US Army Corps of Engineers
Wilmington District

FINAL INTEGRATED DETAILED PROJECT REPORT AND ENVIRONMENTAL ASSESSMENT

SOUTHPORT, NC SECTION 14 EMERGENCY STREAMBANK AND SHORELINE EROSION PROTECTION PROJECT

Emergency Streambank and Shoreline Erosion Protection
Section 14 of the Flood Control Act of 1946, as amended

May 2013

FINDING OF NO SIGNIFICANT IMPACT

The National Environmental Policy Act of 1969, as amended (NEPA), requires consideration of the environmental impacts for major federal actions. The proposed action and the environmental impacts of the proposed action were addressed in the Final Integrated Detailed Project Report and Environmental Assessment, Southport, NC - Section 14 Emergency Streambank and Shoreline Erosion Protection Project (DPR/EA) dated May 2013. The DPR/EA was coordinated with various regulatory agencies and the public, and comment letters were received and considered. This Finding of No Significant Impact (FONSI) documents the environmental considerations and the decision that no significant impacts would occur if the proposal is implemented. The EA and FONSI have been prepared pursuant to NEPA in accordance with the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 to 1508), which applies to all Federal agencies for implementing the procedural provisions of NEPA, and the U.S. Army Corps of Engineers procedures for implementing NEPA (33 CFR Part 230).

Description of the Proposed Action and Alternatives:

The DPR/EA dated May 2013 describes the proposed action as the Recommended Plan that provides reliable protective measures to prevent the ongoing streambank and shoreline erosion at the site from destructively impacting the wastewater pumping station. This plan is authorized under Section 14 of the 1946 Flood Control Act and is acceptable to the USACE and local sponsor. The Recommended Plan would protect a public facility that is used to provide essential public services and is in imminent threat of damage related to natural erosion processes on the shoreline. The Recommended Plan would consist of removal of the existing concrete debris and placement of a sloping rock revetment comprised of granite armor stone placed over bedding stone along a stretch of 350 linear feet of shoreline adjacent to the pumping station. Formulation and evaluation focused on the alternative with minimal adverse environmental impacts and the least cost.. Alternative actions included the No Action alternative: wherein no stabilization measures would be implemented under this authority, an offshore stone sill, and a bulkhead. While all alternatives, with the exception of the No Action alternative, would meet the purpose and need, only the sloping rock revetment was both environmentally acceptable with minimal impacts, and had the lowest cost. .

Public and Agency Coordination:

On February 25, 2013, the DPR/EA, dated October 2012 was mailed to federal and state agencies, local communities, and the interested public for a 30-day review and comment period. As a result of this review period, comments from state and agencies yielded refinements to design of the proposed action. Comments received during the review period were reviewed and considered in making the decision to sign the FONSI (appendix A).

a. **Summary of Environmental Resources and Impacts:**

Section 6.0 of the DPR/EA provides information on the affected environment present in the proposed project area in Southport, Brunswick County, North Carolina. The probable consequences (impacts and effects) of the Recommended Plan and the No Action on the environmental resources in Southport, NC vicinity and the Cape Fear River were evaluated. No

adverse long-term effects would be expected. For the No Action alternative no project environmental impacts would occur; however, the pumping station site would deteriorate under the progressing shoreline erosion, and likely damage or destruction of this essential public facility would result.

***b.* Facts and Conclusions Leading to the Finding of No Significant Impact (FONSI):**

Based on the results of the impact analyses, it has been determined that no significant impacts would occur as a result of implementing the Proposed Action. The Proposed Action would not have any unavoidable adverse effects, nor would it result in the irreversible or irretrievable commitment of resources. Proceeding with the Proposed Action would not significantly or adversely impact the affected environment. Additionally, no significant cumulative effects would be expected.

***c.* Finding of No Significant Impact:**

I have reviewed the Detailed Project Report and Environmental Assessment, Southport, NC - Section 14 Emergency Streambank and Shoreline Erosion Protection Project (DPR/EA), the information provided by interested parties, and the information contained in this Finding of No Significant Impact, and I find that the Recommended Plan will not significantly affect the quality of the human environment. Therefore, preparation of an Environmental Impact Statement pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended, is not required.

Date: 2 May 2013

COL, EN

Steven A. Baker
Colonel, U.S. Army
District Commander

FONSI APPENDIX A

Comments Received on Southport, NC Section 14 Emergency Streambank and Shoreline Erosion Protection Project Southport, NC October 2012

A.1 US Department of Commerce, NOAA National Marine Fisheries Service

Comment 1: Based on the information provided, NMFS agrees with the District that adverse impacts to EFH would be minimal.

Response 1: Noted.

A.2 US Department of the Interior Fish and Wildlife Service

Comment 1: In accordance with the Endangered Species Act of 1973, as Amended, (ESA) and based on the information provided and other available information the service concurs that the proposed project is not likely to adversely affect federally-listed species or their critical habitat as defined by the ESA. We believe that the requirements of Section 7(a)(2) of the Act have been satisfied for this project.

Response 1: Noted.

A.3 US Environmental Protection Agency

Comment 1: Alternatives considered by the COE addressed stream bank / shoreline erosion which is threatening a Southport pump station. The alternatives presented in the DEA focused on bank hardening and other "construction based" options for addressing the erosion issue. Did the COE also consider boat traffic management measures such as installing "no-wake" signs near the facility? Obviously, bank stabilization (as proposed under the preferred alt) is an immediate need to protect the facility, but minimizing the causes of bank erosion should also be considered.

Response 1: Although boat traffic is acknowledged to play a role in the erosion, wind-driven waves and storms were determined to be the driving force over time for the shoreline erosion. Additionally, a “no-wake” zone within the shipping channel is not a feasible option due to the costs in impacts to shipping.

Comment 2 Four Alternatives were considered in the DEA (CH5) - 1) No Action 2) Preferred Alt - Sloping Rock Revetment 3) Offshore Stone Sill 4) Bulkhead. After the screening of the alternatives, the COE determined that the Sloping Rock Revetment, the Offshore Stone Sill, and

Bulkhead were deemed acceptable. Under CH 6 the COE goes on to discuss the impact of the No Action vs the Preferred Alt - Sloping Rock Revetment, but does not carry forward the other acceptable alternatives. EPA recommends that the COE provide additional clarification on why certain alternatives were deemed acceptable (Table 5.01 provides some insight). Also, we recommend providing a discussion on why all acceptable alternatives were not carried forward through the env. impacts analysis section of the DEA.

Response 2: Section 5.2 and Table 5.01 were intended to communicate why certain alternatives were deemed acceptable. All acceptable alternatives were not carried forward through the environmental impacts analysis section as Engineering Regulation (ER) 1105-2-100, Appendix F, F-23 (d) states that for the Section 14 Authority "… given the narrow geographic focus, low cost of these projects, and the imminent threat to the facilities, the formulation and evaluation should focus on the least cost alternative solution." The sloping rock revetment was the least cost alternative which was deemed acceptable, and has minimal adverse environmental impacts. Thus, only the tentatively selected plan was carried forward for final analysis.

Comment 3: EPA understands that the COE has requested written approval from the NCDWQ that WQC #3689 is applicable for this project. EPA recommends that the project engineer design and implement Best Management Practices (BMPs) which will minimize stormwater impacts associated with this project. The construction best management practices plan should include implementable measures to prevent erosion and sediment runoff from the project.

Response 3: Best Management Practices (BMPs) to minimize stormwater impacts will be utilized. In addition, no construction activity shall occur in the waters of the Cape Fear River unless a turbidity curtain is in place. If a turbidity curtain is not used equipment shall not enter or work in the water at any time. All equipment must work landward of the active tide line. All equipment shall be moved to higher ground on the incoming tide.

A.4 US Army Corps of Engineers – Regulatory Services Division

Comment 1: Regulatory is in agreement that the proposed shoreline stabilization project in Southport, Brunswick County is authorized under the terms and conditions of Nationwide Permit 13. To be consistent with CAMA's regulations, we ask that work along the shoreline be conducted during low tide levels.

Response 1: No construction activity shall occur in the waters of the Cape Fear River unless a turbidity curtain is in place. If a turbidity curtain is not used equipment shall not enter or work in the water at any time. All equipment must work landward of the active tide line and moved to higher ground on the incoming tide.

A.5 US Department of Agriculture – Natural Resources Conservation Service

Comment 1: While the NRCS does have expertise in natural resource conservation, this agency is not able to complete the requested review at this time due to the demands on our personnel for implementing Farm Bill conservation programs. Accordingly, the NRCS does not have any comments at this time.

Response 1: Noted.

A.6 NC Department of Environmental and Natural Resources – Division of Marine Fisheries

Comment 1: The project appears consistent with DMF rules. DMF would request that all shoreline work be conducted at low tide levels to minimize turbidity impacts in adjacent waters. If this is not possible, temporary use of a turbidity curtain should be used.

Response 1: All measures to reduce erosion and turbidity shall be utilized during construction of this project. No construction activity shall occur in the waters of the Cape Fear River unless a turbidity curtain is in place. If a turbidity curtain is not used, the following restrictions shall apply. No equipment shall enter or work in the water at any time. All equipment must work landward of the active tide line. All equipment shall be moved to higher ground on the incoming tide.

A.7 NC Department of Cultural Resources, State Historic Preservation Office

Comment 1: We believe the EA adequately addresses our concerns for historic resources.

