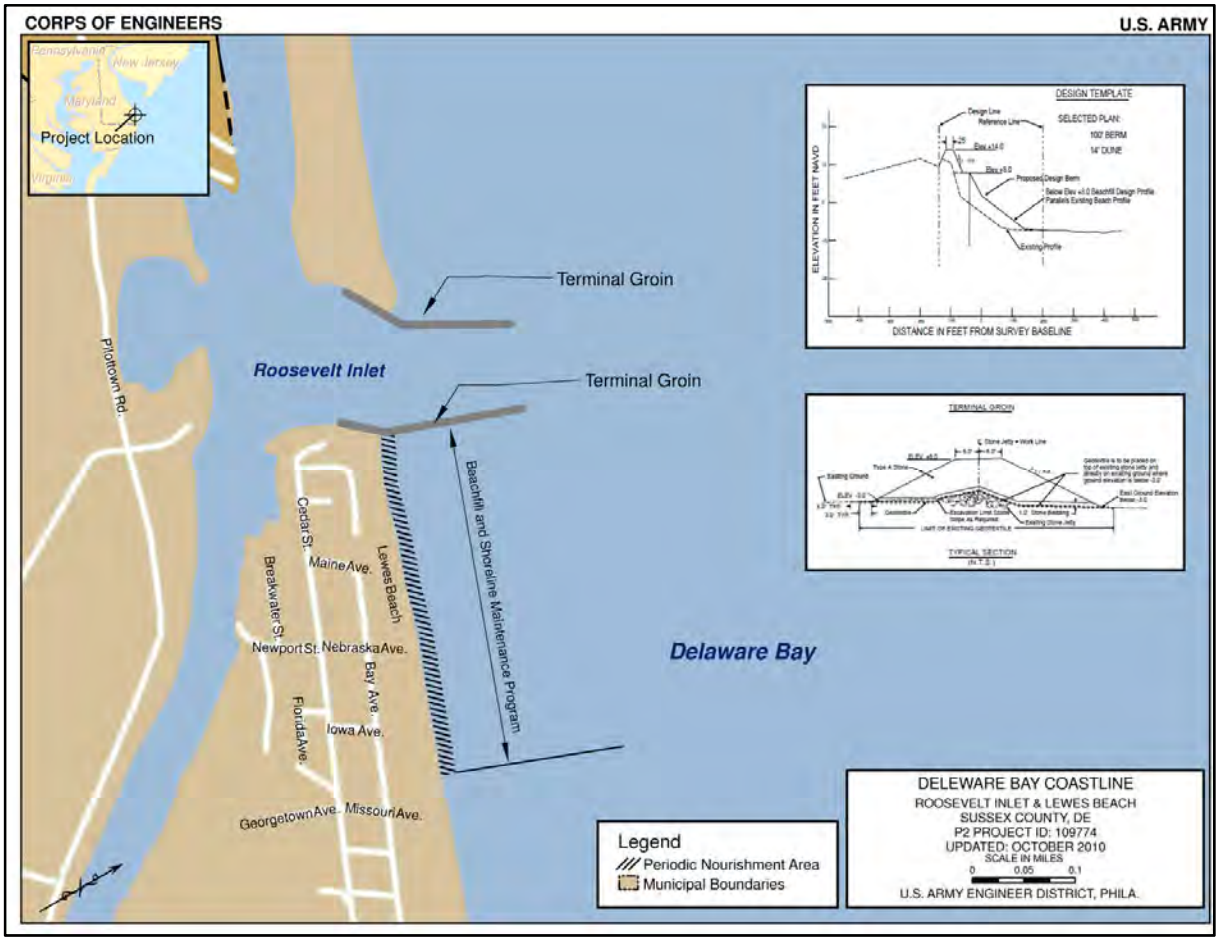

Figure 1 Location Map

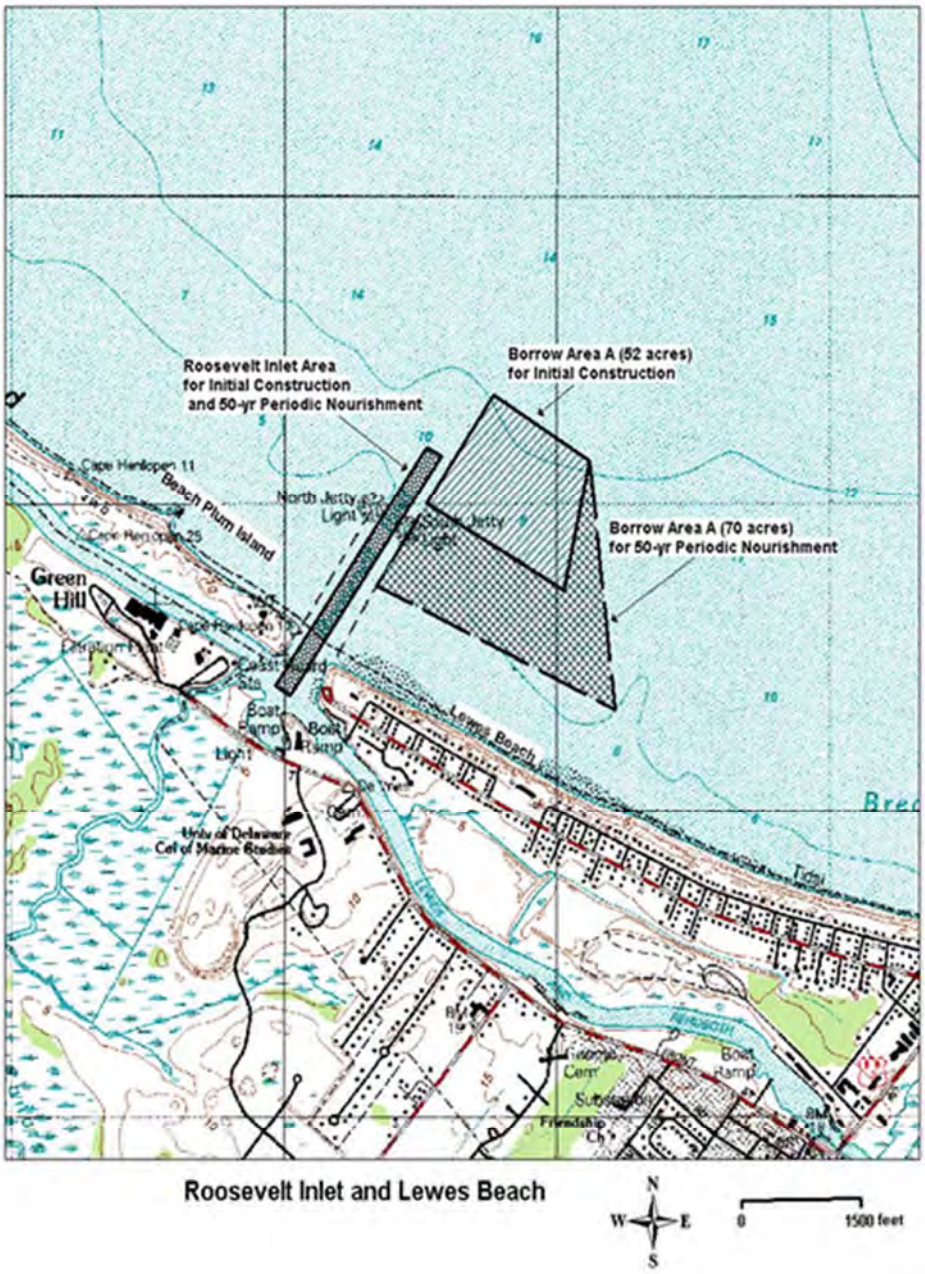

Figure 2. Lewes Beach CSRM Existing Sand Sources

Sand for the berm and dune is obtained from two sources: Roosevelt Inlet and Borrow Area A located offshore of Lewes Beach.

Initial construction of the project beachfill and terminal groin was completed in September 2004 and dune crossovers, sand fence, and dune grass were completed in December 2004. Periodic nourishment is scheduled to occur on a 6-year cycle, with an estimated volume of 132,000 cy of sand required for each cycle. A contract for periodic nourishment was awarded in September 2011 and construction was completed in January 2012. Flood Control and Coastal Emergencies (FCCE) repair and restoration was completed in November 2013 in response to Hurricane Sandy under P.L. 84-99, which authorizes project repairs following disaster declarations. The next scheduled periodic nourishment will be in FY 2019. However, inresponse to storm damages experienced in the nor'easter of January 2016, the project has been approved for repairs and restoration in accordance with Section 3029 (a) of the Water Resources Reform and Development Act (WRRDA) of 2014, which provides an amendment to PL-84-99 guidance. This authorization provides funding to restore the project template with approximately 60,000 cy of sand in the fall/winter of 2017/2018.

The non-Federal sponsor for this project is the Delaware Department of Natural Resources and Environmental Control (DNREC).

2.0 PURPOSE AND NEED

As presented in USACE (1997), the purpose of this project is to provide (as a CSRM project) hurricane and storm damage reduction for 50 years, for the community of Lewes, Sussex County, Delaware, based on this bayfront community's vulnerability to storm damages. Problems identified in the project area include 1) long term shoreline erosion as a result of natural forces; 2) storm damage vulnerability with potential for storm-induced erosion, inundation and wave attack exacerbated by long term erosion; and 3) shoreline erosion as a result of Federal navigation projects in the vicinity. USACE (1997) evaluated a number of structural and non-structural alternatives that resulted in the authorized beachfill and terminal groin plan described in Section 1.0.

The plan as evaluated in USACE (1997) only considered dredging as a means for obtaining sand (i.e. Roosevelt Inlet and Borrow Area A sources), which was due to economic efficiencies associated with dredging large quantities of sand required for initial construction (174,000 cy) and periodic nourishment (132,000 cy). However, a recent need has been identified to obtain sand utilizing the "truck haul" method, which is the transport of sand (obtained from a local commercial quarry), and subsequent delivery to the beach by dump trucks. This method is more economical (compared to dredging) when sand fill quantities are

substantially less, and there is considerable cost savings when the mobilization/demobilization of a dredge is not required. The truck haul method was not evaluated in USACE (1997) because it was not contemplated given the higher sand quantities estimated for initial construction and periodic nourishment.

The need to provide beachfill sand delivered by the truck haul method was identified in the 2016 PIR (USACE, 2016) following the January 2016 Nor'easter which resulted in damages to the project. It is currently estimated that approximately 30,000 cy of sand is needed to restore the project to full construction template following the January 2016 Nor'easter. The truck haul method may also be more appropriate in potential future FCCE actions and/or periodic nourishment where sand quantity requirements are significantly less than those described in USACE (1997).

3.0 ALTERNATIVES CONSIDERED

Because project alternatives were fully evaluated in USACE (1997) to meet the purpose and needs discussed in 2.0, this assessment only focuses on alternate means of delivering sand to the project area. Three alternatives are available for consideration: 1) Dredging utilizing existing sand sources; 2) local commercial sand quarry and truck haul delivery and 3) no action.

3.1 Dredging Existing Sand Sources

USACE (1997) formulated the selected CSRM plan (Section 1.0) by utilizing the Federal navigation project at Roosevelt Inlet (RI) as a sand source, and to have an offshore borrow area (Borrow Area A) to provide additional sand, as needed (Figure 2). The RI sand source provides incidental benefits by reducing channel maintenance dredging needs/frequency while providing beachfill quality sand at Lewes Beach. The use of the offshore Borrow Area A is intended to supplement the sand needs for Lewes Beach. Both RI and Borrow Area A were required for initial construction in 2004. For periodic nourishment in 2012, RI had an insufficient amount of sand; therefore, only Borrow Area A was utilized. A hydraulic cutter-suction dredge (CSD) was used in both instances.

Hydraulic CSD's and trailing suction hopper dredges (TSD's) provide an efficient means of delivering sand to the project location on Lewes Beach. CSD's and TSD's can move massive quantities of sand from the source to the receiving beach in a short amount of time (up to 10,000 cubic yards/day, depending on dredge size and pumping distance). The sand sources (RI and Area A) are nearby (generally within 2,000 feet of the receiving beach), and do not require booster pumps. Cost effectiveness for using dredges for delivering sand as beachfill is realized for large projects. The average cost

per cubic yard of sand can be relatively low; however, a significant cost item for dredging is found in mobilization and de-mobilization costs for a dredge. In the case of a 30,000 cubic yard beachfill, the mobilization/demoblization cost can be up to 8 times the cost of the actual dredging/placement costs (cost/cy). However, in a larger scale project, such as 150,000 cubic yards, the mobilization/de-mobilization costs may be only 2 times the cost of the actual dredging/placement costs.

Environmental effects were evaluated in USACE (1997), and concluded that there would be a temporary removal of the benthic community within both sand sources, but re-colonization is expected. However, benthic community shifts are expected in Borrow Area A during infilling, but is not considered significant based on the pre-existing benthic community (primarily composed of opportunistic and equilibrium species). The benthic community along the nearshore and intertidal beach would experience a temporary adverse impact from fill placement by smothering of the less mobile organisms. Dredging would temporarily increase turbidity in the sand source locations and the beachfill placement areas, but would subside upon cessation of dredging due to the coarse nature of the sediments. Impacts to fisheries are adverse by impacting benthic food prey items in the borrow area and placement areas. Turbidity could inhibit sight feeding and respiration, but these effects are expected to be minor and temporary. During the initial construction in 2004, historic artifacts from an undocumented 18th century shipwreck were removed from Borrow Area A and deposited on Lewes Beach. This discovery required additional cultural resources documentation and mitigation, and resulted in the establishment of an exclusion zone and archaeological monitoring during any future dredging within Borrow Area A.

3.2 Truck Haul Method (Preferred Method)

The truck haul method would utilize dump trucks to deliver the sand obtained from a local commercial sand quarry. The quarry sand would be delivered along state, county and local roads to the project location on the beach. The specifications require that the delivered sand be de-watered and be composed of predominantly fine to medium sands with no more than 3% fines (silts and clays) and 3% gravels. The sand would also closely match existing sand colors. Delivery routes may be variable due to source location, but the trucks would be required to meet all Delaware Department of Transportation (DelDot) requirements. The trucks would enter the project location through the public parking lot located at the east side of Roosevelt Inlet. From there, the trucks would access the upper beach to dump the previously de-watered sand on the upper beach. Dozers and graders would distribute the dumped sand along the beach and across the beach (including the intertidal and nearshore areas) to attain the authorized project berm and dune template. Delivery and construction

hours would be limited to weekdays during daylight hours during the construction period. It is estimated that based on the quantities required, an average of 5 truckloads per hour could be delivered (approximately 60 truckloads delivered per day).