Response 1: Acknowledged

Final Integrated Detailed Project Report & EA

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List of Acronyms

2H:1V	**2 Horizontal feet per Vertical foot of slope**
CAP	**Continuing Authorities Program**
CEDAS-ACES	**Coastal Engineering Design and Analysis System – Automated Coastal Engineering System**
CP&L	**Carolina Power and Light**
DPR/EA	**Detailed Project Report/Environmental Assessment**
FEMA	**Federal Emergency Management Agency**
HTRW	**Hazardous, Toxic, and Radioactive Waste**
IKS	**In-Kind Services**
MLLW	**Mean Lower Low Water**
NAVD	**North American Vertical Datum**
NCDENR	**North Carolina Department of Environment and Natural Resources**
NCDOT	**North Carolina Department of Transportation**
NMFS	**National Marine Fisheries Service**
NOAA	**National Oceanic and Atmospheric Administration**
NWP	**Nationwide Permit**
NOX	**Nitrogen Oxide**
USACE	**US Army Corps of Engineers**
USDA	**U.S. Department of Agriculture**
USFWS	**U.S. Fish and Wildlife Service**
VOC	**Volatile Organic Compound**
WQC	**Water Quality Certification**

Appendices

EXECUTIVE SUMMARY

This Final Integrated Detailed Project Report and Environmental Assessment (DPR/EA) presents the findings of the Southport, NC Section 14 Emergency Streambank and Shoreline Erosion Protection Study, and has been prepared to document the plan formulation process and potential environmental effects associated with the implementation of emergency streambank and shoreline erosion protection alternatives for the project site. The geographic scope of the Southport, NC Section 14 project consists of a City of Southport wastewater pumping station site located on the Cape Fear River shoreline at the intersection of West Bay Street and South Lord Street in Southport.

The overall goal of the Southport, NC Section 14 project is to provide reliable protective measures to prevent the ongoing streambank and shoreline erosion at the site from destructively impacting the wastewater pumping station. Section 14 of the Flood Control Act of 1946, as amended, is a Continuing Authorities Program (CAP) focusing on relatively smaller water resource-related projects not requiring specific Congressional authorization. The Section 14 program is designed for protection of essential, properly-maintained public facilities in imminent threat of damage or failure from natural streambank and shoreline erosion processes. The subject wastewater pumping station qualifies under the Section 14 program, since it is maintained by the City of Southport as a key element of the municipal wastewater system, and is under imminent threat of damage or failure from continuing shoreline erosion at the site.

This DPR/EA summarizes baseline existing conditions in the project area. It also develops and discusses potential solutions as a guide to potential Federal and non-Federal involvement in the protection project. This DPR/EA provides a description and discussion of the likely array of alternative plans, including their benefits, costs, and environmental effects and outputs. This report also identifies, evaluates, and recommends a solution (the Preferred Alternative) that best meets the planning objectives of protecting the wastewater pumping station from damaging shoreline erosion.

The Preferred Alternative (shoreline erosion protection) focuses on implementing reliable shoreline stabilization to alleviate the threat of damage or failure to the wastewater pumping station from shoreline erosion. The Preferred Alternative would consist of removal of the existing concrete debris and placement of granite armor stone at a maximum side slope of 2H:1V (2 horizontal feet per vertical foot), with a crest width of just over 5 feet, along a stretch of ~350 linear feet of shoreline adjacent to the pumping station. The armor stone unit size would be 20-inch, 850-lb on average, and it would be placed in a double layer for an overall thickness of 3.5 feet. The armor stone would be placed over a 12” thick layer of 5-12” granite bedding stone, in turn placed over a layer of geotextile fabric. The Total Direct Construction Costs of the Preferred Alternative would be $331,000 (including contingency). Two separate project cost estimates appear in this report, reflecting the changing value of money over time. The Total First Cost for implementation of the Preferred Alternative would be $587,000 with a benefit-cost ratio of 3.1. This “Total First Cost” is at the current price level as of October 1, 2012. The cost estimate used to determine final cost-sharing is based on the Total Project Cost (Fully Funded) amount of $596,000, which is estimated to include inflation through the mid-point of

construction, and also includes feasibility phase costs of $88,000 which are 100% Federally funded bringing the Total Project Cost to $684,000. The Fully Funded Federal cost-share for the preferred alternative is 65% at $387,000 (based off of $596,000). The Fully Funded non-Federal cost-share is 35% at $209,000, which includes cost estimate credit for real estate and in-kind services. Lower real estate costs could increase the cash contribution of the non-Federal sponsor to meet the 35% cost share. The period of analysis used to compute costs is 50 years with a FY 12 Federal interest rate of 4.0%. The non-Federal sponsor fully supports the preferred alternative.

1.0 STUDY AUTHORITY

This project, protection of a city wastewater pumping station located on the Cape Fear River shoreline of the City of Southport, North Carolina (Figure 1.01) would be pursued under the authority of Section 14 of the Flood Control Act of 1946, as amended, for emergency stream bank and shoreline erosion protection. Section 14 authorizes the US Army Corps of Engineers (USACE) to study, design, and construct emergency streambank and shoreline works to protect public services including (but not limited to) streets, bridges, schools, water and sewer lines, National Register sites, and churches from damage or loss by natural erosion. Section 14 is under the Continuing Authorities Program (CAP) which focuses on water resource related projects
of relatively smaller scope, cost and complexity. Traditional USACE civil works projects are of wider scope and complexity and are specifically authorized by Congress. The Continuing Authorities Program is a delegated authority to plan, design, and construct certain types of water resource and environmental restoration projects without specific Congressional authorization. Additional information on this program can be found in USACE 2000, Planning Guidance Notebook, Appendix F.

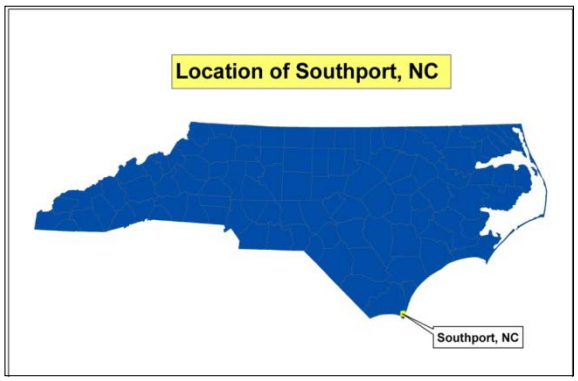


Figure 1.01 Location Map

The Section 14 program is designed for implementing projects to protect public facilities that are used to provide essential public services, are properly maintained, and are in imminent threat of damage or failure related to natural erosion processes on stream banks and shorelines. The subject pumping station is a key element of the city wastewater system, an essential public service, and is maintained as such. It is under imminent threat of damage or failure from continuing shoreline erosion at the site, and therefore qualifies under the Section 14 program. The sponsor, the City of Southport, strongly supports a partnership with the USACE to protect the pump station through the Section 14 authority, as stated in correspondences with City officials & a City Resolution (Appendix C). The non-Federal sponsor for this study and project is the City of Southport, NC.

The feasibility study was carried out in a manner consistent with the USACE Environmental Operating Principles (EOPs). The principles are consistent with NEPA; the Army's Environmental Strategy with its four pillars (prevention, compliance, restoration, and conservation); and other environmental statutes that govern USACE activities. Finally, the implementation framework proposed as part of the study seeks to work collaboratively, fully engaging individuals, agencies, and local groups in identifying, planning, and implementing shoreline protection efforts.

2.0 PURPOSE AND NEED FOR ACTION

The City of Southport has experienced shoreline erosion across the majority of the town's waterfront. Of particular concern is the City's wastewater pumping station located on the river shoreline at West Bay Street and South Lord Street (Figure 2.01). The USACE has made several visits to Southport in the last decade in reference to shoreline erosion problems at this site. The condition of the shoreline in front of the wastewater pumping station has changed significantly from the earlier trips and has continually moved closer to the pumping station with the shoreline only 20 feet from the building as of a March 2011 site visit. An erosion assessment of the project area is provided in section 4.0 of this report.

The subject area of the waterfront fronts a wind fetch of around 5 miles, resulting in significant wave action and substantial impacts to the shoreline. The exposure of the site also makes it susceptible to storm surge effects from hurricanes and northeasters. Wakes from passing vessels in the adjacent Atlantic Intracoastal Waterway and the Wilmington Harbor Federal Navigation Channel also impact the shoreline at the site.
Figure 3.01 illustrates nearby waterways
and open waters.

Figure 2. Map of wastewater pump station location on Southport waterfront

Figure 2.01 Vicinity Map

Continued erosion of the shoreline is expected to directly impact the pump station if reliable protective measures are not provided. The wastewater pumping station is a municipal facility critical to city operations. Consequences of pump station failure would include the following:

- loss of wastewater pumping services to approximately 200 homes.
- pollution of the Cape Fear River and Intracoastal Waterway with approximately 150,000 gallons of raw sewage per day until controlled.
- cost of replacement of structure, pumps, motors, and controls.
- acquisition of a new placement site.

This study will investigate the No Action alternative and various alternatives for protection of the wastewater pumping station.

3.0 LOCATION OF STUDY AREA AND ENDANGERED FACILITY

The study area is located in Southport, coastal southeastern North Carolina, as shown in Figures 1.01 and 2.01. The City of Southport is located near the mouth of the Cape Fear River (see Figure 3.01) and has a population of approximately 2,500. The subject wastewater pumping station site is located in the southern area of Southport on the river shoreline, at the intersection of West Bay Street and South Lord Street (Figure 2.01). Congressional representation for the area includes the following:

Senator Richard Burr (R)
Senator Kay Hagan (D)
Congressional District: NC 7 – Rep. Mike McIntyre (D).