The need to use the truck haul method is based on cost. Beachfill projects that generally require less than 125,000 cubic yards of sand may be more cost effective using a truck fill over dredging. Many variables would need to be considered for the costs; however, a significant variable is that a truck fill avoids the large mobilization costs that a dredge would require.

The truck haul method would avoid adverse impacts on the aquatic ecosystem in the Roosevelt Inlet and offshore Borrow Area A. However, impacts to the terrestrial, intertidal and nearshore placement areas would be similar to dredging as less mobile organisms would be buried in the filled areas. Turbidity would be minimal since the material is coarse-grained, and will not require de-watering, as dredged sands would require. The trucks would be required to be Delaware Department of Transportation highway certified, and would be operated in accordance with appropriate state and local laws. Adverse impacts on the community would be temporary during the daylight hours based on additional traffic on local roads, wear and tear on local roads, noise, and air quality. Additionally, the duration of the overall construction may be considerably longer with a truck haul, which does not deliver sand as efficiently as the dredging method would. These impacts are somewhat minimized in that the work would be limited to the tourist offseason (primarily fall and winter months) when there would be less activity and congestion on local roads. The truck haul method is not expected to have adverse effects on cultural resources.

3.2.1 Potential Truck Haul Routes in Lewes

There are a number of potential commercial sand quarry operations within 30 miles of the project location, which would involve a large number of variable routes to deliver the sand to the project location. Therefore, it is assumed that truck hauls would enter and exit the project area from major roads such as Route 1 and Route 9 (Figure 3). All routes considered to deliver sand via the truck haul method would require access to Cedar Street in Lewes. Cedar Street, a residential street composed of single family homes and beach cottages, leads directly to the Roosevelt Inlet parking lot (adjacent to the Lewes Yacht Club), which will be the project staging location and access point to the beach. There are no alternate routes for Cedar Street to access the project area.

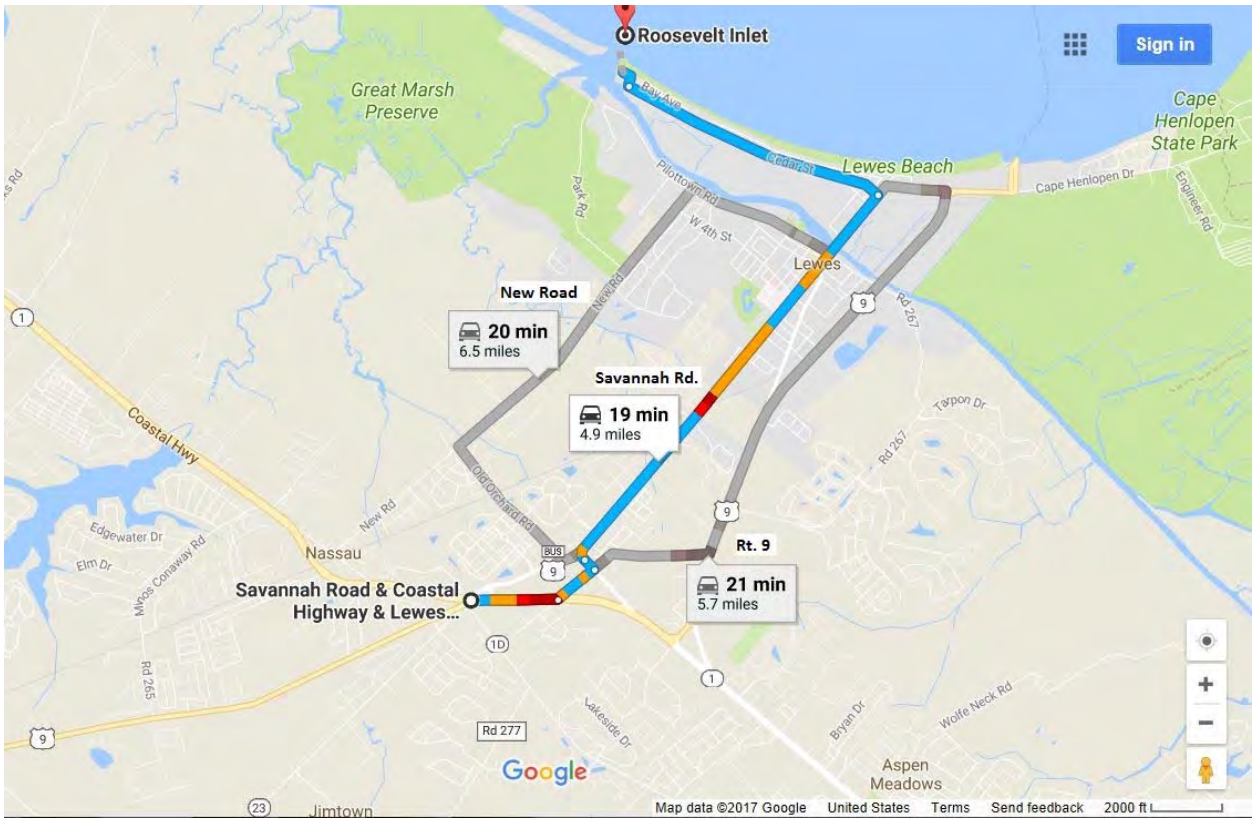

Figure 3. Potential Truck Haul Routes Into Lewes

3.2.1.1 Savannah Road (Business Route 9) and Cedar Street

The Savannah Road route provides the shortest and most direct route to Cedar Street from either State Route 1 or U.S. Route 9. Savannah Road passes through the heart of Lewes and crosses the Lewes and Rehoboth Canal by a drawbridge (Bridge 3-154). This route is characterized by high residential and commercial development along Savannah Road, and may have more of an effect on residents and business with increased noise and traffic in a more congested portion of Lewes.

3.2.1.2 U.S. Rt. 9 and Cedar Street

U.S. Route 9 (Theo C. Freeman Highway) runs along the eastern side of Lewes and crosses over the Lewes and Rehoboth Canal. Access to Cedar Street from U.S. Route 9 is possible by taking Cape Henlopen Drive west to E. Savannah Road. In general, U.S. Route 9 does not have the level of high development along its route as Savannah Road does; however, U.S. Route 9, at times, may receive heavy traffic entering or leaving the area from the Cape May

Lewes Ferry terminal along Cape Henlopen Drive. This route appears to have the least disruptive effect on residents and businesses because of the relatively sparse development along U.S. Route 9. An alternate within this route would be the use of Kings Highway, which connects to both Route 9 (Theo C. Freeman Highway) and Savannah Road through the downtown historic area.

3.2.1.3 New Road

New Road could serve as an access on the western side of Lewes from Route 1 via Nassau Road. This route primarily passes through farmland, light residential and some commercial areas. This route would require access through a residential portion on Pilottown Road, Savannah Road, and the Savannah Road drawbridge (Bridge 3-154) over the Lewes and Rehoboth Canal.

3.3 No Action

No action for the CSRM project was originally considered in USACE (1997). No action for maintaining the authorized beach and dune design template would increase the vulnerability and risks from storm damages within the affected area of Lewes, therefore; no action does not meet the project needs and objectives.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

USACE (1997) provided a discussion on affected resources and environmental impacts of the selected plan within the project area. A review of the affected environment resources was conducted to determine if significant changes have occurred subsequent to USACE (1997). This review is presented as Table 1. Resource topics that do not require further discussion are incorporated by reference. Resources that require further discussion are presented as indicated in Table 1.

Table 1. Status of Affected Resources			
Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (1999)?**	**Notes**
General Environmental Setting	USACE (1997)	No	No further discussion.
Site Geology and Groundwater	USACE (1997)	No	No further discussion.
Air Quality	USACE (1997)	Yes	A new updated CAA analysis is required.
Water and Sediment Quality	USACE (1997)	Yes	New source of sand proposed from a land-based quarry.
Vegetation and Wetland Habitats	USACE (1997)	Yes	Dune constructed in 2004 and planted with dune vegetation.
Beach and Intertidal Habitat	USACE (1997)	Yes	Shoreline filled with dredged sand in 2004, 2011 and truckfill sand from a quarry in 2013.
Shellfish	USACE (1997)	Yes	Dredging/beachfill was conducted in 2004 and 2011 affecting Roosevelt Inlet and Borrow Area A. Truck fill on beach completed in 2013.
Finfish	USACE (1997)	Yes	Dredging/beachfill was conducted in 2004 and 2011 affecting Roosevelt Inlet and Borrow Area A. Truck fill on beach completed in 2013.

Table 1. Status of Affected Resources			
Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (1999)?**	**Notes**
Essential Fish Habitat	Was not performed in USACE (1997)	Yes	EFH assessment conducted in 2002.
Benthos	USACE (1997)	Yes	Dredging/beachfill was conducted in 2004 and 2011 affecting Roosevelt Inlet and Borrow Area A. Truck fill on beach completed in 2013.
Wildlife (non-T/E)	USACE (1997)	Yes	Dredging/beachfill was conducted in 2004 and 2011 affecting Roosevelt Inlet and Borrow Area A. Truck fill on beach completed in 2013.
Threatened and Endangered Species	USACE (1997)	Yes	Updated consultation with USFWS and Atlantic sturgeon listing in 2013.
Recreation	USACE (1997)	No	
Land Use	USACE (1997)	No	
Visual and Aesthetic Values	USACE (1997)	No	
Cultural Resources	USACE (1997)	Yes	Shipwreck discovery in Borrow Area A in

Table 1. Status of Affected Resources			
Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (1999)?**	**Notes**
			2004 during initial construction.
Hazardous, Toxic and Radioactive Waste (HTRW)	USACE (1997)	No	No new information. Truck haul material would originate from an approved/existing commercial quarry source.
Socioeconomics	USACE (1997)	No	
Land Use/Zoning		Yes	The proposed action is to include the use of “truck haul” delivery of sand as another means of repairing/nourishing the project beach.
Roads and Infrastructure		Yes	The proposed action is to include the use of “truck haul” delivery of sand as another means of repairing/nourishing the project beach.
Aesthetics	USACE (1997)	No	
Environmental Justice	USACE (1997)	No	
Cumulative Impacts	USACE (1997)	No	

The environmental impacts of beach nourishment were evaluated in the Environmental Assessment (USACE, 1997). Sand would be placed by truck on the upper beach area, and distributed by earth moving equipment. If sand is

pushed below the mean high water line, this sand will affect the nearshore subtidal areas adjacent to the beach, the intertidal zone, the upper beach, and dune areas. This discharge will generate minor and localized short-term turbidity with the discharge of material that is greater than 90% sand, which will settle out quickly. The beachfill placement areas are highly dynamic, and harsh environments for organisms that inhabit them. Benthic infauna in the sandy-intertidal and nearshore zones are adapted to rapid changing environments as brought on by high wave energy. A truck haul would have some temporary impacts on the local community by placing more truck traffic on local roads, wear and tear on roads, and localized air quality impacts. However, based on the smaller quantities of material required by truck haul, these impacts are not considered significant.

4.1 Air Quality

The Environmental Protection Agency (EPA) adopts National Ambient Air Quality Standards (NAAQS) for the common air pollutants, and the states have the primary responsibility to attain and maintain those standards. Through the State Implementation Plan (SIP), The Delaware Department of Natural Resources and Environmental Control – Division of Air Quality manages and monitors air quality in the state. The goal of the SIP is to meet and enforce the primary and secondary national ambient air quality standards for pollutants. Criteria pollutants have primary ambient air quality standards designed to protect public health, including an adequate margin of safety to protect sensitive populations such as children and asthmatics. The criteria pollutants being monitored in Delaware are: ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter (PM – PM2.5/PM10) and lead (DNREC, 2013).

Changes and overall improvement in ambient air quality were noted in Delaware's 2013 annual air quality report (DNREC, 2013). In 2013, only one pollutant, ozone, exceeded the national ambient air quality standard. Other pollutants monitored in Delaware (SO2, CO, NO2, PM2.5, PM10 and lead) were below the national standards. According to the air quality index (AQI), there were only a few days that fell into the category of moderate or unhealthy for sensitive populations. Based on recent trends, the number of days with good air quality continues to increase. The U.S. Environmental Protection Agency (EPA) announced on August 4, 2014 that New Castle County has met the previous annual and 24-hour air quality standards for fine particulate matter. On August 19, 2014, EPA also determined that all of Delaware has met the even stricter annual fine particulate standards that were put into place in 2012. Substantial pollution control improvements due to federal rules and Delaware regulations have contributed to the much improved fine particulate air quality. For ozone, there were two days with exceedances of the 8-hour ozone standard in 2013

statewide, with one exceedance occurring in New Castle County and one in Sussex County. There were no exceedances of the state 1-hour ozone standard. Ozone concentrations continue to show a generally decreasing trend in all three counties over recent years. Concentrations of air toxics in Wilmington continue to show generally low or declining levels. Emissions of air pollutants are calculated every three years as part of a comprehensive emissions inventory (DNREC, 2013).

The Clean Air Act requires that all areas of the country be evaluated and then classified as attainment or non-attainment areas for each of the National Ambient Air Quality Standards. Areas can also be found to be “unclassifiable” under certain circumstances. The 1990 amendments to the act required that areas be further classified based on the severity of non-attainment. The classifications range from “Marginal” to “Extreme” and are based on “design values”. The design value is the value that actually determines whether an area meets the standard. In 2008, the U.S. Environmental Protection Agency (EPA) promulgated a revised National Ambient Air Quality Standard (NAAQS) for ground level ozone at a concentration of 0.075 ppm averaged over eight hours. The new standard supersedes the previous 8-hour ozone standard of 0.08 ppm. New Castle and Sussex counties exceeded the new 0.075 ppm standard based on 2009-2010-2011 3-year monitoring data. Based on the 2009-2011 monitoring data, EPA designated New Castle County a “marginal nonattainment area (NAA)” within the Philadelphia-Wilmington-Atlantic City NAA, and Sussex County a stand-alone “marginal Seaford NAA,” under the new 0.075 ppm standard (Figure 4). Kent County was designated as an attainment area because it met the standard (DNREC, 2013).

The EPA established the calendar year 2011 as the base year inventory for the new 0.075 ppm ozone standard. Ground-level ozone is created when

Figure 4. Delaware Non-Attainment Areas for Ozone
(Source: DNREC, 2013)

nitrogen oxides (NOx) and volatile organic compounds (VOC's) react in the presence of sunlight. NOx is primarily emitted by motor vehicles, power plants, and other sources of combustion. VOC's are emitted from sources such as motor vehicles, chemical plants, factories, consumer and commercial products, and even natural sources such as trees. Ozone and the pollutants that form ozone (precursor pollutants) can also be transported into an area from sources hundreds of miles upwind (DNREC, 2013).

4.1.1 Impacts of Truck Haul on Air Quality

Air quality impacts resulting from the release of carbon monoxide and particulate emissions will occur at the site during project related activities and may be considered offensive, but are generally not considered far-reaching. Exhaust from the construction equipment will have an effect on the immediate air quality around the construction operation but should not impact areas away from the construction area. These emissions will subside upon cessation of operation of heavy equipment.

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a non-attainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). In the case of the Lewes Beach Coastal Storm Risk Management Project, the Federal action is to repair and restore the project utilizing beachfill sand delivered by truck haul method from a commercial quarry. The U.S. Army Corps of Engineers, Philadelphia District would be responsible for construction. Sussex County, Delaware within which the Federal Action will take place is classified as marginal nonattainment for ozone (oxides of nitrogen [NOx] and volatile organic compounds [VOCs]). Sussex County, DE is within the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Nonattainment Area.

There are two types of Federal Conformity: Transportation Conformity and General Conformity (GC). Transportation Conformity does not apply to this project because the project would not be funded with Federal Highway Administration money and it does not impact the on-road transportation system. However, GC is applicable to this project. Therefore, the total direct and indirect emissions associated with project construction must be compared to the GC trigger levels presented below.

Pollutant	**General Conformity Trigger Levels (tons per year)**
NOx	100
VOCs	50

Total direct and indirect emissions are calculated by determining horsepower-hours (hp-hrs), which are generated by cost engineers as part of the Micro Computer Aided Cost Estimating System (MCACES) cost estimate of the project. The cost estimate provides a detailed account of power equipment, the horsepower of the equipment, and the amount of time the equipment is being used. Once the hp-hrs are generated, a load factor is assigned to the equipment, which provides an average of the degree of how hard the equipment is operating (eg. full power or half power). Once the hp-hrs are adjusted based on load factor, they are multiplied by the emissions factor, which is an estimate of the amount of emissions produced per hp-hr (an example would be grams of NOx per hp-hr. This value is then converted to tons of the constituent emitted. Indirect emissions for this project are typically computed by estimating the work crew travel trips to the work site and back during the construction period with an estimate of the emissions produced by this activity.

The emissions estimates for the initial construction were determined to be 5.0 tons of NOx and 0.72 tons of VOCs, which fall below the general conformity trigger levels. A Record of Non-Applicability (RONA) is provided in Appendix A along with the supporting estimate data.

4.2 Water Quality and Sediment Quality

Water and sediment quality of the Lewes Beach and Roosevelt Inlet area of the lower Delaware Bay were described in USACE (1997). The beach intertidal and nearshore environment is subjected to mixing and typical salinity of lower bay environments. Subsequently, dredging and beachfill operations conducted in 2004 and 2011within the project areas temporarily generated turbidity, but the overall long-term water and sediment quality within the affected area have not significantly changed.

4.2.1 Impacts of Truck Haul on Water and Sediment Quality

The placement of sand in the intertidal and subtidal zones along Lewes Beach will generate minor amounts of turbidity. However, the turbidity will be minor and temporary due to the grain size of the trucked in sand, which will contain greater than 96% sands and gravels. Additionally, the truck filled sand will not require de-watering, which will generate less turbidity than a typical dredging/beachfill operation. Sediment quality is expected to be maintained within the affected area due to the use of clean sands obtained from a commercial quarry and requirements to match existing sand color and grain sizes.

4.3 Vegetation and Wetlands

A new dune was constructed as part of the Federal project in 2004, and has been planted with American beachgrass (*Ammophila breviligulata*) and seeded with seaside panic grass (*Panicum amarum*). Other voluntary primary dune species include sea rocket (*Cakile edentula*), seaside goldenrod (*Solidago sempervirens*), and cocklebur (*Xanthium echinatum*). There are no vegetated wetlands within the affected area.

4.3.1 Impacts of Truck Haul on Vegetation and Wetlands

No significant adverse effects on dune flora. The access point will utilize an existing dune crossover point from the staging area in the Roosevelt Inlet public parking. Any disturbance to dune vegetation would be repaired with replanted American beachgrass and/or seeded with seaside panic grass, if needed. No wetland impacts are anticipated since there are no vegetated wetlands within the affected area.

4.4 Fisheries

4.4.1 Shellfish

Several commercial and recreational shellfish species occur in the area that include: hard clams (*Mercenaria mercenaria*), oysters (*Crassostrea virginica*), horseshoe crabs (*Limulus polyphemus*), and blue crabs (*Callinectes sapidus*). USFWS (1995) reports that hard clams are widespread in the general area, but do not occur in commercial densities. Recreational harvest of hard clams is popular along the sand flats adjacent to Cape Henlopen. Oysters are not within the affected beachfill area, but occur in the nearby Broadkill River, however; they are not in commercially harvestable quantities. Horseshoe crabs are harvested for their blood and for bait for conch and eel pots. Management of harvest quotas are strictly controlled by the Delaware Division of Fish and Wildlife.

4.4.1.1 Impacts of Truck Haul on Shellfish

Commercial and recreational shellfish resources do not occur within the affected area in harvestable densities. The placement of sand could bury less mobile species such as the hard clam and egg and larval horseshoe crabs within the intertidal zone and shallow subtidal zone where beachfill would be deposited. Adverse impacts can be minimized by the use of sutiable sand grain sizes for future recruitment of these species and timing the fill activities to avoid critical spawning and larval stages. For horseshoe crabs, a timing restriction would be imposed from March 1st to September 30th to avoid these life stages.

4.4.2 Finfish

Finfish were previously described in USACE (1997). Based on DNREC surveys from 1980 to 1993, the most abundant species sampled in the lower Delaware Bay were bay anchovy (*Anchoa mitchilli*), weakfish (*Cynoscion regalis*), hogchoker (*Trinectes maculatus*), striped cusk-eel (*Ophidion marginatum*), Atlantic croaker (*Micropogonias undulatus*), and spot (*Leiostomus xanthurus*).

4.4.2.1 Impacts of Truck Haul on Finfish

Most finfish are capable of avoiding any active filling by the placement of sand and redistribution of it in the intertidal and nearshore subtidal zone of the beach. This is minimized by the gradual rate of sand placement by truck fill. Minor and temporary losses of benthic prey items

may be experienced through the burial of benthic organisms in the intertidal and nearshore subtidal zone. This is expected to be temporary as the newly placed beachfill would be recolonized by benthic organisms. Active filling in aquatic habitats may generate turbidity that can have adverse impacts on respiration and sight feeding by finfish. This effect is minimized by the coarse grain size of the sand and method of placement, which allows for particles to settle out rapidly.

Recreational fishing may be temporarily affected as portions of the beach would be inaccessible during construction for days and/or weeks at a time. This impact could be minimized by opening up segments immediately after fill template is achieved and maintaining access to the Roosevelt Inlet Jetty, which is a popular spot for anglers.

4.4.3 Essential Fish Habitat

Under provisions of the reauthorized Magnuson-Stevens Fishery Conservation and Management Act of 1996, the nearshore and intertidal areas of Lewes Beach were designated as Essential Fish Habitat (EFH) for species with Fishery Management Plans (FMP's), and their important prey species. An EFH evaluation was conducted in USACE (2002) for EFH species and their designated life stages within an area identified by the following boundaries: "Waters within the square within the salt water salinity zone of Delaware Bay affecting the following: north and east of Cape Henlopen, DE., from just northwest of Roosevelt Inlet within Breakwater Harbor north of Lewes, DE., within the Harbor of Refuge, around the cape south past Rehoboth Beach, DE., to ½ way down Dewey Beach, east of northern Rehoboth Bay. Also affected are waters within the Delaware Inland Bay estuary within northern Rehoboth Bay, and over the Hen and Chicken Shoals."

Among 27 species identified within this area, the intertidal and shallow subtidal areas are most likely to be EFH for all life stages for winter flounder (*Pleuronectes americanus*), windowpane flounder *(Scopthalmus aquosus),* bluefish *(Pomatomus saltatrix),* summer flounder *(Paralicthys dentatus),* and several shark species including the sandbar shark (*(Charcharinus plumbeus)*, which has a designated habitat area of particular concern (HAPC).

4.4.3.1 Impact of Truck Haul on EFH

The EFH assessment performed by USACE (2002) evaluated channel (Roosevelt Inlet) and Borrow Area A dredging, beach nourishment, and jetty construction. Since the truck haul is a form of beach nourishment, the same assumptions apply for EFH in the intertidal and shallow nearshore provided that sand grain sizes are compatible with native beach materials. In USACE (2002) it

was concluded that: “Beach nourishment will consist of the placement of beachfill for approximately 255 feet bayward of the mean high water line, which would cover approximately 10.2 acres of intertidal and shallow subtidal aquatic habitat, which would be relocated bayward. Benthic organisms would be buried beneath beachfill sand placed in this area. Most of the benthic organisms are expected to perish, however, some vertical migration through the fill is possible. Benthic recolonization is expected shortly after beachfill is placed. No significant permanent adverse changes in the physical habitat (ie. substrate grain sizes, hydrodynamics, and water quality) are expected in the impact area provided that the beachfill contains similar grain sizes as the native beach. Temporary degradation of water quality through increased turbidity is expected as beachfill dewaters, however, this is expected to be minor since the beachfill has a small fine grain fraction.”

For winter flounder EFH, USACE (2002) further concluded for beachfill: “The placement of beachfill material along the shallow shoreline of Lewes Beach is likely to have some adverse impacts on spawning adults and early life stages (larvae and juveniles), if these life stages are present. However, the impacts are not expected to be significant because of the small area affected (approximately 10 acres) and, as stated above, data from New Jersey and Delaware indicate that winter flounder populations currently using Delaware Bay are smaller than those further north in the range and become less abundant moving from northern New Jersey to southern New Jersey.”

For sandbar shark EFH and HAPC, USACE (2002) concluded that: “Pratt (1997) believes that there will be a great potential to impact shark pups and their food source of benthic organisms in the nursery areas along the lower Delaware Bay Coast, if sand is deposited near the beach (in areas 1 – 4 m deep) in the nursery season. Potential impacts may include but not be limited to: changing the habitat characteristics, depth, profile, odor, turbidity and fauna of the area. Loss of forage would also occur. Prey species, principally crabs and fish of many species, may be disrupted directly by the presence of physical activity in the area and indirectly by the covering of vulnerable food web organisms with sand. A “closed” window from 1 May to 15 September was recommended by the National Marine Fisheries Service (Gorski, 2000) to prevent potential impacts, such as suffocation, to newborn and juvenile sharks. After this time period, the young sharks have reached a larger size where they would be more able to avoid the sand placement operations.”

Based on the EFH evaluation in USACE (2002), the truck haul method would have temporary adverse effects for several EFH species including benthic prey items; however, the impacts of the truck haul would be minimized since no dredging and turbidity associated with dredging would occur and that fill

placement would likely not occur from 1 May to 15 September. Therefore, no further EFH evaluation is required for truck haul sand placement.

4.5 Benthos

USACE (1997) references a study (Maurer and April, 1979) of a lower Delaware Bay intertidal sand flat near the affected area where the principal benthic species found were polychaete worms (*Scoloplos fragilis*, *Scolelepis squamata*, and *Heteromastus filiformis*), bivalves (*Gemma gemma*, *Tellina agilis* and *Nucula proxima*), crustaceans (*Neohaustorius biarticulatus*, *Chiridotea caeca*, *Sphaeroma quadridentatum*, and *Ovalipes occellatus*), and the horseshoe crab (*Limulus polyphemus*).

4.5.1 Impacts of Truck Haul Filling on Benthic Community

Beachfill placement via truck haul method will affect the upper beach, intertidal, and shallow nearshore as sand is dumped and redistributed by construction equipment to attain the beach template profile. Approximately 3.3 acres of intertidal and shallow nearshore benthic habitat will be affected. Direct impacts on the intertidal and nearshore benthic community will be the burial and smothering of less mobile organisms such as the ones described in 4.5. Depending on the sand thickness, some of these organisms may escape burial through vertical migration through the newly deposited sand. Adverse effects on the benthic community are considered to be temporary as the new substrate can become recolonized soon after the event. The success and rate of recolonization is dependent on the placement of suitable grain sizes and the season of recruitment. The close match of the sand grain size with existing beach grain sizes should minimize these adverse impacts.

The horseshoe crab is an important benthic species due to their spawning and deposition of eggs on Delaware Estuary beaches, which provide a critical food source for migratory shorebirds. Lewes Beach contains suitable habitat for horseshoe crab spawning, however, it does not receive the intensive horseshoe crab spawning as other Delaware Bay beaches experience higher up in the estuary. Avoidance of beachfill placement from March 1st to September 30th would minimize adverse effects of spawning horseshoe crabs.

4.6 Wildlife

USACE (1997) listed a number of avian, mammalian, and reptilian fauna that may commonly be found in the dune, upper beach, and intertidal portions of the affected area. The dune area can be occupied by mammals such as the eastern cottontail (*Sylvaligus floridanus*), white footed mouse (*Peromyscus leucopus*), and meadow vole (*Microtus pennsylvanicus*), birds such as song

sparrow (*Melospiza melodia*), savannah sparrow (*Passerculus sandwichensis*), gray catbird (*Dumutella carloninensis*), northern mockingbird (*Mimus polyglottos*), and the reptile: eastern box turtle (*Terrapene carolina*). The beach includes scavengers such as gulls (*Larus* spp.), fish crows (*Corvus ossifragus*), and grackles (*Quiscalus quiscula*), which tend to feed in the upper intertidal beach wrack. The intertidal zone is active with shorebird feeding particularly on horseshoe crab eggs and other benthic intertidal fauna during their spring migrations. Shorebirds likely to occur in the affected area include sanderling (*Calidris alba*), semi-palmated sandpiper (*Calidris pusilla*), ruddy turnstone (*Arenaria interpres*), dunlin (*Calidris alpina*), black bellied plover (*Pluvialis squatarola*), and the Federally threatened rufa red knot (*Calidris canutus rufa)*. The eastern diamondback terrapin (*Malaclemys terrapin terrapin*) is a common reptile that inhabits the area's coastal marshes, beaches and waterways; however, its numbers have been declining, and has been listed on Delaware's Species of Greatest Conservation Need. Female diamondback terrapins typically seek out sandy areas such as dune areas above mean high water to lay their eggs.

4.6.1 Impacts of Truck Haul Filling on Wildlife

Direct impacts on wildlife from truck haul filling on the beach would be minimal since most species are highly mobile and capable of avoiding construction activities. A seasonal restriction of construction from March 1st to September 30th would avoid peak migratory shorebird feeding. Indirect effects such as a temporary loss of benthic prey items for shorebirds would be expected in areas where benthic organisms would be smothered through beachfill placement, but this food source is expected to recover. Diamondback terrapins are known to nest in upper beach/dune areas above the high tide line. In many instances, eggs and newly hatched turtles can overwinter underground. The extent of nesting on Lewes Beach is unknown, but it is possible that potentially some overwintering nests may become smothered after fill placement.