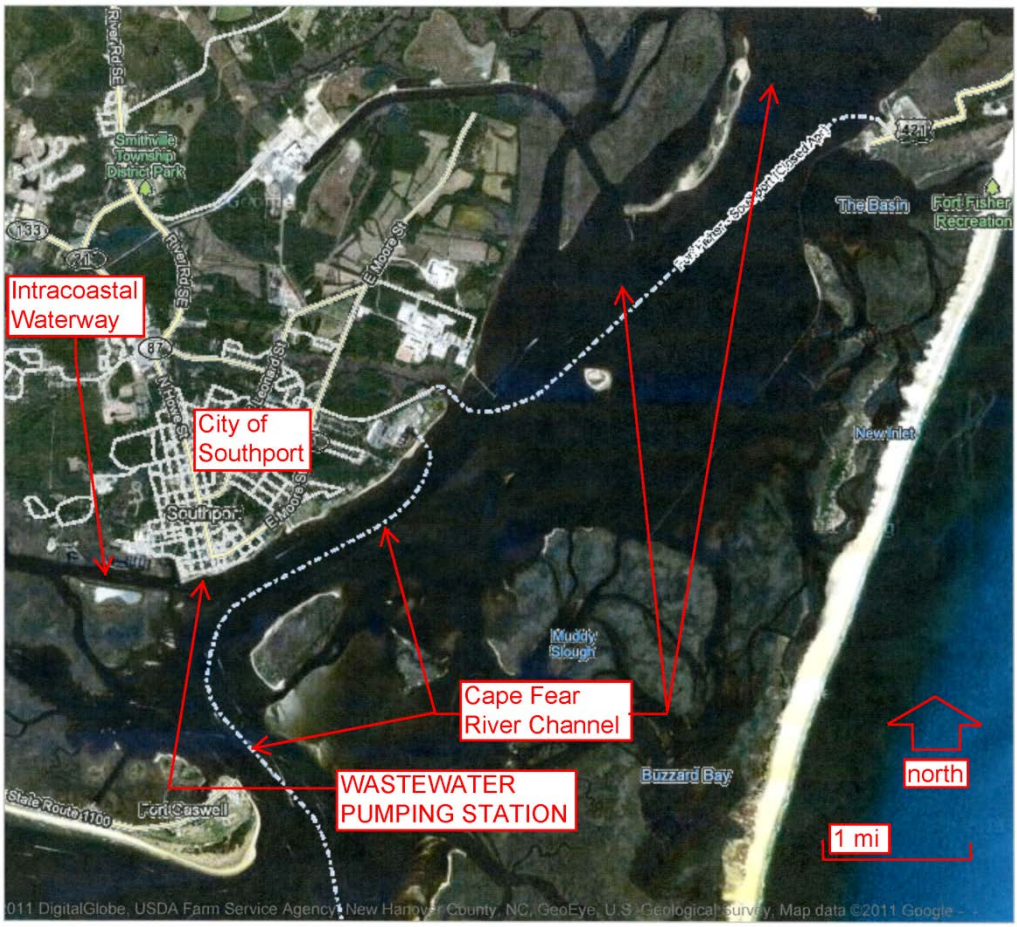


Figure 3.01 Waterways Near Southport and the Wastewater Pumping Station

4.0 EROSION ASSESSMENT

The extent of the erosion problem along the Southport waterfront was assessed through the comparison of aerial/satellite imagery. Imagery was obtained spanning an 18-year period from 1993 to present. Images selected from this period are shown in Figures 4.01, 4.02, 4.03 and 4.04, for the respective years of 1993, 2000, 2006 and 2011. The 1993 aerial photo (Figure 4.01) shows a relatively straight shoreline along the waterfront extending westward from the bulk-headed property immediately upstream (eastward) of the pump station. At that time the shoreline was about 90 feet from the base of the pump station. By 2000 (Figure 4.02) erosion is evident westward of the bulkhead extending along the pump station property and further downstream to the vicinity of the pier (shown in the lower left of the figure). At this time, some seven years later, the shoreline has receded to within about 77 feet of the pump station. The erosion continued to progress as indicated in Figure 4.03 (2006). This figure shows a significant offset in the shoreline between the bulk-headed property and the downstream property along the project area. By 2006 the shoreline was approximately 57 feet from the pump house. The present day image, 2011, shown in Figure 4.04, reveals that the erosion process has continued. The figure displays a shoreline configuration that has essentially formed two embayments. One embayment is present between the pump station and the bulkhead (upstream) and the other has formed immediately downstream of the pump station. At the pump station itself, the beach has narrowed with the bank erosion being temporarily slowed by rubble placed by the town (visible in the image). By 2011, the shoreline has retreated to within approximately 20 feet of the base of the pump station.

Shorelines were digitized from the imagery for each of the dates and are shown superimposed on the 2011 photo in Figure 4.05. The shoreline was taken as the wet/dry line on the imagery which is assumed to approximate the local mean high water line. From this figure the progressive erosion is readily displayed as the shoreline migrated landward from essentially a straight configuration to the present day erosional embayments over the 18-year period. Three transects were selected at the site, as shown in the figure, along which shoreline change was measured for each date. Transect 1 is located within the central portion of the upsteam embayment, transect 2 is coincident with the pump station and transect 3 is located within the downstream embayment. The shoreline changes were measured with respect to the 1993 shoreline position as summarized in Table 4.01. As shown in the table, the shoreline retreated 82 ft, 70 ft and 112 ft, for transects 1, 2, and 3, respectively, over the 18-year period. This equates to an overall average retreat of about 88 feet for the period. The computed erosion rates for each of the transects are 4.6 ft/yr, 3.9 ft/yr and 6.2 ft/yr with an average of 4.9 ft/yr. This rate is rather high, and is comparable to erosion rates found along exposed areas along North Carolina's open coastline. Figure 4.06 shows a graph of the measured shoreline change (from Table 4.01) for each of the three transects. This graph displays the trend in the shoreline over time which likewise reveals the progressive nature of the erosion for all three transects. All indications are that the erosion will continue in the future unless appropriate shore protection measures are undertaken in a timely manner.

Figure 4.01 Aerial Photograph of Southport Pump Station and Vicinity 1993

Figure 4.02 Aerial Photograph of Southport Pump Station and Vicinity 2000

Figure 4.03 Satellite Image of Southport Pump Station and Vicinity 2006

Figure 4.04 Image of Southport Pump Station and Vicinity 2011

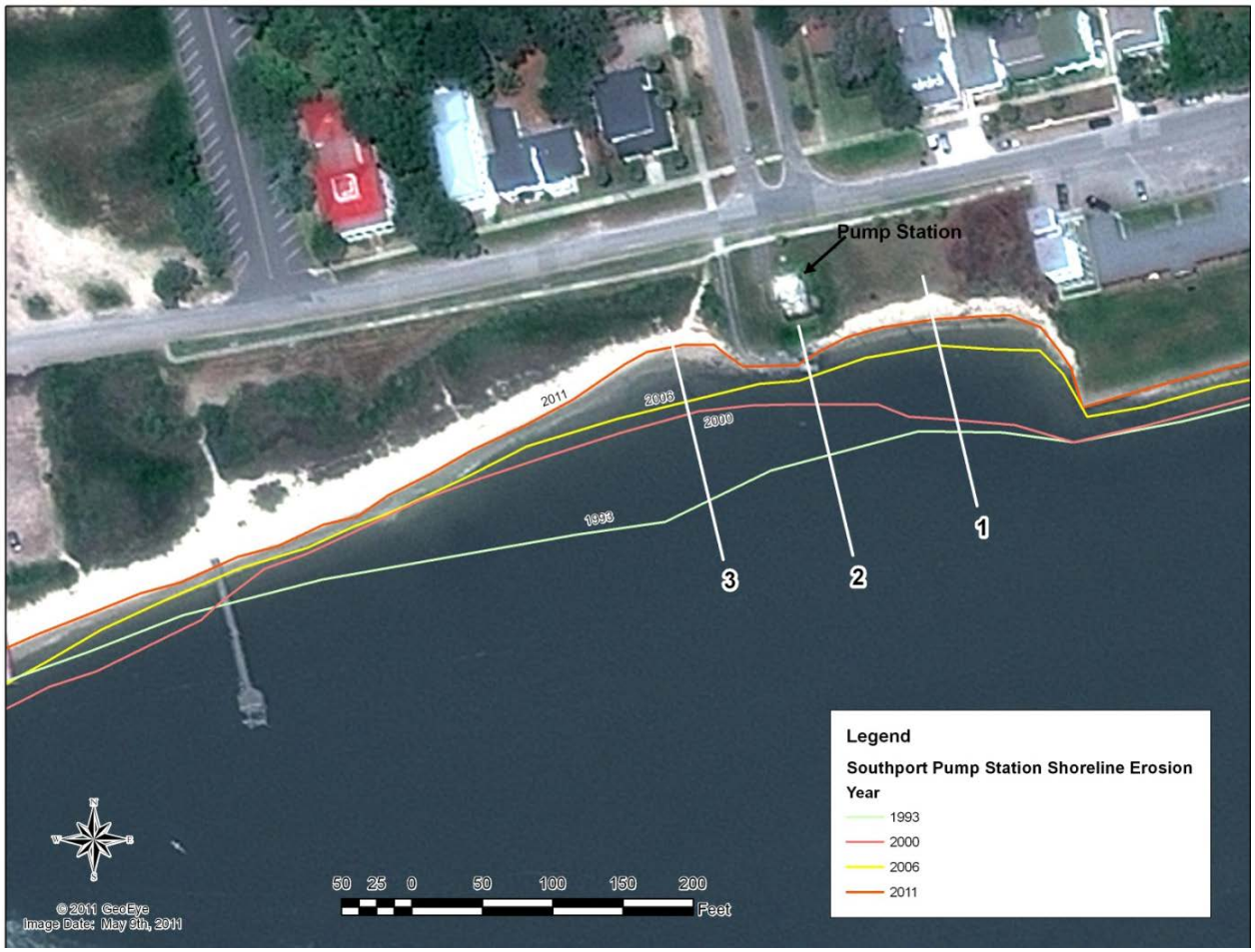


Figure 4.05 Shoreline Change in the Vicinity of Southport Pump Station, 1993-2011