4.6.2 Threatened and Endangered Species

Delaware's coastal waterways and beaches are inhabited by a number of Federal and state listed threatened and endangered species as presented in Table 2.

Table 2. Threatened and Endangered Species Along the Delaware Coast (Source: WSCRP)

Scientific Name	Common Name	Taxon	Habitat	Federal Status	State Status	State Rank	SGCN Tier
Balaenoptera musculus	Blue whale	Mammal	Marine/pelagic	E	E	*	*

Table 2. Threatened and Endangered Species Along the Delaware Coast (Source: WSCRP)							
Scientific Name	**Common Name**	**Taxon**	**Habitat**	**Federal Status**	**State Status**	**State Rank**	**SGCN Tier**
Balaenoptera physalus	Fin whale	Mammal	Marine/pelagic	E	E	*	*
Megaptera novaeangliae	Humpback whale	Mammal	Marine/pelagic	E	E	*	*
Eubalaena glacialis	N. Atlantic Right whale	Mammal	Marine/pelagic	E	E	*	*
Balaenoptera borealis	Sei whale	Mammal	Marine/pelagic	E	E	*	*
Physeter macrocephalus	Sperm whale	Mammal	Marine/pelagic	E	E	*	*
Charadrius melodus	Piping Plover	Bird	Sandy beaches/overwash areas	T	E	S1	1
Calidris canutus	Red Knot	Bird	Sandy beaches/overwash areas	T	E	S1M	1
Sterna antillarum	Least Tern	Bird	Sandy beaches/overwash areas	--	E	S1B	1
Sterna hirundo	Common Tern	Bird	Sandy beaches/overwash areas	--	E	S1B	1
Sterna forsteri	Forster's Tern	Bird	Sandy beaches/overwash areas	--	E	S1B	1
Rynchops niger	Black Skimmer	Bird	Sandy beaches/overwash areas	--	E	S1B	1
Haematopus palliates	American Oystercatcher	Bird	Sandy beaches/overwash areas	--	E	S1B	1
Dermochelys coriacea	Leatherback sea turtle	Reptile	Marine/pelagic /demersal	E	E	*	*
Lepidochelys kempii	Kemp's Ridley sea turtle	Reptile	Marine/pelagic /demersal	E	E	*	*
Chelonia mydas	Green sea turtle	Reptile	Marine/pelagic /demersal	T	E	*	*
Caretta caretta	Loggerhead	Reptile	Marine/pelagic /demersal	T	E	*	*
Eretmochelys imbricata	Hawksbill sea turtle	Reptile	Marine/pelagic /demersal	E		*	*
Acipenser oxyrinchus oxyrinchus	Atlantic sturgeon	Fish	Marine/pelagic/demersal	E	E	*	*
Amaranthus pumilus	Seabeach Amaranth	Plant	Sandy beaches/overwash areas	T	--	S1	--
*Information on State Rank and SGCN Tier not readily available							

In 2016, the USACE consulted with the U.S. Fish and Wildlife Service (USFWS) concerning Federally listed species within the Lewes Beach affected area. The USFWS identified the Federally threatened piping plover and the rufa red knot as possibly occurring in the vicinity of the project area. However, in a letter dated 9/20/2016, the USFWS concluded that the beachfill activities for Lewes Beach are "not likely to adversely affect" these species based on the limited use of the area by rufa red knots and that the nearest piping plover nesting area was 1/8 of a mile from the project area, and the last known nest was greater than 15 years before. Seabeach amaranth is an annual plant that is Federally threatened, and occurs on sandy beaches and overwash areas. Although seabeach amaranth is documented along the Delaware Atlantic Coast, no plants have been found within the affected area. Other T & E species within the vicinity of the project involve several sea turtles, marine mammals, and the Atlantic sturgeon. These species occur primarily offshore, and are either pelagic and/or demersal in their habits. A number of state listed colonial nesting birds nest on sandy beaches along Delaware's sandy beaches, which include the least tern and black skimmer; however, these species are not likely or known to nest within the affected area. No occurrences of the state endangered American oyster catcher are known within the affected area.

Some marine mammals may be classified as threatened or endangered species, but all fall under the jurisdiction of the Marine Mammal Protection Act. The marine mammal species that are commonly encountered in the Delaware Estuary are bottlenose dolphin (*Tursiops truncatus*), harbor porpoise (*Phocoena phocoena*), humpback whale (*Megatera novaeangliae*), harbor seal (*Phoca vitulina concolor*), and gray seal (*Halichooerus grypus*). Species not commonly sighted but which may incidentally utilize the estuary are pygmy sperm whale (*Kogia breviceps*), long-finned pilot whale (*Globicephala melaena*), fin whale (*Balaenoptera physalus*), northern right whale (*Eubalaena glacialis*), harp seal (*Cystophora cristata*), and ringed seal (*Poca hispida*).

4.6.3 Impacts of Truck Haul Filling on Threatened and Endangered Species

As discussed in the preceding paragraph, USFWS has concluded that the project is "not likely to adversely affect" the piping plover and rufa red knot. Additionally, construction activities would be prohibited between March 1 and September 30th, which should avoid nesting periods of state listed beach nesting birds, if they are present. Truck haul filling would be limited to the intertidal and shallow subtidal zones and is expected to have no adverse effect on Federal and state listed sea turtles, whales, and Atlantic sturgeon, which occur offshore in pelagic and demersal waters.

The truck haul filling of Lewes Beach is not expected to have adverse effects on any marine mammals protected under the Marine Mammal Protection Act. Should a marine mammal, such as a seal be observed to be "hauling out" onto the beach during construction, a protective buffer zone will be established around it until it leaves the area.

4.7 Cultural Resources

Federal undertakings will comply with the Archaeological and Historical Preservation Act of 1974 (16 USC 469-469c), the Abandoned Shipwreck Act of 1987 (PL 100-298; 43 USC 2101-2106), The National Historic Preservation Act of 1966, as amended (16 USC 470) and the Advisory Council on Historic Preservation's implementing regulations 36CFR800 (protection of Historic Properties). Section 106 of the National Historic Preservation Act requires Federal agencies to provide the State Historic Preservation Officer (SHPO), as agent to the Advisory Council on Historic Preservation, reasonable opportunity to evaluate and comment on any Federal undertaking. The placement of sand on beaches and the use of sand from underwater borrow sites are typically subjected to cultural resources investigations in order to locate potentially significant resources.

The proposed action of beach filling via the use of commercially quarried sediment, and trucking that sediment to its location along a beach that has been routinely filled will have *No Effect* on historic properties eligible for or listed on the National Register of Historic Places.

4.8 Land Use/Zoning

A review of the City of Lewes Zoning Map (City of Lewes, 2011) demonstrates that the various truck haul routes would pass through a diverse array of zoning districts (Figure 5). At the heart of Lewes is the Historic Town Center (TC-H) located in the vicinity of the intersection of Savannah Road and Front Street. The historic center also occupies residential areas along Savannah Road and Kings Highway zoned as Residential Medium Density Historic (R-4)(H). The Savannah Road corridor has the most diverse zoning with hospital facilities (Bebee Hospital) zoned as Community Facilities – Health Care (CF)(HC), Bethel Cemetery (Community Facility) (CF), schools (Community Facility – Educational (CF)(E), Mixed Residential (R-5) and suburban (R-1). The north side of the Lewes and Rehoboth Canal zoning along Savannah Road is a mix of Marine Commercial (MC), Residential Beach (R-3), and Open Space (OS). Cedar Avenue to Roosevelt Inlet is predominantly zoned as R-3 (Residential Beach). Route 9 (Theo C Freeman Memorial Hwy) has less

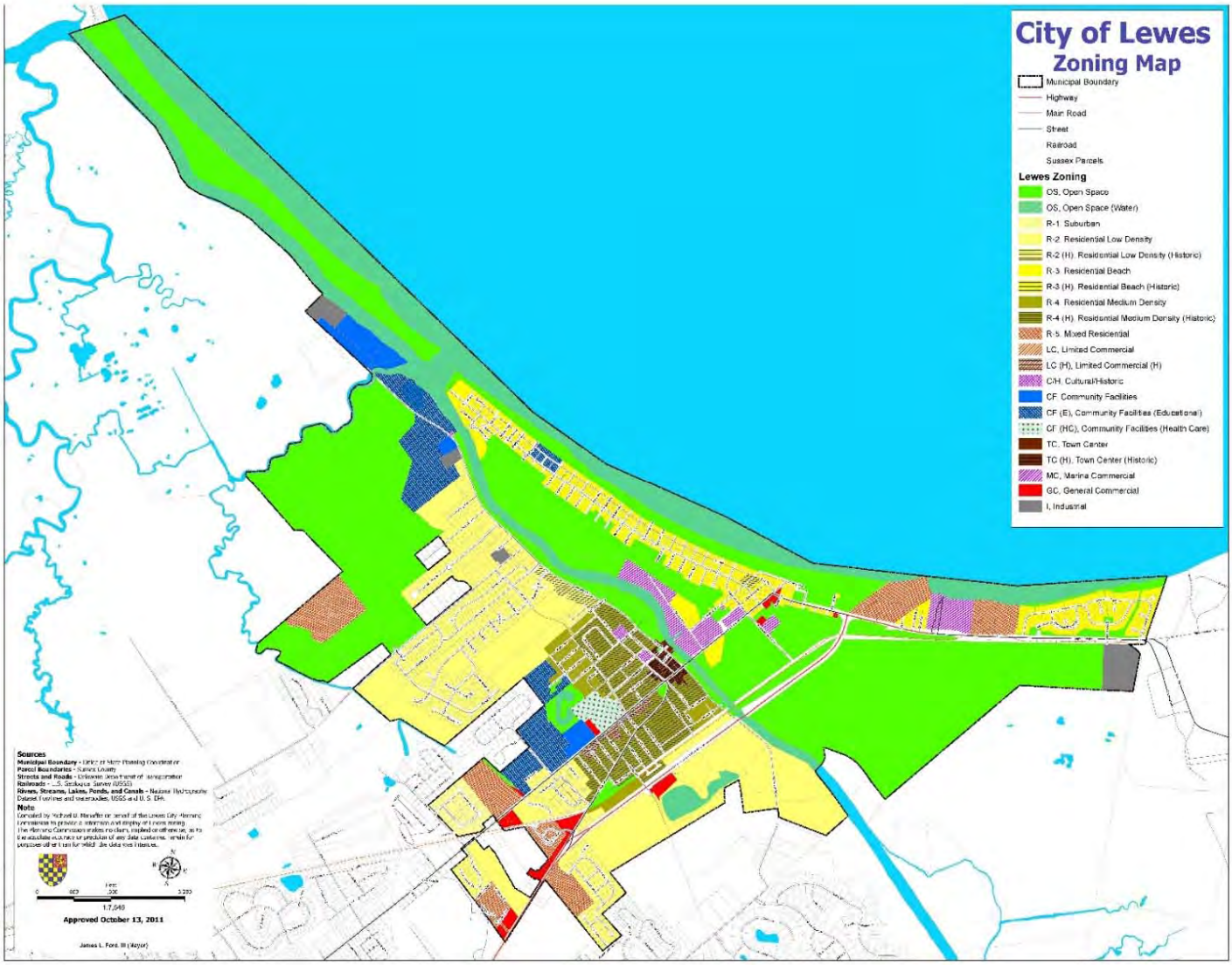

Figure 5. City of Lewes Zoning Map

development than Savannah Road with primarily Open Space (OS) north of the Lewes and Rehoboth Canal and some less intensively developed areas zoned as Residential Low Density (R-2) south of the canal, which has some large tracts of existing farmland with some smaller areas of General Commerical (GC), Residential Medium Density (R-4), Residential Medium Density – Historic (R-4)(H) and Mixed Residential (R-5). The New Road route through Lewes is the least diverse that is primarily zoned as Residential Lowe Density (R-2) and Open Space (OS). Pilottown Road and Front Street are mostly zoned as Open Space (OS) along the canal, Residential Low Density – Historic (R-2)(H) and Residential Medium Density- Historic (R-4)(H).

4.8.1 Impacts of Truck Haul on Land Use/Zoning

The truck haul alternative and alternative haul routes within Lewes will not affect land use or zoning in Lewes. The Savannah Road and Kings Highway Routes would encounter the highest density of development and most diverse zoning within Lewes while the Route 9 (Theo C. Freeman Memorial Highway) and New Road Routes would encounter the least number of different zoning districts, land uses, and development.

4.9 Roads and Infrastructure

The Lewes area is served by a number of state, county, and local municipal roads that could be affected by truck hauling.