Table 4.01. Shoreline Change Data for Transect Locations at Southport Pump Station 1993-2011

Transect	Year				Rate (ft/yr)
	1993	2000	2006	2011	
1	0	9	63	82	4.6
2	0	37	57	70	3.9
3	0	63	72	112	6.2
average	0.0	36.3	64.0	88.0	4.9

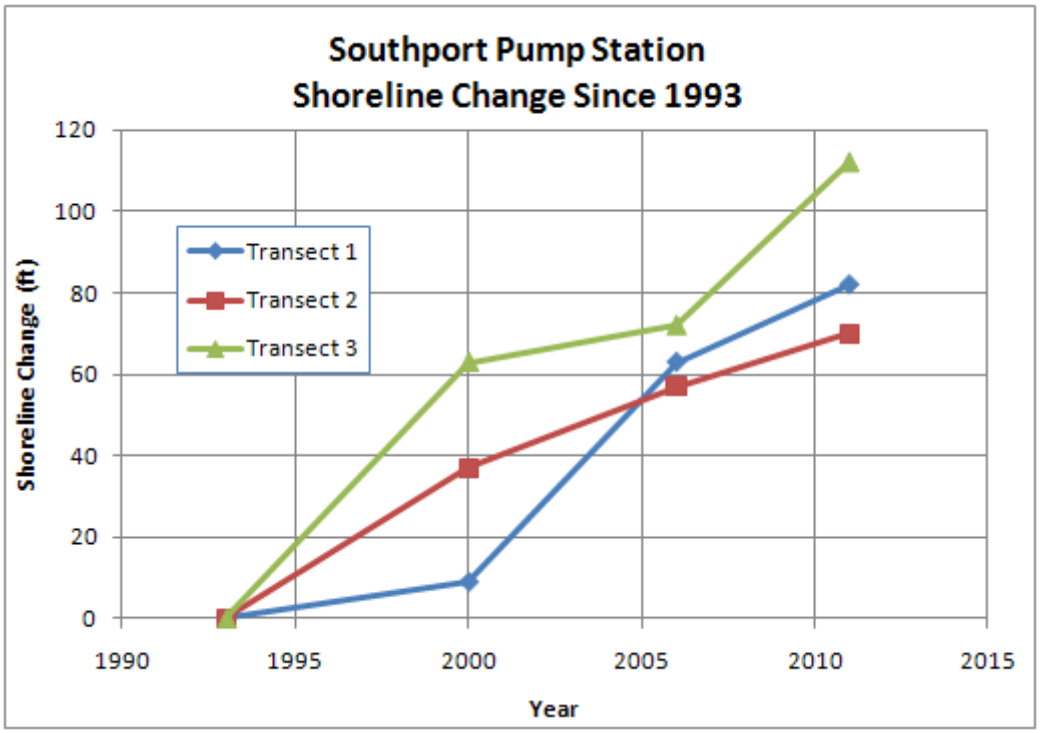


Figure 4.06 Shoreline Change Trends at Southport Pump Station since 1993

Figures 4.07, 4.08, 4.09, and 4.10 show ground photos taken during a recent field reconnaissance in March 2011. The photos were taken during the period of extreme low tide, exposing much of the lower bank not usually visible. Figure 4.07 is taken from the vicinity of the adjacent bulkhead looking downstream along the project area, whereas Figure 4.08 is taken looking upstream along the project property. These photos show the eroded condition of the waterfront and the recently added concrete rubble placed by the town as a stop-gap measure to help protect the pump station. Figure 4.09 shows a closer view of the pump station and adjacent timber stairs which are being undermined by the erosion process. Figure 4.10 taken in the immediate vicinity of the pump station reveals the proximity of the eroding bank to the structure, then only a distance of about 20 feet.

Figure 4.07 March 2011 Photo at Low Tide Looking Westward along the Eroding Shoreline at Southport Pump Station

Figure 4.08 March 2011 Photo Looking Eastward along the Eroding Shoreline at Southport Pump Station

Figure 4.09 March 2011 photo Showing the Eroded Condition and recently added Concrete Rubble at the Southport Pump Station

Figure 4.10 March 2011 Photo Showing the Proximity of the Eroded Bank to the Southport Pump Station

5.0 PLAN FORMULATION AND EVALUATION OF ALTERNATIVES

5.1 Alternatives Considered

The following alternatives were cost estimated on the same terms for Total Direct Construction Costs (not to include Real Estate or Detailed Design costs). The Sloping Rock Revetment and Offshore Stone Sill alternatives were both carried forward to MCASES analysis (see Appendix E).

No Action Alternative:

Under the No Action Alternative, the USACE would not construct streambank protection to address the existing erosion at the wastewater pumping station at West Bay and Lords Street in Southport, NC. The recent placement of sidewalk rubble by the town as a stop-gap measure should slow erosion but would still leave the building threatened unless appropriate shore protection measures are undertaken in a timely manner. Failure of the pump station would result in the loss of wastewater pumping services to approximately 200 homes and pollution of the Cape Fear River and Intracoastal Waterway from 150,000 gallons of sewage per day until corrected. This alternative would also result in the incurred costs of replacement of the structure, pumps, motors and controls. No Direct Construction Costs.

Preferred Alternative: Sloping Rock Revetment:

Under this alternative a stone revetment would be constructed to stabilize the existing shoreline in the vicinity of the wastewater pumping station. The stone revetment would be constructed along approximately 350 linear feet of shoreline. The existing concrete debris would be removed from the shoreline and replaced with a layer of bedding stone topped with armor stone. The bedding stone would be NCDOT (NC Department of Transportation) Class B stone (5”-12” granite), and would be placed over a layer of geotextile to form a 12-inch thick layer. The armor stone would be 600 to 1,100 pound granite stone with 50% of the stone weighing more than 850 pounds. The armor stone would be placed on top of the bedding stone at a thickness of 3.5’ and side slope of 2H:1V. A typical cross section is shown in Appendix D. The estimated Total Direct Construction Cost for the construction of this alternative would be $324,000

Offshore Stone Sill:

This alternative would involve construction of an offshore stone sill to protect the shoreline in the vicinity of the wastewater pumping station. The stone sill would be constructed between the 0’ MLLW contour and the -1’ MLLW contour along approximately 400 linear feet of shoreline. The sill would consist of a layer of bedding stone topped with armor stone. The bedding stone would be a minimum 1’ thick layer of NCDOT Class B stone (5”-12” granite). The armor stone would be 600 to 1,100 pound granite stone with 50% of the stone weighing more than 850 pounds. The armor stone would be placed on top of the bedding stone to a thickness of 3.5’, to cover the crest width and side slopes. The crest elevation would be approximately 5’ above MLLW. One layer of armor stone at a 5-foot width would be placed around the perimeter of the

sill. The sill would protect the shoreline from direct wave energy, and marsh grass would be planted in the space between the sill and shoreline for further stabilization, as well as environmental benefit. The existing concrete rubble fronting the pump station would remain to work in conjunction with the offshore sill in protection of the station. The estimated Total Direct Construction Cost for the construction of this alternative would be $631,000.

Bulkhead:

For this alternative, a vinyl sheet pile bulkhead would be constructed at the base of the existing slope. The bulkhead would be 24" high, with a top elevation of 3' above MLLW, and would extend along approximately 340 linear feet of shoreline. Subgrade tiebacks would be installed by excavation into high ground, placing the tiebacks, and backfilling to anchor the wall for adequate stability under backfill and wave action loading. The estimated Total Direct Construction Cost for the construction of this alternative would be $400,000.

OTHER ALTERNATIVES CONSIDERED BUT INITIALLY SCREENED OUT:

Marsh Fringe:

This alternative would consist solely of planting salt marsh vegetation along the shoreline in the vicinity of the pump station to improve stability. Intent would be to establish plantings to stabilize the shoreline soil, reducing or preventing upland erosion by acting as a porous breakwater to gradually dissipate wave energy. The establishment and successful performance of planted marshes depends largely upon the shoreline exposure to wind, waves and boat wakes. If the shoreline is exposed to less than one mile of wind fetch, marsh planting is considered likely to be successful from the standpoint of wave energy. However, since the pump station is exposed to impacts from up to approximately five miles of wind fetch, marsh plantings would be subject to a high likelihood of failure from significant wave action. Accordingly, this alternative was screened out of consideration as a viable alternative.

Placement of Surplus Dredged Material:

This alternative would consist of periodic replacement of material eroded from the shoreline, using dredged material from nearby dredging projects. Rates of erosion have been historically rapid even for consolidated shoreline material, due to the severity of wave exposure from up to five miles of wind fetch. Frequent maintenance intervals would be required due to the expected rapid loss of material placed from dredging. The Placement of Surplus Dredged Material would likely fail to meet the Purpose and Need criterium, due to the likelihood of rapid erosion from heavy wave action over the long wind fetches. Unconsolidated material could erode at an even higher rate than the existing shoreline, which has historically demonstrated high erosion rates. Although technically feasible from the standpoint of placing material, the cost of repetitive placement suggests that this alternative is effectively unsustainable. This alternative was screened out, and was therefore not evaluated for cost.