4.9.1 Impacts of Truck Haul on Roads and Infrastructure

Three potential truck haul routes were presented in Section 3.2 that inevitably use Cedar Ave. in Lewes to access the staging area at the parking lot adjacent to Roosevelt Inlet. It has been estimated that truck haul delivery rates would average approximately 5 truckloads per hour over a 12-hour day, which could add approximately 60 truckloads (120 trips) per day on local roads. Assuming a fill quantity of 30,000 cubic yards required for beachfill, and using 20 cubic yard-sized double axle trucks, this would require approximately 1,500 truckloads (3,000 trips) over a 150-day period of performance. Table 3 provides three potential routes into and out of Lewes to provide access for truck deliveries of sand to the project location at Roosevelt Inlet. These routes were broken up into smaller segments to show the degree of increased truck traffic on local roads. The existing traffic volumes were based on the 2016 Delaware Department of Transportation Vehicle Volume Survey (accessed from http://deldot.gov/Publications/manuals/traffic_counts/index.shtml on 8/29/2017). The increase in truck traffic is based on the assumption of 120 trips (60 deliveries

Table 3. Estimated Effect of Additional Truck Haul Traffic on Lewes' Local Roads

Potential Route	Route Segment	2016 DELDOT Vehicle Volume Survey*		Addition of 120 Truck Trips Per Day With 2016 AADT			
		AADT	Truck % AADT (#trucks)	% Increase of AADT	Total # of Trucks	Total % Trucks	% Increase of Trucks
Rt. 9B Savannah Rd	Cedar Ave to Roosevelt Inlet	5,233	14% (733)	2.3%	853	16%	16%
	Rt. 9B Savannah Rd to Bayview Ave (includes Bridge 3-154)	6,165	13% (801)	1.9%	921	15%	15%
	Rt. 9B Savannah Rd to Front St.	10,511	13% (1,366)	1.1%	1,486	14%	9%
	Rt. 9B Savannah Rd to Kings Hwy.	10,463	13% (1,360)	1.1%	1,480	14%	9%
	Rt. 9B Savannah Rd to Donovan's Rd	18,511	13% (2,406)	0.6%	2,526	14%	5%
U.S. Route 9 Freeman Hwy.	Cedar Ave to Roosevelt Inlet	5,233	14% (733)	2.3%	853	16%	16%
	Cape Henlopen Drive	4,782	13% (622)	2.5%	742	15%	19%
	US9 Freeman Hwy to Cape Henlopen Dr. (includes Rt. 9 bridge)	2,738	13% (356)	4.4%	476	17%	34%
	US9 Kings Hwy to Freeman Hwy	10,434	14% (1,461)	1.2%	1,581	15%	8%
	US9 Kings Hwy to Clay Rd	17,228	14% (2,412)	0.7%	2,532	15%	5%
New Road	Cedar Ave to Roosevelt Inlet	5,233	14% (733)	2.3%	853	16%	16%
	Rt. 9B Savannah Rd to Bayview Ave (includes Bridge 3-154)	6,165	13% (801)	1.9%	921	15%	15%
	Front St. to Savannah Rd Rt 9B	1,979	14% (277)	6.1%	397	19%	43%
	Pilottown Rd to New Rd	2,706	14% (379)	4.4%	499	18%	32%
	New Rd to Pilottown Rd	2,433	14% (341)	4.9%	461	18%	35%
	New Rd to Lewes Limits	5,263	14% (737)	2.3%	857	16%	16%
	Nassau Rd to New Rd	1,183	14% (166)	10.1%	286	22%	72%

AADT=Annual Average Daily Traffic from 2016 DELDOT Vehicle Volume Survey
*Data retrieved from KMZ file located at http://deldot.gov/Publications/manuals/traffic_counts/index.shtml on 8/29/2017

+ 60 return trips) on these roads per day. It is assumed that all potential routes will utilize the Cedar Ave to Roosevelt Inlet segment to access and leave the project area. Existing truck usage (based on 2016 estimates) of the various route segments are generally 13% to 14% of the traffic. The addition of 120 truck trips could moderately increase truck usage of the local roads from 14% to 22% of the total traffic, and could increase the Average Annual Daily Traffic (AADT) by 0.6% to 10.1%. This impact is more noticeable on the roads with lower AADT than those with higher AADT. All three routes involve crossing bridges over the Lewes and Rehoboth Canal. Two of the routes involve crossing the Savannah Road (Route 9B) drawbridge (Bridge 3-154) and the other route (Route 9) crosses the U.S. Route 9 Bridge before Cape Henlopen Drive. These bridges could experience 1.9% and 4.4% more AADT traffic, respectively, with a potential increase of truck traffic by 15% and 34%, respectively.

As can be seen in Table 3, truck traffic would be significantly increased on the less busy roads, and the increased truck traffic could incrementally exacerbate local congestion and noise on busy roads. However, these adverse effects are temporary. The assumption of 60 deliveries a day could result in a completion (delivery of 30,000 cubic yards of sand) in about 25 days. However, this scenario may actually take longer based on weekends, holidays, availability of trucks, scheduling issues, and other unforeseen issues, which could result in fewer deliveries per day on average.

A number of steps can be taken to minimize the effects of the increased truck traffic and construction in general, which include:

- Conduct deliveries only on weekdays during daylight hours to minimize noise.
- Avoid existing road and utility construction areas if possible.
- Observe all local and State laws for speeds, noise, emissions, safety inspections, and height and weight limits.
- Maintain and protect traffic on all affected roads during the construction period.
- Provide measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction.
- Protect the traveling public from damage to person and property.
- Minimize the interference with public traffic on roads selected for hauling material to and from the site.
- Investigate the adequacy of existing roads and their allowable load limit.
- Provide repairs of any damage to roads caused by construction operations.

5.0 COMPLIANCE WITH ENVIRONMENTAL STATUTES

Compliance with applicable Federal Statutes, Executive Orders, and Executive Memoranda, was originally discussed in the USACE (1997). Table 4 is a complete listing of compliance status relative to environmental quality protection statutes and other environmental review requirements.

Table 4. Compliance with Environmental Quality Protection Statutes and Other Environmental Review Requirements

FEDERAL STATUTES	**COMPLIANCE W/PROPOSED PLAN**
Archeological - Resources Protection Act of 1979, as amended	Full
Clean Air Act, as amended	Full
Clean Water Act of 1977	Full
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act of 1972, as amended	Full
Endangered Species Act of 1973, as amended	Full
Estuary Protection Act	Full
Federal Water Project Recreation Act, as amended	N/A
Fish and Wildlife Coordination Act	Full
Land and Water Conservation Fund Act, as amended	N/A
Marine Protection, Research and Sanctuaries Act	Full
Magnuson-Stevens Fishery Conservation and Management Act	Full
National Historic Preservation Act of 1966, as amended	Full
National Environmental Policy Act, as amended	Full
Rivers and Harbors Act	Full
Watershed Protection and Flood Prevention Act	N/A
Wild and Scenic River Act	N/A
Executive Orders, Memorandums, etc.	
EO 11988, Floodplain Management	Full
EO 11990, Protection of Wetlands	Full
EO12114, Environmental Effects of Major Federal Actions	Full
EO 12989, Environmental Justice in Minority Populations and Low-Income Populations	Full
County Land Use Plan	Full

Full Compliance - Requirements of the statute, EO, or other environmental requirements are met for the current stage of review.
Partial Compliance - Some requirements and permits of the statute, E.O., or other policy and related regulations remain to be met.
Noncompliance - None of the requirements of the statute, E.O., or other policy and related regulations have been met.
N/A - Statute, E.O. or other policy and related regulations are not applicable.

6.0 CONCLUSIONS

In 1997, USACE completed a Final Environmental Assessment and Finding of No Significant Impact (EA/FONSI) for the construction of a Federal Coastal

Storm Risk Management Project for the community of Lewes, Sussex County, Delaware. This EA evaluated the impacts associated with changes that have occurred since the EA/FONSI was completed in 1997. New information, new statutes and the development of different operating practices subsequent to USACE (1997) required that the proposed Federal action be evaluated pursuant to the National Environmental Policy Act of 1969, as amended.

The evaluations presented in this EA address the changes in the project area, changes in the proposed project, and regulatory changes. These changes are consistent with the project actions previously detailed and documented, and would not result in any new or significant impacts to the project area. Based on the data presented and continuing coordination with State and Federal resource agencies, no significant adverse environmental impacts are expected to occur as a result of the proposed project changes. Since the potential impacts from these changes identified have been determined to be minor, localized and temporary, the preparation of a new or Supplemental Environmental Impact Statement is not warranted and a Finding of No Significant Impact (FONSI) for the proposed action is appropriate.

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U.S. Fish and Wildlife Service (USFWS). 1995. Delaware Bay Coastline – Roosevelt Inlet/Lewes Beach Feasibility Study Planning Aid Report: Baseline Biological Conditions. Prepared by the USFWS for the Philadelphia District U.S. Army Corps of Engineers.

APPENDIX-A

CLEAN AIR ACT RECORD OF NON-APPLICABILITY (RONA)

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RECORD OF NON-APPLICABILITY (RONA)

Project Name: Lewes Beach Coastal Flood Risk Management Project

Reference: USACE Flood Control and Coastal Emergencies (FCCE) Project Information Report (PIR) and PIR Addendum.

Project/Action Point of Contact: Steven Allen, CENAP-PL-E

Begin Date: September 2017

End Date: April 2018

1. Project Description: Under the authority of 33 USC 701n (Public Law (PL) 84-99) the Federal Government has the mission to provide timely, effective, and efficient disaster preparedness, response, recovery, and mitigation projects and services on a nationwide basis to reduce loss of life and property damage under DOD, USACE, FEMA, and other agencies' authorities. In order to qualify for assistance under PL 84-99, a Project Information Report (PIR) is prepared to document damage to the project, estimate costs and benefits of the proposed rehabilitation effort, and document National Environmental Policy Act, Fish and Wildlife Coordination Act, Endangered Species Act, and coastal zone management coordination. This documentation was prepared in response to the nor'easter 22 – 25 January 2016 nor'easter, which caused damage to the Lewes Beach shore protection project, due to beach erosion of the project. In response to this storm, a PIR was prepared to document these damages and to recommend various project "repair" and "restore" scenarios. The most likely scenario recommend beachfill acquired by truck hauling from an approved commercial sand quarry.

2. An emissions estimate was completed to determine the Nitrogen Oxides (NOx) and Volatile Organic Carbon (VOC) emissions (precursors to ozone formation) associated with the largest sand quantity presented in the August 2016 Lewes Beach PIR. This sand quantity is estimated at 42,400 cy, associated with Scenario 3, the full "repair and restore" option. This scenario is presented consistent with USACE Implementation Guidance dated 4 April 2016, specific to implementing "repair and restore" identified in WRRDA 2014 Section 3029. Repair of the losses caused by the January 2016 and September-October 2015 nor'easters, plus restoration to the full authorized project template using a truck haul to deliver sand from the an approved commercial sand quarry, will require approximately 42,400 cy of sand. Truck hauling, placing sand and grading work is calculated to generate a total of 5.0 tons of NOX and 0.72 tons of VOCs that would be split over two calendar years.

3. The project described above has been evaluated for Section 176 of the Clean Air Act. Project related emissions associated with the federal action were estimated to evaluate the applicability of General Conformity regulations (40CFR§93 Subpart B).

4. The project is located in Sussex County, Delaware, which has the following nonattainment-related designations with respect to the National Ambient Air Quality Standards (40CFR§81.133): Marginal Nonattainment 2008 8-hour Ozone Standard (primary and secondary).

5. The requirements of this rule do not apply because the total direct and indirect emissions from this project are less than the 100 tons trigger level for NO_x for each project year and significantly below the 50 tons trigger level for VOC (40CFR§93.153(b)(1) & (2)), as VOCs, are typically a fraction of total NOx emissions. The estimated emissions for the project for each pollutant are provided below.

CALENDAR YEAR	MONTHS	TONS NOx	TONS VOC
2017	1	2.5	0.36
2018	1	2.5	0.36
TOTAL	**2**	**5.0**	**0.72**

6. The project conforms with the General Conformity requirements (40CFR§93.153(c)(1)) and is exempted from the requirements of 40 CFR §93 Subpart B.

Peter R. Blum P.E.
Chief, Planning Division

DELAWARE COAST, LEWES BEACH, STORM DAMAGE REDUCTION PROJECT EMISSION INVENTORY

TABLE 1 - PROJECT NOX EMISSION SOURCES AND ESTIMATED POWER

Equipment/Engine Category	task	# of engines	hp	load factor (LF)	hrs/day	days of operation*	hp-hr	NOX EF (g/hp-hr)	Emissions (Tons)
Mobilization & Demobilization									
Shore Crew									
Lube Truck/Oiler	shore crew	1	165	0.80	8	17	17,952	9.2	0.18
Tractor and Sweeper	shore crew	1	165	0.68	8	17	15,259	9.2	0.15
Dozer crawler, D65EX-15	shore crew	2	205	0.80	8	17	44,608	9.2	0.45
Loader, front end, wheeled, D155WX	shore crew	2	181	0.71	8	17	34,955	9.2	0.35
Hydraulic Excavator, crawler, PC 400	shore crew	1	454	0.53	8	17	32,724	9.2	0.33
Dump Truck, 20 CY	shore crew	8	400	0.80	8	17	348,160	9.2	3.53
								TOTAL	**4.99** Tons NOX
			Assume:						
				175000	Tons x	1 day = 3000 Tons		58 Days	
				3000	Tons x day	25 Tons = Truck		120 Trips from borrow area to work site	
				20	cy Truck x	1.25	Tons cy	25.00 Tons of sand	

Nox Crew Emissions

Construction Stage	# Workers	Trips/day	#days	miles/trip	0.96 g of Nox/mile		Total Nox
Mob/demob Shore Crew	10	2	2	30	0.96		0.00126984
Beachfill Crew	10	2	20	30	0.96		0.01269841
				TOTAL NOx (Tons):			**0.01**

DELAWARE COAST, LEWES BEACH, STORM DAMAGE REDUCTION PROJECT EMISSION INVENTORY

TABLE 2 - PROJECT VOC EMISSION SOURCES AND ESTIMATED POWER

Equipment/Engine Category	task	# of engines	hp	load actor (LF	hrs/day	days of operation*	hp-hr	VOC EF (g/hp-hr)	Emissions (Tons)
Mobilization & Demobilization									
Shore Crew									
Lube Truck/Oiler	shore crew	1	165	0.80	8	17	17,952	1.3	0.03
Tractor and Sweeper	shore crew	1	165	0.68	8	17	15,259	1.3	0.02
Dozer crawler, D65EX-15	shore crew	2	205	0.80	8	17	44,608	1.3	0.06
Loader, front end, wheeled, D155WX	shore crew	2	181	0.71	8	17	34,955	1.3	0.05
Hydraulic Excavator, crawler, PC 400	shore crew	1	454	0.53	8	17	32,724	1.3	0.05
Dump Truck, 20 CY	shore crew	8	400	0.80	8	17	348,160	1.3	0.50
								TOTAL	**0.71** VOCs

Assume:					
175000	Tons x	1 day = 3000 Tons	58	Days	
3000	Tons x day	25 Tons = Truck	120	Trips from borrow area to work site	
20	cy Truck x	1.25	Tons cy	25.00	Tons of sand

VOCs Crew Emissions

Construction Stage	# Workers	Trips/day	#days	miles/trip	0.84 g of VOC/mile		Total VOC
Mob/demob Shore Crew	10	2	2	30	0.84		0.001111
Beachfill Crew	10	2	20	30	0.84		0.011111
				TOTAL VOCs (Tons):			0.012222

APPENDIX-B

CLEAN WATER ACT SECTION 404(B)(1) EVALUATION

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EVALUATION OF 404 (b)(1) GUIDELINES

* This evaluation involves the aquatic placement of sandy material obtained from a commercial sand quarry as an alternate sand source for the Federal coastal storm risk management project at Lewes Beach, Sussex County, Delaware. This type of placement is typically done by delivering sand fill to the beach via truck haul obtained from a commercial quarry. A previous 404(b)(1) evaluation for the placement of sand at this location involved dredging for sand from Roosevelt Inlet and/or Borrow Area A as presented in USACE (1997). The truck haul method is not intended to replace dredging as a means of obtaining sandy beachfill, but is intended to be an alternate source for sand when conditions warrant the truck haul method be implemented.

I. PROJECT DESCRIPTION

A. Location

The project discharge site is located at Lewes Beach in Sussex County, Delaware. The western limit of the main project area is Roosevelt Inlet. The eastern limit of the main project area is approximately 900 feet east of the inlet at the intersection of Nebraska and Bay Avenues. A 500-foot beachfill taper will extend eastward from this limit. Thus, the main project area length is approximately 900 feet and the total project length, including the taper, is approximately 1,400 feet.