Relocation of Pump Station:

This alternative would consist of relocating the pump station to a site less vulnerable to erosional damage. In order to relocate the pump station, the gravity collection system would require rerouting and a new site utilized. Due to the existing residential development, a potential relocation area is the southwest corner of South Caswell Avenue and West Moore Street. The estimate of probable cost for the land, pump station construction, gravity sewer rerouting, and professional service fees to relocate the pump station is approximately $2 million. The cost of relocation far exceeds the other alternatives and was therefore screened out.

5.2 Screening of Final Alternatives

The final array of alternatives considered for implementation were evaluated for their success in meeting the Planning Objectives, including Purpose and Need and sustainability; and the Planning Constraints, including technical feasibility, environmental acceptability, and economic feasibility. The evaluation criteria were then considered in screening the alternatives according to their overall acceptability. As stipulated under the Section 14 Authority, formulation and evaluation should focus on the least cost alternative solution. A discussion of the evaluations follows, with a summary of findings and screening results shown in Table 5.2.

No Action Alternative:

The No Action Alternative would not meet the Purpose and Need for action, since no measures would be implemented for needed protection of the threatened wastewater pumping station. The pumping station site would deteriorate under the progressing shoreline erosion, and likely damage or destruction of this essential public facility would result. Since "No Action" does not meet the Purpose and Need requirement, it is not considered an acceptable alternative.

Sloping Rock Revetment:

The Sloping Rock Revetment alternative would meet the Purpose and Need by providing effective shoreline stabilization to protect the wastewater pumping station from the threat of erosion. This alternative would be sustainable with a minimal-to-moderate level of maintenance, primarily repairs to restore and maintain revetment integrity following storm events and long-term effects of wave action. The alternative would be technically feasible in that the structure is a proven and commonly-used method of shoreline stabilization for locations with similar conditions. Relative to the other acceptable alternatives, this is the least-cost alternative. Considering all evaluation criteria, the Sloping Rock Revetment is considered the preferred alternative.

Offshore Stone Sill:

The Offshore Stone Sill alternative would also meet the stated Purpose and Need for action, and would be sustainable with a moderate level of maintenance, involving repairs following storm events and effects of wave action over the long term. Maintenance requirements could be somewhat greater than those for a Sloping Rock Revetment structure, since the sill would be a

freestanding structure without continuous shoreline integration. This alternative is technically feasible, involving a proven structure type for sites with similar conditions. Although this alternative could be considered economically feasible, it would be the highest-cost option among the acceptable alternatives, 72% more so than the sloping rock revetment.

Bulkhead:

The Bulkhead alternative would meet the stated Purpose and Need for action, and would be sustainable, but would require a moderately-high level of maintenance. Storm and long-term high-impact wave action effects from the long wind fetches could require repair to damaged and deteriorating components, and special attention to undermining, overwashing, and flanking of the structure. Failure of any component could quickly compromise the integrity of the whole assembly. This alternative is technically feasible in that bulkhead structures are very commonly used in similar shoreline conditions, and successfully so, given adequate maintenance. This alternative could be considered economically feasible, but at a 23% higher cost than the Sloping Rock Revetment ($400,000). The U.S. Fish & Wildlife Service indicated that they would not endorse this alternative.

Table 5.01- Screening of Alternatives

SCREENING OF ALTERNATIVES						
Possible Alternatives	Planning Objectives		Planning Constraints			Screening Result
	Meets Purpose and Need	Sustainable	Technically Feasible	Environmentally Acceptable	Economically Feasible	
No Action	No	N/A	N/A	N/A	N/A	Not acceptable, doesn't meet Purpose & Need
Sloping Rock Revetment	Yes	Yes, with minimal-to-moderate maintenance	Yes	Yes, with minimal environmental benefit (stop erosion into waters)	Yes, $577k*	Acceptable, preferred overall
Offshore Stone Sill	Yes	Yes, with minimal-to-moderate maintenance	Yes	Yes, this option preferred by environmental agencies.	Yes, $940k*	Acceptable, not most economical
Bulkhead	Yes	Yes, with moderately high maintenance	Yes	No. Least acceptable protection measure for agencies.	Yes, $725k	Not most maintainable or environmentally acceptable
Marsh Fringe	No, likely to fail due to wind fetch exposure	No, likely to fail due to wind fetch exposure	Possible, but difficult	Yes, but short-term benefit due to likely failure	N/A	Not acceptable, likely to fail
Placement of Dredged Material	No, almost certain to fail by quick erosion	No, almost certain to fail by quick erosion	Yes, but very hard to maintain	No, erosion rates would likely be higher than current rates	N/A	Not acceptable, likely to fail

***see Appendix E for cost details**

5.3 Selected Alternative

The evaluation and screening of alternatives resulted in the following:

- Three alternatives, the No Action, the Marsh Fringe, and Placement of Dredged Material, were determined to be unacceptable.
- Three alternatives, the Sloping Rock Revetment, Offshore Stone Sill, and Bulkhead, were considered acceptable.
- The Sloping Rock Revetment was considered the Preferred Alternative, given its cost and maintainability relative to the other two acceptable alternatives.

The City of Southport has expressed acceptance of the Sloping Rock Revetment as their Locally-Preferred Alternative. As a result of evaluation, screening, and local acceptance, the Selected Alternative is the "Sloping Rock Revetment".

Selected Alternative Description: This plan will provide a stone revetment to stabilize the existing shoreline in the vicinity of the waste water pumping station. The stone revetment will be constructed along approximately 350 linear feet of shoreline. The existing concrete debris and stone will be removed from the shoreline and replaced with a layer of bedding stone topped with armor stone. The Bedding stone will be NCDOT Class B stone (5"-12" granite). The bedding stone will be placed on a layer of geotextile. The bedding stone will be placed to provide a 1' thick layer. The armor stone will be 600 to 1,100 pound granite stone with 50% of the stone weighing more than 850 pounds. The armor stone will be placed on top of the bedding stone to provide a 3.5' thickness. The armor stone will be placed at a 2H:1V side slope. A typical section is shown in figure 5.01. A plan view of the alternative footprint is shown in figure 5.02. Estimated construction time is 4 to 5 months. Erosion control measures will be taken. Additional measures may be established during review and conclusion of the consistency process.

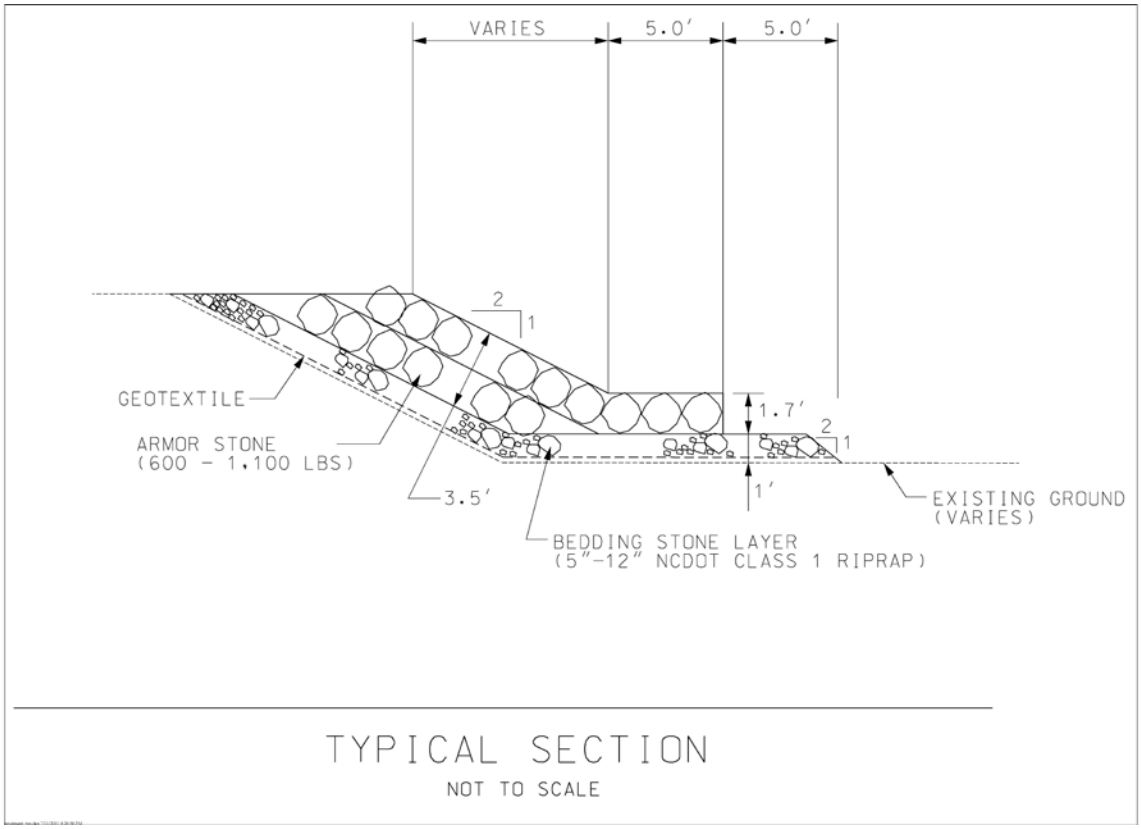


Figure 5.01 Typical cross section of selected

Figure 5.02 Plan view of selected alternative

6.0 EXISTING AND FUTURE-WITHOUT PROJECT CONDITIONS, AND IMPACTS OF THE RECOMMENDED PLAN

6.1 Sediments

Brunswick County is formed of Pleistocene terrace plains with Pamlico plain along the coast and Cape Fear River. Peedee formation marine sands, clays, and marls underlie the county and are expected to lie at shallow depths beneath the surficial Pleistocene terraces of sands, sandy loams, and clays that cover nearly the entire county (Clark, Miller, et. al.1912, The Coastal Plain of North Carolina). Soils at the project site are Wando and Urban Land complex (WdB) comprised of well-drained Eolian sands and/or beach sand with a slope of zero to six percent (USDA Website Soil Survey).

Construction impacts of the preferred alternative to sediments would result from removal of remnant concrete pieces and clearing of the site prior to placement of riprap along the bank. These impacts would include short term increases in erosion and sedimentation. These impacts are considered to be temporary and minimal, as well as further minimized by implementing appropriate sediment and erosion control practices. It is expected that the implementation of the preferred alternative would result in an overall reduction in erosion along the shoreline and provide protection to the pump station.

The no action alternative would not increase erosion or sedimentation along the project site. However, the current rate of erosion along the shoreline would continue causing continued impacts to the water pump station and adjacent properties. Photographs of the site are shown as Figures 4.07, 4.08, 4.09, and 4.10.

6.2 Water Quality

Waters around the project site are classified as "SA" from the Federal Point (the large peninsula that divides the Cape Fear River from the Atlantic Ocean) downstream to the Atlantic and "SC" in a restricted area in the vicinity of Southport. Waters of the Atlantic Ocean at the mouth of the Cape Fear River are classified as "SB". "SC" waters are defined as waters suitable for fishing, fish and wildlife propagation, secondary recreation, and other uses requiring water of lower quality. "SB" are waters suitable for primary recreation in addition to "SC" uses. "SA" waters are suitable for shellfishing for market purposes, as well as "SB" and "SC" uses (NCDENR 2009).

The preferred alternative is expected to have favorable long term effects on water quality, since bank erosion results in increased turbidity within the water column. The preferred alternative would be expected to reduce long term erosion problems associated with erosion of the bank, but may increase turbidity for a short duration during the construction. Appropriate sedimentation and erosion control practices that equal or exceed the most recent version of the "North Carolina Erosion and Sediment Control Planning and Design Manual" would be designed, installed, and maintained properly to assure compliance with the appropriate turbidity standards.

The no action alternative would not result in any short term increases in turbidity beyond the current turbidity levels associated with erosion of the bank. However, unlike the preferred alternative which is expected to reduce overall turbidity, erosion that increases turbidity in the immediate area would continue with potential substantial impacts to the water pump station and adjacent properties associated with pump station failure.

A Section 401 (P.L. 92-500 and P.L. 95-217) water quality certification (WQC) #3885, has been issued by the State of North Carolina. All work is in compliance with the conditions of WQC #3885. The USACE has requested written approval from NC Division of Water Quality (NCDWQ) that the WQC is applicable. No work will begin until NCDWQ has formally approved use of the WQC. This project has been coordinated with the USACE Wilmington District Regulatory Division regarding the need for Section 404 Clean Water Act authorization. Regulatory has determined that the proposed shoreline stabilization project complies with the terms and conditions of the Nationwide Permit (NWP) 13. To be consistent with the NC Coastal Zone Management Program, work will be conducted during low-tide cycles to the best extent practicable and turbidity curtains will be deployed to reduce turbidity in the Cape Fear River.

6.3 Wetlands and Floodplains

The area proposed to be stabilized is devoid of any marsh or submerged aquatics as observed during site inspections in October 2008 and March 2011. On a site visit in April of 2003, there were remnants of marsh grass, but those were removed through erosion at some point before the 2008 visit.

The preferred alternative would not impact wetlands at or adjacent to the project site. In compliance with Executive Order 11988, no practical alternative exists to the proposed stabilization of the shoreline of the pump station located within the flood plain. The preferred alternative would have to, in some places, be constructed at or below the mean high water contour. Every effort will be taken to minimize potential harm to or within the flood plain by reducing the amount of material placed in the floodplain to only that which is required to protect the shoreline using the best construction practices available at the site. Construction of the preferred alternative would not impact the overall floodplain nor would there be any increase in the 100 – year floodplain elevations due to implementation of the project. The action is in compliance with State/local floodplain protection standards. The Wilmington Harbor Navigation Project has channel improvements that run from the mouth of the Cape Fear River to Downtown Wilmington. This channel passes the project area.

There are currently no wetlands identified within the project area and, as such, the no action alternative would not result in any impacts to wetlands. The no action alternative would not result in impacts to the floodplain.

6.4 Hazardous and Toxic Waste

EPA's Envirofacts Data Warehouse website was queried to identify the presence of EPA regulated facilities within 3 miles of the proposed project site. The Envirofacts databases contain information on facilities collected from regulatory programs such as RCRA, EPCRA, Superfund, Clean Water Act, and Clean Air Act and information on environmental activities that may affect air, water, and land in the project area. Sixteen sites were reported within the three mile radius; however no sites were located in the project area. The closest site was over 1/2 mile away and would not affect the project area.

An onsite inspection was conducted by personnel from the Environmental Resources Section, Planning and Environmental Branch, U.S. Army Corps of Engineers, Wilmington District on March 29, 2011. Based on this site visit and an investigation of historic aerial photographs, no evidence of hazardous and toxic materials or indicators of those materials were present in the project area.

6.5 Cultural Resources

The Southport Historic District was added to the National Register of Historic Places in 1980. Southport is described as "the best example of a Victorian coastal town in North Carolina" in the 1980 National Register of Historic Places nomination form. Contributing properties were evaluated for their association with the coastal trading development and maritime heritage of Southport (Criterion A); distinctive characteristic of North Carolina coastal architecture and embodying documented work of known local builders using materials from local producers; and exemplification of the transition from traditional carpentry craftsmanship to mass production of building materials that took place in the nineteenth century in North Carolina (Criterion C). Retrieved July 12, 2011 from http://www.hpo.ncdcr.gov/nr/BW0008.pdf.

The Area of Potential Effect (APE) includes approximately 300 feet of shoreline for ground disturbance associated with the proposed project and frontage along the north side of Bay Street from Howe Street to Caswell Avenue for visual effects (Figure 2). No known historic properties are located along the shoreline proposed for stabilization. Eight known historic properties are within the project APE. Seven of these properties are houses with frontage along the north side of Bay Street between Howe Street and Caswell Avenue.

The eighth historic property, the River Pilots Tower, is located approximately 20 feet northeast of the eroded shoreline (Figure 6.01). The River Pilots Tower would not be adversely affected by the project as construction activities would occur along the exposed beach below the shoreline during periods of low tide.

An additional property, the pump station, has not been evaluated for National Register of Historic Places eligibility. According to the City of Southport Public Services Director, the pump station was put into operation in 1965 (Ralph Cardwell, personal communication). The structure is a nondescript, one-story brick building, approximately 16 ft x 18 ft and 289 square ft (Figure 4). The pump station has a flat roof with a single entry-door on the west-facing wall. According to the State Historic Preservation Office, the pump station was omitted from the National Register nomination for the Southport Historic District, and does not meet the National Register Criteria for nomination. The SHPO also indicated that the pump station is not eligible to be listed individually and is considered a non-contributing resource within the Southport Historic District.

Visual effects of the proposed project were assessed for the seven historic properties along the north side of Bay Street, the River Pilots Tower, and the Southport Historic District as a whole. The viewshed was established by standing at various points on the property frontage along Bay Street and looking towards the 300 feet of shoreline proposed for erosion control and vice versa. Once the viewshed was established, the visual effects were assessed considering the town's retention of its late-nineteenth century appearance (Statement of Significance, Southport Historic District nomination form). Retrieved July 12, 2011 from http://www.hpo.ncdcr.gov/nr/BW0008.pdf.

The eroded shoreline cannot be seen at eye-level from the intersection of Lord and Bay Streets westward (Figure 6.01). East of this point, between Lord and Howe Streets, limited views of the shoreline can be seen at eye-level. The entire shoreline is visible from the River Pilots Tower (Figure 6.02).

The proposed project will not have an obstructive effect since the revetment would be level with the existing shoreline with a 2:1 slope toward the water. Aesthetic effects would be negligible considering the limited view of the project area from the north side of Bay Street. Where the project area can be viewed, the placement of natural material (granite) would eliminate the modern intrusion (i.e. obstruction of historical views) caused by the current rip rap of concrete slab, brick, and exposed geotextile along much of the Southport waterfront. More importantly, the revetment will provide protection to the River Pilots Tower from the encroaching shoreline.

In consultation with the NC SHPO, we have determined there will be no effect on historic properties listed in, or eligible for, the National Register of Historic Places (NRHP). The SHPO letter of concurrence dated August 19, 2011 is located in appendix F. Furthermore, the construction contract will include an Inadvertent Discovery Plan to address the potential inadvertent discovery of archeological materials and/or human remains.

Figure 6.01 Viewshed at the intersection of Lord and Bay Streets looking southeast

Figure 6.02 View of the project area looking east. Historic buildings along Bay Street can be seen in the upper left-hand corner of the figure

6.6 Air Quality

The project area, located in Brunswick County North Carolina, is in attainment with National Ambient Air Quality Standards parameters. The proposed action would not affect the attainment status of the project area or region.

Air quality would be temporarily and insignificantly affected by the proposed action. Emissions are expected to occur and could result from the operation of construction equipment, and any other support equipment which may be on or adjacent to the construction areas. Increases in dust emissions would occur during construction, but these impacts would be short term, only occurring while construction is ongoing, and not impact overall air quality. Any project related emissions are not expected to contribute significantly to direct or indirect emissions and would not impact air quality within the project area. A State Implementation Plan conformity determination (42 United States Code 7506 (c)) is not required since the project area is in attainment for all criteria pollutants.