B. General Description

The beachfill portion of the project consists of a design template with a minimum 100-foot beach berm (flat portion of beach above mean high water) at an elevation of +8.0 feet NAVD with a dune at elevation +14.0 feet NAVD. At the time of fill placement, the berm width may be considerably wider (up to 200 feet) than the design template of 100 feet to accommodate advanced (sacrificial) nourishment quantities and to hold a construction template profile. This project was first constructed in 2004, and has been maintained by routine periodic nourishment and storm repairs in accordance with PL-84-99 under the Flood Control and Coastal Emergencies (FCCE) Program. Beachfill quantities and extents will vary depending on conditions and needs at the time of each nourishment cycle and emergency storm repairs in order to maintain the design template.

C. Authority and Purpose

The Delaware Bay Coastline, DE & NJ, Roosevelt Inlet - Lewes Beach, DE project was authorized for construction by Title I, Section 101 (a) (13) of WRDA 1999, PL 106-53, 113 Stat. 269.

“(13) DELAWARE BAY COASTLINE, DELAWARE AND NEW JERSEY-ROOSEVELT INLET-LEWES BEACH, DELAWARE. – The project for navigation mitigation and hurricane and storm damage reduction, Delaware Bay coastline, Delaware and New Jersey-Roosevelt Inlet-Lewes Beach, Delaware: Report of the Chief of Engineers dated February 3, 1999, at a total cost of $3,393,000, with an estimated Federal cost of $2,620,000 and an estimated non-Federal cost of $773,000, and at an estimated average annual cost of $196,000 for periodic nourishment over the 50-year life of the project, with an estimated annual Federal cost of 152,000 and an estimated annual non-Federal cost of $44,000.”

Repairs to the project following significant storm events are under the authority of 33 USC 701n (Public Law (PL) 84-99), in which the Federal Government has the mission to provide timely, effective, and efficient disaster preparedness, response, recovery, and mitigation projects and services on a nationwide basis to reduce loss of life and property damage under DOD, USACE, FEMA, and other agencies' authorities**.**

The purpose of this projects is to provide Navigation Mitigation and Coastal Storm Risk Management for the community of Lewes, Sussex County, Delaware.

D. General Description of Dredged or Fill Material

1. General Characteristics of Material.

The beachfill material for storm repairs and/or periodic nourishment is obtained from a commercial quarry that is trucked in to the site (beach). The specification for the beachfill sand require that it is composed of predominantly fine to medium sands with no more than 3% fines (silts and clays) and 3% gravels. The sand would also closely match existing sand colors, and be sufficiently de-watered prior to delivery onsite.

2. Quantity of Material. The quantity of material required to be discharged is variable because fill needs will be determined based on pre-nourishment surveys. Truck haul fills are generally for quantities less than 125,000 cubic yards. Larger fill quantities generally require beachfill obtained by dredging, which is evaluated in USACE (1997).

3. Source of Material.

The source of material would be an existing approved commercial sand quarry.

E. Description of the Proposed Discharge Site

1. Location. The proposed discharge locations include the upper beach and dunes, lower beach intertidal areas and nearshore areas of Lewes Beach.

2. Size. The proposed beachfill discharge areas are composed of eroding beach berm, foreshore, nearshore and dunes. Areas affected by discharges below MHW will vary depending on needs, but the estimated affected areas below MHW is generally 10 acres or less.

3. Type of Site. The proposed beachfill discharge area is composed of a higher energy Delaware Bay sandy beach. The proposed discharge sites are unconfined with placement to occur on beach areas including intertidal sandy estuarine habitat and nearshore surf zone.

4. Type(s) of Habitat. The type of habitat present at the proposed discharge location is estuarine sandy beach (upper beach and dune), estuarine intertidal and estuarine subtidal nearshore habitats.

5. Timing and Duration of Discharge. Discharges would occur from October 1st to March 1st. Discharges associated with periodic nourishment would occur over a duration of approximately 1 to 3 months every 6 years during the 50-year project life, but this could vary depending on size and scope of beachfill based on current conditions. Additional discharges

could result based on needs for storm repairs following a significant storm event in accordance with PL-84-99.

F. Description of Discharge Method

Beachfill sand would be delivered by dumptruck and placed directly on the beach in piles. Subsequently, the sand would be pushed into the intertidal and nearshore waters using bulldozers. Final grading would be accomplished using standard construction equipment such as bulldozers and graders.

II. FACTUAL DETERMINATION

A. Physical Substrate Determinations

1. **Substrate Elevation and Slope.** The design berm width is 100 feet wide with an elevation after fill placement at +8.0 feet NAVD at the top of the berm. The 100-ft. berm width is a minimum width. At the time of fill placement, the berm width may be 200 feet or more to account for advanced nourishment and a temporary construction template. The top of dune elevation is +14.0 ft. The proposed profile would have a foreshore slope of 10H:1V initially to 15H:1V, after fill adjustment occurs. The underwater slope parallels the existing bottom to the depth of closure.

2. **Sediment Type.** The sediment type involved would be sandy beachfill material (generally consists of 96% or greater of fine, medium and coarse sands and gravels) obtained from a commercial quarry.

3. **Dredged/Fill Material Movement.** The planned construction would establish an initial construction template, which is wider than the final intended design template or profile. It is expected that compaction and erosion and sorting would be the primary processes resulting in the change to the design template. The loss or winnowing of fine grain materials into the water column would occur during the initial settlement. These materials may become re-deposited within subtidal nearshore waters.

4. **Physical Effects on Benthos.** The proposed construction and discharges would result in initial burial of the existing beach and nearshore benthic communities when this material is discharged during berm construction. Substrate is expected to be composed of material that is similar to existing substrate, which is expected to become recolonized by the same type of benthos that previously existed at the location.

5. **Other Effects.** Other effects would include a temporary increase in suspended sediment load and a change in the beach profile, particularly in reference to elevation. Bathymetric changes in the placement site would raise the bottom several feet, which would be offset seaward.

6. **Actions Taken to Minimize Impacts.** Actions taken to minimize impacts include selection of fill material that is similar in nature to the pre-existing substrate.

B. Water Circulation, Fluctuation, and Salinity Determinations

1. Water. Consider effects on:

a. **Salinity** - No effect.
b. **Water chemistry** - No significant effect.
c. **Clarity** - Minor short-term increase in turbidity during construction.
d. **Color** - No effect.
e. **Odor** - No significant effect.
f. **Taste** - No effect.
g. **Dissolved gas levels** - No significant effect.
h. **Nutrients** - Minor effect.
i. **Eutrophication** - No effect.
j. **Others as appropriate** - None.

2. Current patterns and circulation

a. **Current patterns and flow** – Minor impacts to circulation patterns and flow in the beach zone and nearshore where the existing circulation pattern and flow would be offset seaward the width of the beachfill placement.

b. **Velocity** - No effects on tidal velocity and longshore current velocity regimes.

c. **Stratification** - Thermal stratification normally occurs beyond the mixing region created by the surf zone. The normal pattern should continue after construction of the proposed project.

d. **Hydrologic regime** - The regime is tidal estuarine. This will remain the case following construction of the proposed project.

3. **Normal water level fluctuations** - The tides are semidiurnal. The mean tide range for the area is 4.1 feet. Beachfill placement would not affect the tidal regime. Mean High Water occurs at +1.6 ft. NAVD and Mean Low Water occurs at -2.5 ft. NAVD.

4. **Salinity gradients** - There should be no significant effect on the existing salinity gradients.

5. **Actions that will be taken to minimize impacts**- None are required; however, utilization of clean sand that matches existing beach sand would minimize water chemistry impacts.

C. Suspended Particulate/Turbidity Determinations

1. **Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal (Beachfill Placement) Site** - There would be a short-term elevation of suspended particulate concentrations during construction phases in the immediate vicinity of the fill discharge locations. Elevated levels of particulate concentrations at the discharge locations may also result from "washout" after beachfill is placed.

2. Effects (degree and duration) on Chemical and Physical Properties of the Water Column -

a. Light penetration - Short-term, limited reductions would be expected at the discharge sites from fill placement and berm washout, respectively.

b. Dissolved oxygen - There is a potential for a decrease in dissolved oxygen levels but the anticipated low levels of organics in the fill material should not generate a high, if any, oxygen demand.

c. Toxic metals and organics – The sand obtained from an existing approved commercial quarry would contain less than 3% fines and organics, and is expected to be free of harmful levels of toxic metals and organics.

d. Pathogens - Pathogenic organisms are not known or expected to be a problem from a commercial sand quarry. However, temporary increases in indicator bacteria levels may occur during beachfill discharges as bottom sediments in the intertidal and nearshore become stirred-up during the discharge.

e. Aesthetics - Construction activities and the initial construction template associated with the fill placement site would result in a minor, short-term degradation of aesthetics. This is due to the temporary impacts to noise and sight associated with the fill placement. Newly deposited sand from a truck fill may initially appear dark and produce a sulfurous odor; however, this is expected to be short-term as the new sands undergo “bleaching” by becoming oxidized to air and sunlight.

3. Effects on Biota

a. Primary production, photosynthesis - Minor, short-term effects related to turbidity.

b. Suspension/filter feeders - Minor, short-term effects related to suspended particulates outside the immediate deposition zone. Sessile organisms would be subject to burial if within the deposition area.

c. Sight feeders - Minor, short-term effects related to turbidity.

4. Actions taken to minimize impacts include the selection of clean sand with a small fine grain component and a low organic content. Standard construction practices would also be employed to minimize turbidity and erosion.

D. Contaminant Determinations

The material is not expected to introduce, relocate, or increase contaminant levels at the placement location.

E. Aquatic Ecosystem and Organism Determinations

1. **Effects on Plankton** - The effects on plankton should be minor and mostly related to light level reduction due to turbidity. Significant dissolved oxygen level reductions are not anticipated.

2. **Effects on Benthos** – Initially, sand placement would result in the burial of benthos within the discharge (beachfill) location. The losses of benthic organisms are somewhat offset by the expected rapid opportunistic recolonization from adjacent areas that would occur following cessation of construction activities. Recolonization is expected to occur rapidly in the discharge (beachfill placement) area through horizontal and in some cases vertical migrations of benthos. Some minor losses of benthos associated with rocky intertidal habitat are expected, as portions of the inlet jetty would become temporarily covered with beachfill material.

3. **Effects on Nekton** - Only a temporary displacement is expected, as the nekton would probably avoid the active work area. The proposed action is not expected to have significant adverse impacts on essential fish habitat (EFH) for the species and their life stages identified within the impact area.

4. **Effects on Aquatic Food Web** – Localized impacts in the affected areas due to loss of benthos as a food source through burial at the beachfill placement site. This is expected to be short-term as the beachfill placement sites could become recolonized by benthos within a few days or weeks.

5. **Effects on Special Aquatic Sites** - No special aquatic sites such as sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs and riffle and pool complexes are present at the discharge site.

6. **Threatened and Endangered Species** - The piping plover (*Charadrius melodus*), a Federal and State threatened species, utilizes sandy beach habitat in Delaware. This bird nests on the beach, however, no nesting sites have been reported within the project impact area. The sea beach amaranth (*Amaranthus pumilus*) is a Federally threatened plant that can be found on the upper beach and lower dunes in along the Atlantic Coast Beaches of Delaware. However, this plant has not been identified within the project impact area. The rufa red knot (*Calidris canutus rufa*) could occur in the area, but the USFWS has concluded that its use of the project area would be minimal. Beachfill placement in the intertidal and shallow nearshore is not expected to affect the Federally threatened or endangered Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*), sea turtles, and whales.

7. **Other Wildlife** - The proposed plan would not significantly affect other wildlife.

8. **Actions to minimize impacts** – None required. The utilization of suitable sand as beachfill minimizes impacts to benthic and pelagic organisms at the discharge locations.

F. Proposed Disposal/Discharge (Beachfill Placement) Site Determinations

1. **Mixing Zone Determination**

a. **Depth of water** - 0 to-10 feet NAVD
b. **Current velocity** - Generally less than 3 feet per second
c. **Degree of turbulence** - Moderate to high
d. **Stratification** - None
e. **Discharge vessel speed and direction** - Not applicable
f. **Rate of discharge** – N/A. Rate is established by placement with dumptruck and fill manipulation with dozers.
g. **Dredged material characteristics** - Medium-fine sand and gravels with low silts, clays and organics
h. **Number of discharge actions per unit time** - Continuous over the construction period

2. **Determination of Compliance with Applicable Water Quality Standards** - Prior to construction, a Section 401 Water Quality Certificate will be obtained from the State of Delaware.

3. **Potential Effects on Human Use Characteristics** -

a. **Municipal and private water supply** - No effect
b. **Recreational and commercial fisheries** - Short-term effect during construction; there would be a temporary disruption to fisheries at the placement locations where finfish may avoid construction area. Burial of benthos would result in temporary loss of food source for finfish. Beach access for recreational fisherman may be temporarily restricted in segments during construction.
c. **Water related recreation** - Short-term effect during construction where potential beachgoers, bathers, and surf-fishermen would be prohibited from accessing active construction locations.
d. **Aesthetics** - Short-term adverse effects to noise sight and smell during construction are anticipated.
e. **Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves** – No effects.

G. **Determination of Cumulative Effects on the Aquatic Ecosystem**- Impacts on benthos and the aquatic ecosystem in general are considered to be temporary and do not represent a significant loss of habitat. This action in concert with other existing or proposed similar actions, may produce measurable temporary cumulative impacts to benthic resources. However these impacts are short-term.

H. **Determination of Secondary Effects on the Aquatic Ecosystem** – Secondary impacts such as turbidity on aquatic organisms or temporary loss of food sources through the burial of benthos are considered to be of short duration.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. **Adaptation of the Section 404(b)(1) Guidelines to this Evaluation.** No significant adaptation of the Section 404(b)(1) Guidelines were made relative to this evaluation.

B. **Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site, Which Would Have Less Adverse Impact on the Aquatic Ecosystem.** The alternative measures considered for accomplishing the project objectives were previously evaluated in USACE (1997) and Section 3.0 of the Environmental Assessment. Several alternatives including No Action, Permanent Evacuation and Regulation of Future Development would likely have less adverse impacts on the aquatic ecosystem.

C. **Compliance with Applicable State Water Quality Standards.** This action is not expected to violate State of Delaware Water Quality Standards. A Section 401 water quality certificate will be obtained from the Delaware Department of Natural Resources and Environmental Control prior to initiation of discharges associated with this project.

D. **Compliance with Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act.** The proposed action is not expected to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. **Compliance with Endangered Species Act.** A no effect determination for Atlantic sturgeon, sea turtles, and whales was made since a truck fill does not involve pelagic or deepwater habitats where the species are more likely to be present. Consultation with the USFWS has determined that the project is not likely to adversely affect the Federally listed threatened piping plover, rufa red knot, and seabeach amaranth, which have not occurred within the project impact area. If this condition changes, the Philadelphia District would consult with the U.S. Fish and Wildlife Service.

F. **Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972.** The proposed action will not violate the protective measures for any Marine Sanctuaries designated by the Marine Protection, Research, and Sanctuaries Act of 1972.

G. **Evaluation of Extent of Degradation of the Waters of the United States.** The proposed action is not expected to result in permanent significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems; aquatic ecosystem diversity, productivity, and stability; and recreational, aesthetic, and economic values is not expected to occur or have long-term effects on impacted resources.

H. **Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem.** Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems include selection of fill material that is low in silt content, has little organic material, and is expected to be uncontaminated.

I. **On the basis of the guidelines**, the proposed discharge sites for the dredged material is specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

APPENDIX-C

PERTINENT CORRESPONDENCE

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

September 20, 2016

Mr. Steven D. Allen
U.S. Army Corps of Engineers, Philadelphia District
Environmental Resources Branch
Wanamaker Bldg., 100 Penn Square East
Philadelphia, PA 19107-3390

RE: "Not Likely to Adversely Affect" red knot and piping plover determinations; Lewes Beach Coastal Flood Risk Management Project in Sussex County, Delaware

Dear Mr. Allen:

The U.S. Fish and Wildlife Service (Service) has reviewed your project information from the Service's Information for Planning and Conservation (IPaC) online system dated April 7, 2016 and your email message dated June 8, 2016. The Service has evaluated the potential effects of this project to the threatened red knot (*Calidris canutus rufa*) and piping plover (*Charadrius melodus*). The comments provided below are in accordance with Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

The purpose of this proposed project is the periodic sand nourishment and/or project repairs under PL 84-99 (Flood Control and Coastal Emergencies) for the Federal Lewes Beach project located along the lower Delaware Bay in Lewes, Delaware. The affected area is the beach and dunes extending from the Roosevelt Inlet to approximately Missouri Avenue (about 1,400 linear feet). This project area currently consists of open beach.

While the federally threatened red knot and piping plover are known to occur in the project vicinity, this project as proposed is "not likely to adversely affect" the red knot because red knot use of this proposed project site is minimal. In addition, this project as proposed is "not likely to adversely affect" the piping plover because the only known habitat is located approximately 1/8 mile from this proposed project site and piping plovers have not nested there for the past 15 years. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

We appreciate the opportunity to provide information relevant to threatened and endangered fish and wildlife resources. This Endangered Species Act determination does not exempt this project from obtaining all permits and approvals that may be required by other State or Federal agencies.

If you have any questions or concerns regarding this letter, please contact Trevor Clark of my Endangered Species staff at (410) 573-4527 or by email at Trevor_Clark@fws.gov.

Sincerely,

Genevieve LaRouche
Supervisor

cc: Matthew Bailey, DNREC, Delaware Division of Fish and Wildlife, Smyrna, DE
Audrey DeRose-Wilson, DNREC, Delaware Division of Fish and Wildlife, Smyrna, DE
Kate Fleming, DNREC, Delaware Division of Fish and Wildlife, Smyrna, DE

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
OFFICE OF THE SECRETARY

DELAWARE COASTAL MANAGEMENT PROGRAM

100 W. WATER STREET, SUITE 7B
DOVER, DELAWARE 19904

Phone: (302) 739- 9283
Fax: (302) 739-2048

August 8, 2017

Peter R. Blum, P.E.
Philadelphia District, Corps of Engineers
100 Penn Square East
7th Floor Wannamaker Building
Philadelphia, Pennsylvania 19107-3390

Re: Delaware Coastal Management Federal Consistency Modification Request
Roosevelt Inlet and Lewes Beach Coastal Storm Risk Management Project (FC 2001.0054)

Dear Mr. Blum,

The Delaware Coastal Management Program (DCMP) has received and reviewed a project modification request for the above referenced project which received its initial federal consistency certification concurrence from this office in a letter dated May 14, 2002. The project modification requested is to include truck fill (in addition to previously authorized dredging practices) as a method of sand delivery necessary for restoration of the authorized beach template.

As outlined in your modification request, the change reflects the fact that placing smaller quantities of sand are not economically feasible via dredging due to the high cost of mobilization and demobilization of equipment.

Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP finds that this modification does not represent a change to the coastal zone effects of this project, and concurs with your modification request. All other conditions remain in effect as described in the May 14, 2002 consistency certification.

If you have any questions, please contact me or Tricia Arndt of my staff at (302) 739- 9283.

Sincerely,

Kimberly Cole, Administrator
Delaware Coastal Programs

KC/tka
Cc: File 2001.0054

Delaware's good nature depends on you!

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

U.S. Army Corps of Engineers
c/o Peter Blum, Chief Planning Division
100 Penn Square East
7th Floor Wanamaker Building
Philadelphia, PA 19107

Letter of Addendum and Extension to:
Subaqueous Lands Permit: SP-213/11
Water Quality Certification: WQ-214/11
Issued On: August 31, 2011
Issuance of Addendum: September 5, 2017
Addendum Expiration Date: August 31, 2018

RE: Lewes, Delaware - Beach Replenishment Project

Dear Mr. Blum:

This letter is in response to your request to complete one additional beach renourishment of Lewes Beach, in Lewes, Delaware. The renourishment was originally authorized by the Wetlands and Subaqueous Lands Section's Subaqueous Lands Permit, SP-213/11 and Water Quality Certification, WQ-214/11 issued to the U.S. Army Corps of Engineers on August 31, 2011.

The permit/certification authorized hydraulic dredging in the Roosevelt Inlet and placing the material approximately 1,400 feet along the beach from the Roosevelt Inlet to halfway between Iowa and Missouri Avenues, in Lewes, Delaware. It also authorized one additional renourishment of up to 132,000 cubic yards of material on Lewes Beach within six (6) years of the issuance date of the permit/certification. .

On August 17, 2017 the Corps of Engineers requested authorization to complete additional beach replenishment by placing fill by truck on the beach and moving the material with equipment. This request met the terms and conditions of the original permit/certification.

By this letter, the Wetlands and Subaqueous Lands Section grants a one-year extension to the construction expiration date for the beach renourishment. The construction expiration of the Permit/Certification is hereby changed to August 31, 2018. This Addendum/Extension authorizes the following work as approved September 9, 2017:

- **The replenishments of 30,250 cubic yards of beach fill in Lewes, extending 100 feet from the Roosevelt Inlet and extending 1,400 feet along the beach to halfway between Iowa and Missouri Avenues,**
- **The beach fill shall be distributed by truck haul onto the beach through an existing stabilized dune walkover. The beach fill is then proposed to be distributed by dozers and graders.**

The work shall be completed in accordance with the attached plans (3 sheets). All terms and conditions of the original Permit/Certification shall remain unchanged, except for the modification of Special Condition 4 below and the inclusion of the following conditions:

- **The beach fill shall be purchased from an approved commercial quarry/sandpit. The beach fill shall match the existing sand grain size and color.**
- **All beach fill shall be clean and free from debris.**
- **To protect shorebirds, including the federally listed red knot, beach renourishment activities shall be prohibited from April 15 through July 7.**
- **Modified Special Condition 4 – The federally protected piping plover is known to nest on Atlantic coast beaches in Delaware. Nesting is unlikely within the project area due to its heavy recreational use. However a time of year restriction from March 1 through September 15 shall be in effect, unless the Corps of Engineers employs a Species Conservation and Research Program approved scientist to inspect the disposal area to determine whether any piping plover nesting is occurring. If nests are found within the project limits the dredging operations shall be shut down.**

If you have any questions, please contact this office at (302) 739-9943.

Sincerely,

Steven M. Smailer
Section Manager
Wetlands and Subaqueous
Lands Section

Joanne M. Lee
Environmental Scientist
Wetlands and Subaqueous
Lands Section

Cc: Steven Allen, COE
Tony, Pratt, DNREC

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GENERAL CONDITIONS

1. The permittee and contractor shall at all times comply with all applicable laws and regulations of the Department of Natural Resources and Environmental Control.
2. The activities authorized herein shall be undertaken in accordance with the all conditions, the final stamped and approved plans, and with the information provided in the application.
3. A copy of this Certification and the stamped approved plans shall be available on-site during all phases of construction activity.
4. The conditions contained herein shall be incorporated into any and all construction contracts associated with the construction authorized herein. The permittee and contractor are responsible to ensure that the workers executing the activities authorized by this Certification have full knowledge of, and abide by, the terms and conditions of this Certification.
5. No portion of the structure shall be constructed using creosote treated lumber.
6. No portion of the structure(s) authorized by this Certification shall exceed the width dimension for that structure identified on Page One of this Certification.
7. The activities authorized herein shall be conducted so as not to violate the State of Delaware's Surface Water Quality Standards in effect at the date of Certification.
8. The issuance of this Certification does not constitute approval for any activities that may be required by any other local, state or federal government agency.
9. The issuance of this Certification does not imply approval of any other part, phase, or portion of any overall project the permittee may be contemplating.
10. This Certification authorizes only the activities described herein. Modifications to the project may require a supplemental approval from this office prior to the initiation of construction. A determination of the need for a supplemental approval will be made by this office pursuant to the permittee submitting written notification and revised plans indicating project changes. Failure to contact the Department prior to executing changes to the project shall constitute reason for this Certification being revoked.
11. The Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
12. The permittee will protect and hold the State of Delaware harmless from any loss, cost or damage resulting from the construction or use of said structures.
13. Representatives of the Department of Natural Resources and Environmental Control shall be allowed to access the property to inspect all work during any phases of the construction and may conduct post-construction compliance inspections, collect any samples or conduct any tests that are deemed necessary.
14. The permittee shall maintain all authorized structures and activities in a good and safe condition.

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15. All construction materials, waste or debris associated with this activity shall be properly disposed of and contained at all times to prevent its entry into waters or wetlands. Construction materials shall not be stockpiled in subaqueous lands or wetlands.

16. The permittee or their contractor shall employ measures during construction to prevent spills of fuels, lubricants or other hazardous substances. In the event of a spill, the permittee or their contractor shall make every effort to stop the leak and contain the spill, and shall immediately contact the Hazardous Spill Response Team (HAZMAT) at 1-800-662-8802 and this office at (302) 739-9943. The permittee and their contractor are responsible to comply with all directives to contain and clean up the spilled material(s) as stipulated by the HAZMAT team, and to restore the site as may be required by this office.

17. No construction shall occur after the construction expiration date identified on Page One of this Certification. The permittee may file an extension request of up to one (1) year if necessary to complete the authorized work. Such requests must be received by the Department at least thirty (30) days prior to the construction expiration date.

18. Any actions, operations or installations which are found by the Department to be contrary to the public interest may constitute reason for the discontinuance and/or removal of said action, operation or installation. Removal and restoration shall be at the expense of the permittee and/or upland property owner within thirty (30) days of receipt of written notice of revocation and demand for removal.

19. Disturbance of subaqueous lands or wetlands adjacent to the authorized structures or activities is prohibited unless specifically addressed in the special conditions of this Certification. Disturbance of subaqueous lands or wetlands in the path of construction activities shall be minimized. Any temporarily impacted subaqueous lands or wetlands shall be returned to pre-disturbance elevations and conditions.

20. This Certification is personal but may be transferred provided the permittee provides prior notice to the Department of the intent to transfer and the new property owner provides appropriate documentation to substantiate ownership of the adjacent upland property and/or the structures authorized herein. Failure to transfer this Certification to a new owner may result in the revocation of the Certification and the removal of all structures authorized by this Certification at the expense of the permittee.

21. The permittee shall notify the Wetlands and Subaqueous Lands Section prior to the commencement of the work authorized by this Certification.

22. This Certification is subject to the terms and conditions contained in any easement, license or lease that may have been granted by the State or any political subdivision, board, commission or agency of the State which may apply to the premises where the project authorized herein is located.

23. Erosion and sediment control measures shall be implemented in accordance with the specifications and criteria in the current Delaware Erosion and Sediment Control Handbook so as to minimize entry and dispersal of sediment and other contaminants in surface waters.

24. Failure to comply with any of the terms or conditions of this Certification may result in enforcement action, which could include the revocation of this Certification, and subsequent restoration of the site to preconstruction conditions.

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GENERAL CONDITIONS

1. The permittee and contractor shall at all times comply with all applicable laws and regulations of the Department of Natural Resources and Environmental Control.
2. The activities authorized herein shall be undertaken in accordance with the Permit conditions, the final stamped and approved plans, and with the information provided in the Permit application.
3. A copy of this Permit and the stamped approved plans shall be available on-site during all phases of construction activity.
4. The conditions contained herein shall be incorporated into any and all construction contracts associated with the construction authorized herein. The permittee and contractor are responsible to ensure that the workers executing the activities authorized by this Permit have full knowledge of, and abide by, the terms and conditions of this Permit.
5. No portion of the structure shall be constructed using creosote treated lumber.
6. No portion of the structure(s) authorized by this Permit shall exceed the dimensions for that structure identified on Page One of this Permit.
7. The activities authorized herein shall be conducted so as not to violate the State of Delaware's Surface Water Quality Standards in effect at the date of Permit authorization.
8. The issuance of this Permit does not constitute approval for any activities that may be required by any other local, state or federal government agency.
9. The issuance of this Permit does not imply approval of any other part, phase, or portion of any overall project the permittee may be contemplating.
10. This Permit authorizes only the activities described herein. Modifications to the project may require a supplemental approval from this office prior to the initiation of construction. A determination of the need for a supplemental approval will be made by this office pursuant to the permittee submitting written notification and revised plans indicating project changes. Failure to contact the Department prior to executing changes to the project shall constitute reason for this Permit being revoked.
11. The Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
12. The permittee shall protect and hold the State of Delaware harmless from any loss, cost or damage resulting from the activities authorized herein.
13. Representatives of the Department of Natural Resources and Environmental Control shall be allowed to access the property to inspect all work during any phase of the construction and may conduct pre and post-construction inspections, collect any samples or conduct any tests that are deemed necessary.
14. The permittee shall maintain all authorized structures and activities in a good and safe condition.