The no action alternative would not contribute to emissions and no adverse impacts to air quality are expected to occur.

6.7 Benthic Resources

According to Birkhead et al. (1979), downstream of the Military Ocean Terminal Sunny Point (MOTSU) which is located approximately six miles upstream of the project site in the Cape Fear River, the dominant organisms were polychaetes, especially a spionid polychaete (*Spiophanes bombyx*). Other abundant organisms were the little surf clam (*Mulinia lateralis*), sea pansy (*Renilla reniformis*), mud snails (*Ilynassa obsoleta*), and brittlestars (subclass *Ophiuroidea*). Common species collected were the polychaetes *(Leitoscoloplos variabilis* and *Paraprionospio pinnata*) and the molluscs *(Ilyanassa obsoleta* and *Crassostrea virginica)*. Taxa associated with high salinities such as *Sabellaria vulgaris*, *Aricidea wassi*, and *Magelona* spp. were the most collected species in a 1999 survey transect located near the project area (Ray 1996). These species are considered to be representative of the benthic inhabitants in the vicinity of the project area due to similarities in habitat type and the close proximity to the project area. There are no known oyster resources in the immediate vicinity of the project area.

The proposed alternative would have negligible impacts on benthic resources as the majority of work would occur on the upland portion of the project area with approximately 3,600 square feet of the constructed area occurring within the intertidal zone. Due to the severe erosion and disturbance in the project area, it is not expected that there is a large benthic population in the area; however, construction would alter the predominant habitat from a highly eroded sandy habitat to a rocky habitat in the immediate project area. Constructed areas would stabilize sediments in the most eroded portions of the project area and provide hard structure to benthic organisms that utilize stable structures to persist as well as provide stable sandy habitats in the immediate area surrounding the project. Any impacts to benthic resources would occur during the placement of rip rap and would be short-lived as benthic resources would re-colonize the area rapidly.

The no action alternative would have minimal to no impacts on benthic resources in the waterways near the project area.

6.8 Fisheries Resources

Schwartz et al., (1981) reported the collection of 249 species of fish from a 1973-1980 survey of the saline lower Cape Fear River watershed. The Cape Fear estuary, including the adjacent Atlantic Ocean, is characterized by a few species which occur very abundantly and others which occur only incidentally (CP&L, 1980). EA Engineering (1991) has provided an excellent fisheries literature review for the Cape Fear River basin. The nekton of the Cape Fear River estuary are dominated by species residing in the estuary as larvae or juveniles, using the estuary as nursery or feeding habitat, but spawning offshore in the Atlantic Ocean (Birkhead et al., 1979). Abundant species in the "nursery use" category include Atlantic menhaden (*Brevoortia tyrannus*), Atlantic croaker (*Micropogon*), spot (*Leiostomus xanthurus*), star drum (*Stellifer lanceolatus*), penaeid shrimp, mullet (*Mugil spp*.), and weakfish (*Cynoscion regalis*). Species that are estuarine endemics or permanent residents are also abundant, namely, bay anchovies (*Anchoa mitchilli*), killifishes (*Fundulus* spp.), and silversides (*Menidia* spp.) (Weinstein, 1979). Anadromous species such as blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), alewife (*Alosa pseudoharengus*), striped bass (*Morone saxatilis*), and Atlantic sturgeon (*Acipenser oxyrhynchus*) use the Cape Fear River estuary as a transportation route to upper river spawning and nursery areas (Walburg and Nichols, 1967; Nichols and Louder, 1970). The shortnose sturgeon (*Acipenser brevirostrum*) is also present in the harbor. Anadromous fish use is highest from mid-winter to mid-spring. The catadromous American eel (*Anguilla rostrata*) is widely distributed in the Cape Fear River estuary (Schwartz et al., 1981).

Essential Fish Habitat : The 1996 Congressional amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (PL 94-265) set forth new requirements for the National Marine Fisheries Service (NMFS), regional fishery management councils (FMC), and other federal agencies to identify and protect important marine and anadromous fish habitat. These amendments established procedures for the identification of Essential Fish Habitat (EFH) and a requirement for interagency coordination to further the conservation of federally managed fisheries. An EFH assessment has been prepared and is being coordinated separately with NMFS. The EFH Assessment, which includes fish species which may occur in the vicinity of Southport, NC and which are managed under MSFCMA, and the categories of EFH and Habitat Areas of Particular Concern (HAPC) for managed species, identified in the Fishery Management Plan Amendments of the South Atlantic Fishery Management Council as potentially occurring in southeastern states, is included in Attachment A.

No adverse impacts to fisheries resources are anticipated from the preferred or no action alternatives. The preferred alternative may provide additional hard structure habitat for fish species that utilize the shoreline.

6.9 Terrestrial Resources

Erosion at the proposed project site has destroyed much of the shoreline vegetation, leaving an eroded steep slope with minimal to no vegetation. Vegetation above the eroded zone is comprised of grasses that are regularly mowed as part of maintenance of the pump station.

The preferred alternative would require the sloping of the bank to a more stabilized natural sloping contour of 2H:1V or flatter slope. This would result in approximately 0.11 AC of ground clearing of grasses on the top of the bank. No other impacts to terrestrial resources are expected, and all disturbed areas would be vegetated with grasses or other native plants.

The no action alternative would result in continued erosion of the existing shoreline, further reducing the vegetation along the shoreline.

6.10 Endangered and Threatened Species

The proposed project and its alternatives have been reviewed for compliance with the Endangered Species Act of 1973, as amended. An updated list of threatened and endangered species was obtained from the USFWS (U.S. Fish and Wildlife Service) website and the NMFS (National Marine Fisheries Service) website. The species on this list (Table 6.01) were considered in the development and documentation of the proposed project.

Table 6.01- Threatened and Endangered Species in the Region

Common Name	Scientific name	Federal Status
Vertebrate:		
American alligator	*Alligator mississippiensis*	T (S/A)
Bald eagle	*Haliaeetus leucocephalus*	BGPA
Green sea turtle	*Chelonia mydas*	T
Hawksbill sea turtle	*Eretmochelys imbricate*	E
Kemp's (=Atlantic) ridley sea turtle	*Lepidochelys kempii*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Loggerhead sea turtle	*Caretta caretta*	T
Piping plover	*Charadrius melodus*	T
Red-cockaded woodpecker	*Picoides borealis*	E
Shortnose sturgeon	*Acipenser brevirostrum*	E
West Indian manatee	*Trichechus manatus*	E
Wood stork	*Mycteria americana*	E
Blue whale	*Balaenoptera musculus*	E
Finback whale	*Balaenoptera physalus*	E
Humpback whale	*Megaptera novaeangliae*	E
Right whale	*Eubaleana glacialis*	E
Sei whale	*Balaenoptera borealis*	E
Sperm whale	*Physeter catodon*	E
Shortnose sturgeon	*Acipenser brevirostrum*	E
Flora:		
Cooley's meadowrue	*Thalictrum cooleyi*	E
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E
Seabeach amaranth	*Amaranthus pumilus*	T

E = endangered. A taxon "in danger of extinction throughout all or a significant portion of its range."
T = threatened. A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."
T(S/A) = threatened due to similarity of appearance. A taxon that is threatened due to similarity of appearance with another listed species and is listed for its protection. Taxa listed as T(S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation.

No adverse impacts to endangered or threatened species are anticipated from the preferred or no action alternatives as all work and disturbance will remain within the immediate area of erosion. There are no State-listed threatened or endangered species in Brunswick County that are expected to be encountered during project construction. Work will primarily be located above the mean low water line and will not extend far enough into the adjacent waterway to impact any aquatic threatened or endangered species that may be in the vicinity, nor will the project extend landward into habitats where land-based threatened or endangered species may be encountered.

6.11 Aesthetic and Recreational Resources

The coastal setting and marine environment allow opportunities for boating and fishing as well as provide a scenic backdrop of ocean, river, coastal beaches, and vessels including commercial and recreational boats, as well as ships calling on the port. The Atlantic Intracoastal Waterway follows the Cape Fear River channel from Fort Caswell up to Snows Cut. It carries a large amount of transient recreational boating, as well as local recreation in the vicinity of Southport. On calm summer days the area from Southport to the mouth of the river near Bald Head Island is heavily used by all types of recreational boating. The lower Cape Fear River region is very scenic, with many miles of ocean beach, historic homes and lighthouses, and large expanses of salt marsh bordering the river. Nearby beaches offer extensive recreational opportunities for activities such as swimming, sunbathing, walking, surfing, birdwatching, and fishing. Visual aesthetics have been degraded at the project site from severe erosion along the shoreline.

The preferred alternative is not expected to significantly impact aesthetic or recreational resources. Construction would be restricted to the immediate project area and would provide stabilization to the eroding shoreline. Traffic coordination would be closely coordinated with the City to ensure that any impacts to traffic circulation would be minimal and short-term. Any impacts related to construction including noise and the presence of the construction equipment would be temporary and of short duration. The preferred alternative will be low profile and should not adversely impact views from either the river or the Southport waterfront. No additional adverse impacts to recreation or aesthetics are anticipated.

The no action alternative would not impact recreational or aesthetic resources. Erosion would continue to degrade the shoreline and would cause additional impacts if erosion were to continue to the point that the water pump station was inundated or collapsed.

6.12 North Carolina Coastal Management Program

Pursuant to Section 307(c)(1) of the Federal Coastal Zone Management Act (CZMA) of 1972, as amended (P.L. 92-583), federal activities are required to be consistent to the maximum extent practicable with enforceable policies of the federally approved coastal management program of the state.