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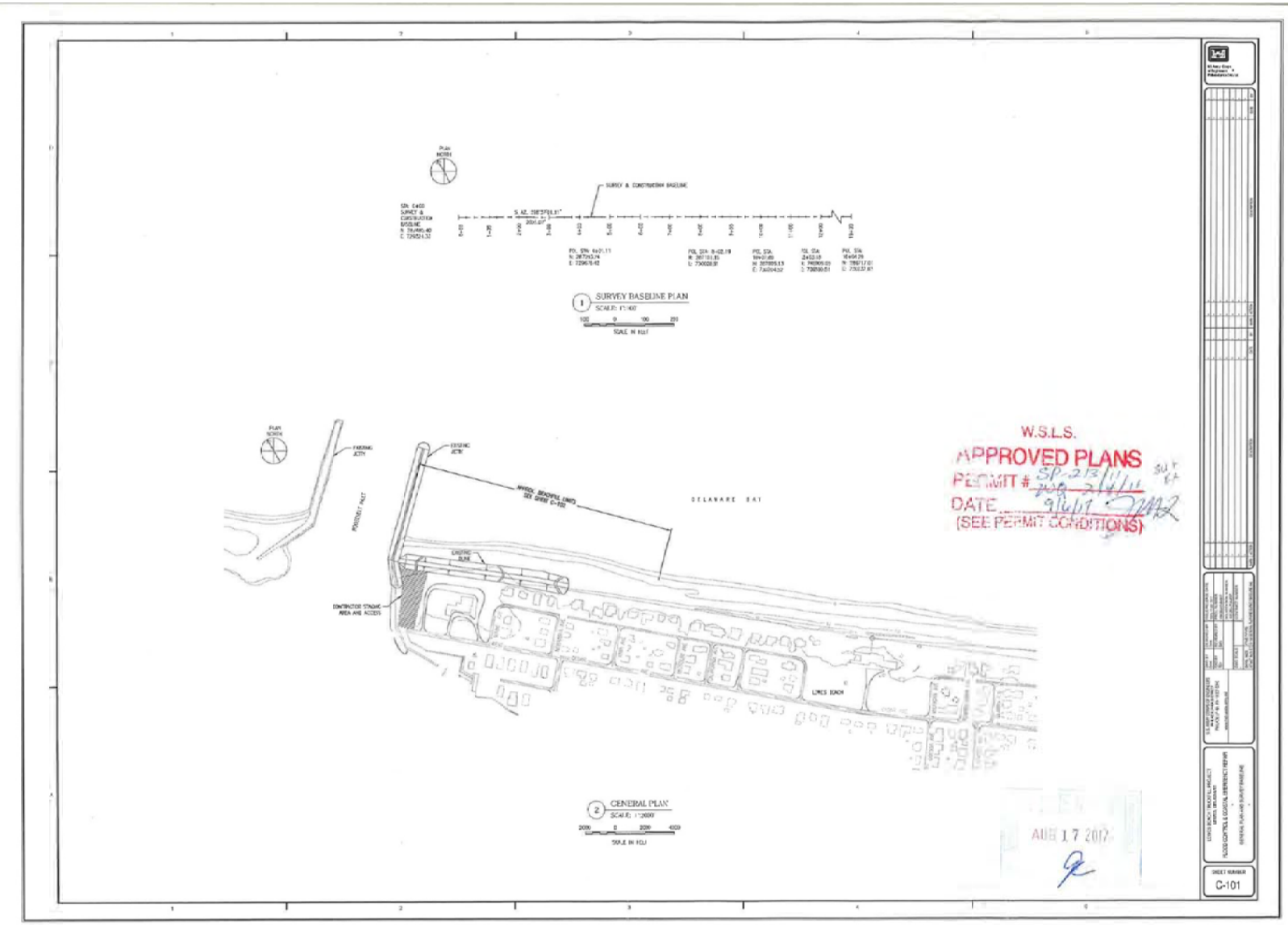
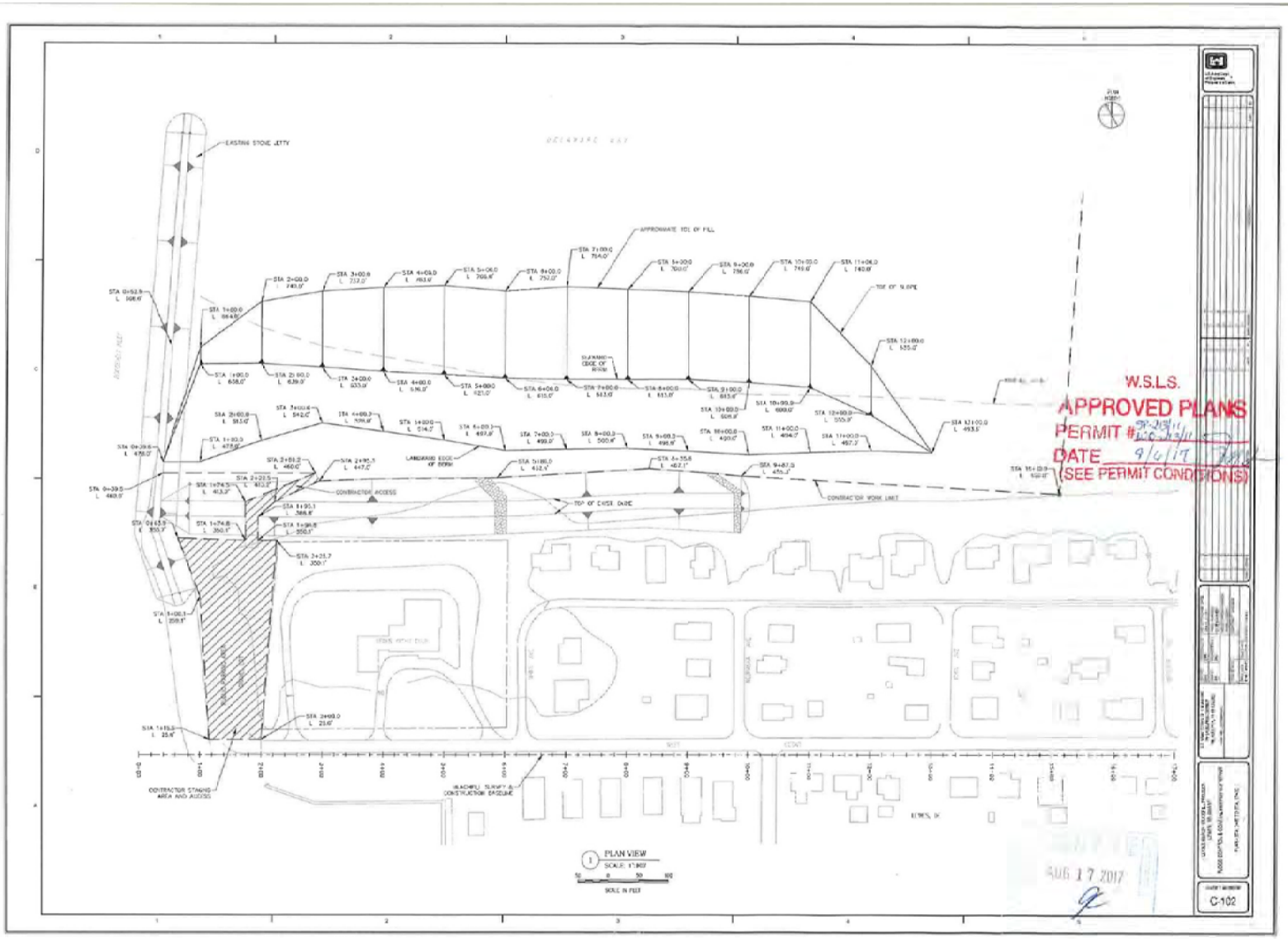
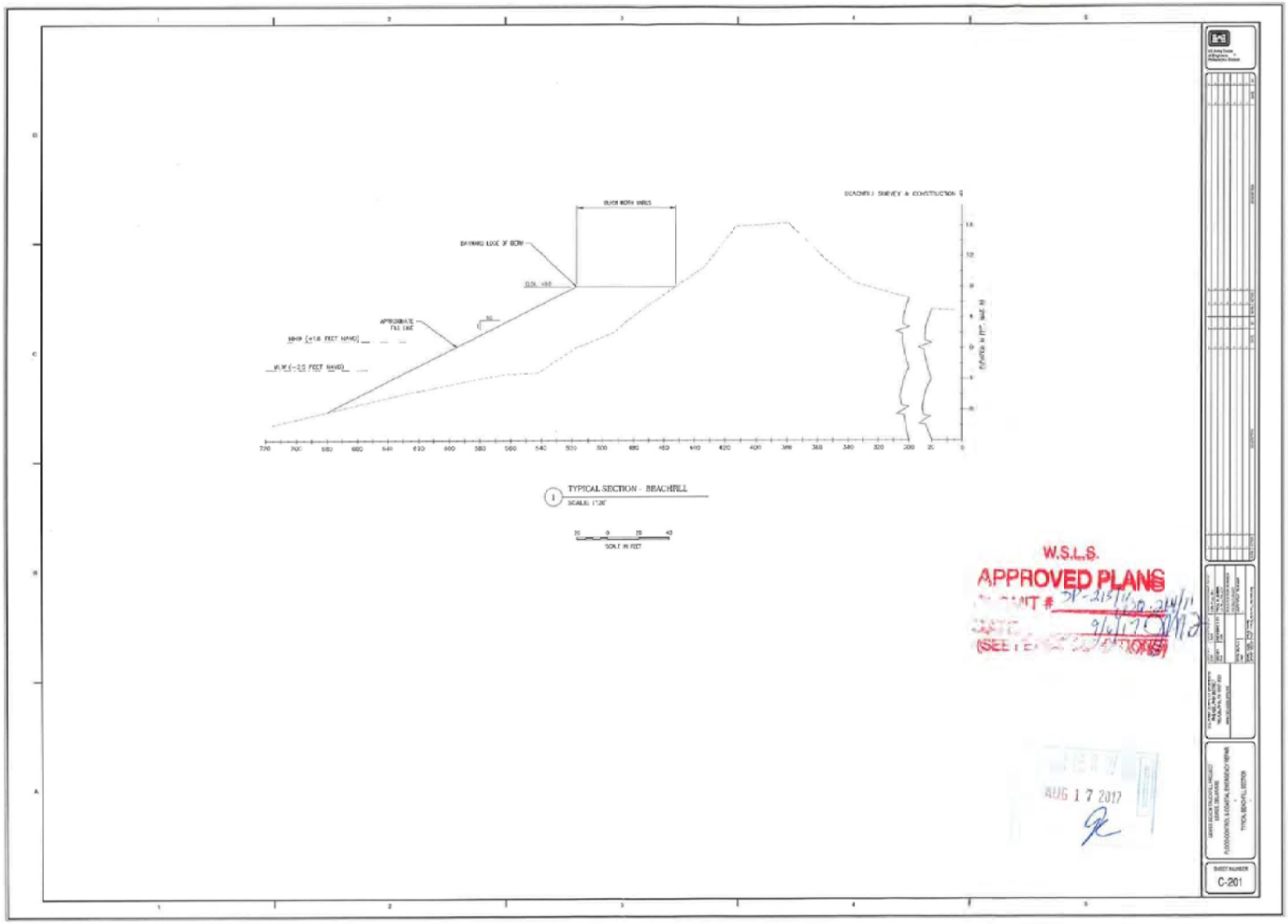
15. All construction materials, waste or debris associated with this activity shall be properly disposed of and contained at all times to prevent its entry into waters or wetlands. Construction materials shall not be stockpiled in subaqueous lands or wetlands.
16. The permittee and contractor shall employ measures during construction to prevent spills of fuels, lubricants or other hazardous substances. In the event of a spill, the permittee and contractor shall make every effort to stop the leak and contain the spill, and shall immediately contact the Hazardous Spill Response Team (HAZMAT) at 1-800-662-8802 and this office at (302) 739-9943. The permittee and contractor are responsible to comply with all directives to contain and clean up the spilled material(s) as stipulated by the HAZMAT team, and to restore the site as may be required by this office.
17. No construction shall occur after the construction expiration date identified on Page One of this Permit. The permittee may file a construction expiration date extension request of up to one (1) year if necessary to complete the authorized work. Such requests must be received by the Department at least thirty (30) days prior to the construction expiration date.
18. Any actions, operations or installations which are found by the Department to be contrary to the public interest may constitute reason for the discontinuance and/or removal of said action, operation or installation. Removal and restoration shall be at the expense of the permittee and/or upland property owner within thirty (30) days of receipt of written notice of revocation and demand for removal.
19. Disturbance of subaqueous lands or wetlands adjacent to the authorized structures or activities is prohibited unless specifically addressed in the special conditions of this Permit. Disturbance of subaqueous lands or wetlands in the path of construction activities shall be minimized. Any temporarily impacted subaqueous lands or wetlands shall be returned to pre-disturbance elevations and conditions.
20. This Permit is personal and may not be transferred without the prior written consent of the Department. Prior to the transfer of the adjacent upland property, the permittee shall obtain the written consent of the Department to transfer the Permit to the new upland property owner. Failure to obtain such written consent may result in the revocation of this Permit and the removal of all structures authorized by this Permit at the expense of the permittee.
21. The permittee shall notify the Wetlands and Subaqueous Lands Section prior to the commencement of the work authorized by this Permit.
22. No portion of the structure shall be installed within ten (10) feet of the adjacent property lines.
23. No portion of the structure shall exceed 20% of the width of the water body as measured at mean low water.
24. The structures authorized by this Permit shall be constructed and maintained in a manner so as to assure water access to adjacent properties.
25. This Permit does not authorize any future repairs below the water line, or any additions or modifications to the structures authorized herein. Such activities require separate written authorization from the Department of Natural Resources and Environmental Control.
26. Failure to comply with any of the terms or conditions of this Permit may result in enforcement action which could include the revocation of this Permit and subsequent restoration of the site to preconstruction conditions.


SURVEY & CONSTRUCTION BASELINE
1 SURVEY BASELINE PLAN
SCALE: 1"=400'
SCALE IN FEET
EXISTING JETTY
DELAWARE BAY
LINCS BEACH
2 GENERAL PLAN
SCALE: 1"=200'
SCALE IN FEET
W.S.L.S.
APPROVED PLANS
PERMIT # SP-213/11
DATE 9/6/11
(SEE PERMIT CONDITIONS)
AUG 17 2011
C-101


EXISTING STONE JETTY
APPROXIMATE TOE OF FILL
TOP OF DIKE DIKE
CONTRACTOR ACCESS
CONTRACTOR WORK LIMIT
CONTRACTOR STAGING AREA AND ACCESS
PLAN VIEW
SCALE IN FEET
W.S.L.S.
APPROVED PLANS
PERMIT #
DATE 9/6/17
(SEE PERMIT CONDITIONS)
AUG 17 2017
C-102


TYPICAL SECTION - BEACHFILL
SCALE: 1"=20'
SCALE IN FEET
W.S.L.S.
APPROVED PLANS
AUG 17 2017
C-201