The proposed action would take place in areas designated as areas of environmental concern (AECs) under the North Carolina Coastal Management Program. Neither the preferred alternative nor the no action alternative would cause a significant impact to the estuarine environment. No marsh, submerged aquatic vegetation, primary nursery, or shellfish areas will be impacted by either alternative.

Therefore, the Wilmington District, U.S. Army Corps of Engineers believes that the preferred and no action alternatives are consistent with the approved Coastal Management Program of the State of North Carolina. A concurrence with this determination will be requested from the NCDCM. Work would not begin until all consistency issues have been addressed.

6.13 Cumulative Effects

Shoreline processes along the shores adjacent to the town of Southport have resulted in community wide erosion issues from wind fetch, tidal fluctuations and boat traffic. This has resulted in significant reinforcement of the banks in past projects. Those projects have resulted in a large portion of the shoreline being reinforced to stabilize the shoreline from further erosion that may impact public and private structures. It is expected that other reasonably foreseeable future projects would also include a form of reinforced structure along the shoreline and repair to current existing reinforced structures, although there are no known stabilization or maintenance plans at this time. As stabilization utilizing rip rap armoring stone has been a long term solution, it is not anticipated that the proposed project will significantly contribute to the overall cumulative effects of armoring eroding shorelines in the project vicinity.

6.14 Public Laws & Executive Orders

Table 6.02 lists the compliance status of all federal laws and policies that were considered for the proposed Southport, NC section 14 emergency streambank and shoreline erosion protection project.

Table 6.02 - Compliance of the Proposed Action with Federal Laws and Policies

Title of Public Law	US CODE	Compliance Status
Archeological and Historic Preservation Act of 1974, As Amended	16 USC 469	Full Compliance
Archeological Resources Protection Act of 1979, As Amended	16 USC 470	Full Compliance
Clean Air Act of 1972, As Amended	42 USC 7401 et seq.	Full Compliance
Clean Water Act of 1972, As Amended	33 USC 1251 et seq.	Full Compliance
Coastal Zone Management Act of 1972, As Amended	16 USC 1451 et seq.	Full Compliance
Endangered Species Act of 1973	16 USC 1531	Full Compliance
Fish and Wildlife Coordination Act of 1958, As Amended	16 USC 661	Full Compliance
Magnuson Fishery Conservation and Management Act	16 USC 1801	Full Compliance
Marine Mammal Protection Act of 1972, As Amended	16 USC 1361	Full Compliance
National Environmental Policy Act of 1969, As Amended	42 USC 4321 et seq.	Full Compliance
National Historic Preservation Act of 1966, As Amended	16 USC 470	Full Compliance
National Historic Preservation Act Amendments of 1980	16 USC 469a	Full Compliance
Noise Control Act of 1972, As Amended	42 USC 4901 et seq.	Full Compliance
River and Harbor Act of 1899, Sections 9, 10, 13	33 USC 401-413	Full Compliance

Executive Orders		
Protection and Enhancement of Environmental Quality	11514/11991	Full Compliance
Protection and Enhancement of the Cultural Environment	11593	Full Compliance
Floodplain Management	11988	Full Compliance
Protection of Wetlands	11990	Full Compliance
Federal Compliance with Pollution Control Standards	12088	Full Compliance
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	12898	Full Compliance
Protection Of Children from Environmental Health Risks and Safety Risks	13045	Full Compliance
Invasive Species	13112	Full Compliance

Note: Items identified as being in Full Compliance assumes their compliance status after the NEPA process is complete.

6.15 Environmental Justice

The EPA defines environmental justice as the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA further defines fair treatment to mean that no group of people should bear a disproportionate share of the

negative environmental consequences of industrial, governmental, or commercial operations or policies(***http://www.epa.gov/environmentaljustice/basics/index.html***). Neither the proposed nor the no action alternative would have the potential for disproportionate health or environmental effects on minorities or low-income populations or communities.

In addition, Federal agencies identify and assess environmental health and safety risks that may disproportionately affect children (EO 13045) as a result of the implementation of Federal policies, programs, activities, and standards (62 Federal Register 19883-19888). Neither alternative would disproportionately affect the safety or health of children.

6.16 Conclusion

Based on the findings in this report, it is in the Federal interest to implement the recommended plan for emergency streambank erosion control at the Southport pump station. The plan will meet the objective of protecting the pump station structure. Table 6.03 details significant environmental factors taken into consideration. Project construction may result in short term impacts to benthic species, short duration of increased turbidity and noise, and minor impacts to terrestrial vegetation during construction. Overall benefits include long term reduction in erosion and turbidity, thereby improving terrestrial and aquatic habitat while supplying protection to the Southport pump station.

Table 6.03- Environmental Impact Comparison of Alternatives

Resource	Alternatives	
	Preferred Action – Sloping Rock Revetment	**No Action**
Sediments	Temporary impacts from grading	Continued erosion of shoreline
Water Quality	Temporary impacts during construction	Continued turbidity from erosion; potential sewage spill
Wetlands & Floodplains	No impacts	No impacts
Hazardous &Toxic Waste	No Impacts	No Impacts
Cultural	No Impacts	No impacts
Air Quality	Insignificant increase in emissions during construction	No impacts
Benthic	Temporary impacts during construction	No impacts
Fisheries	No Impacts	No impacts
Terrestrial Vegetation	Minor ground clearing during construction Stabilization of remaining upland	Loss of Habitat
Endangered & Threatened Species	No Impacts	No Impacts
Aesthetic & Recreational	Temporary increase in noise	No Impacts

7.0 SEA LEVEL RISE CONSIDERATIONS

The preferred alternative will armor the existing shoreline in the area of the pumping station. This design was developed using basic coastal analyses. The top elevation of the existing shoreline and proposed armor varies from about 6' to 11' NAVD88. The mean sea level trend for the tide gage at Southport is 2.08 millimeters/year rise with a 95% confidence interval of +/- .46 mm/yr based on monthly mean sea level data from 1933 to 2006, which is equivalent to a change of about 0.34 feet in 50 years. See 7.01 below. As expected, this tidal record is similar to Wilmington, NC sea level trend of 2.07 mm/yr rise.
[http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8659084 Southport, NC]

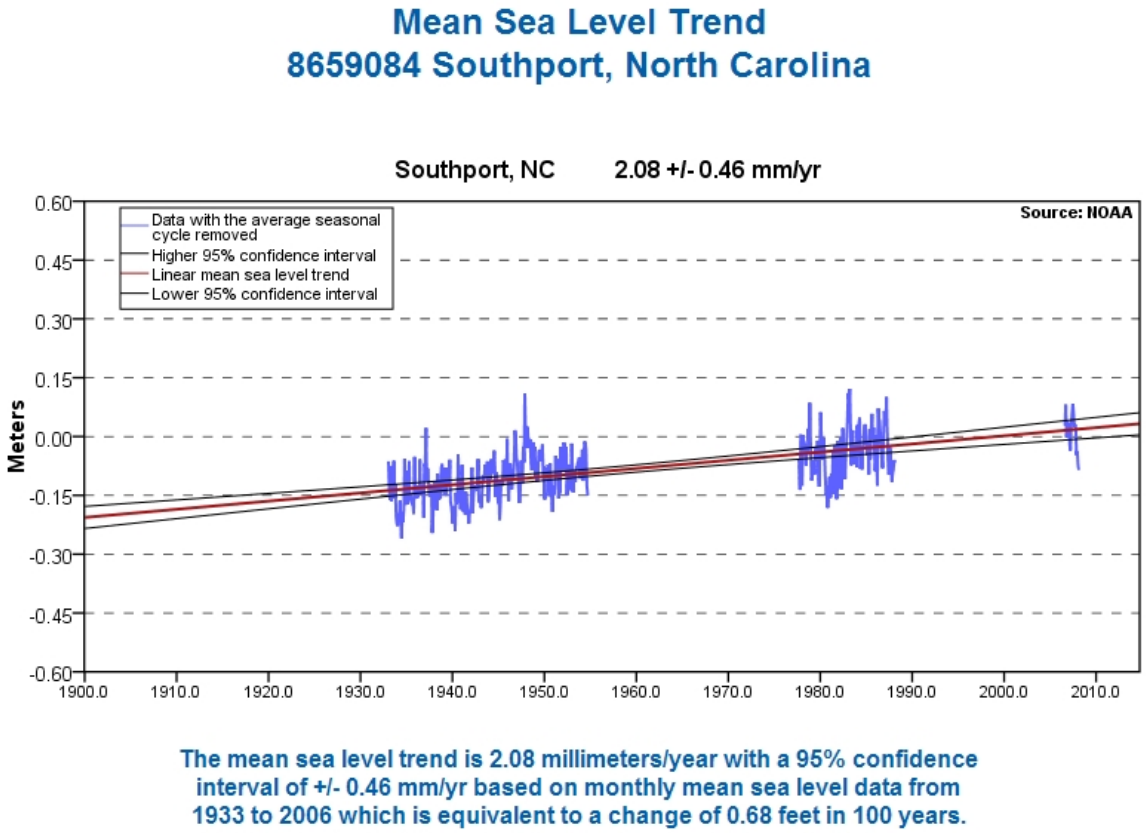


Figure 7.01 Plot of Tide Levels Southport, NC - NOAA Website

With only a 0.34 foot rise in sea level, it is expected that the shore protection as designed will fully function over the 50-yr life of the project. In the immediate area of the pumping station, the armor is at an average elevation of about 8.5 feet NAVD88. This is about 6.5 feet above MHHW so a small rise of less than 0.4 feet is negligible. Figure 7.02 shows the tidal statistics in two datums.

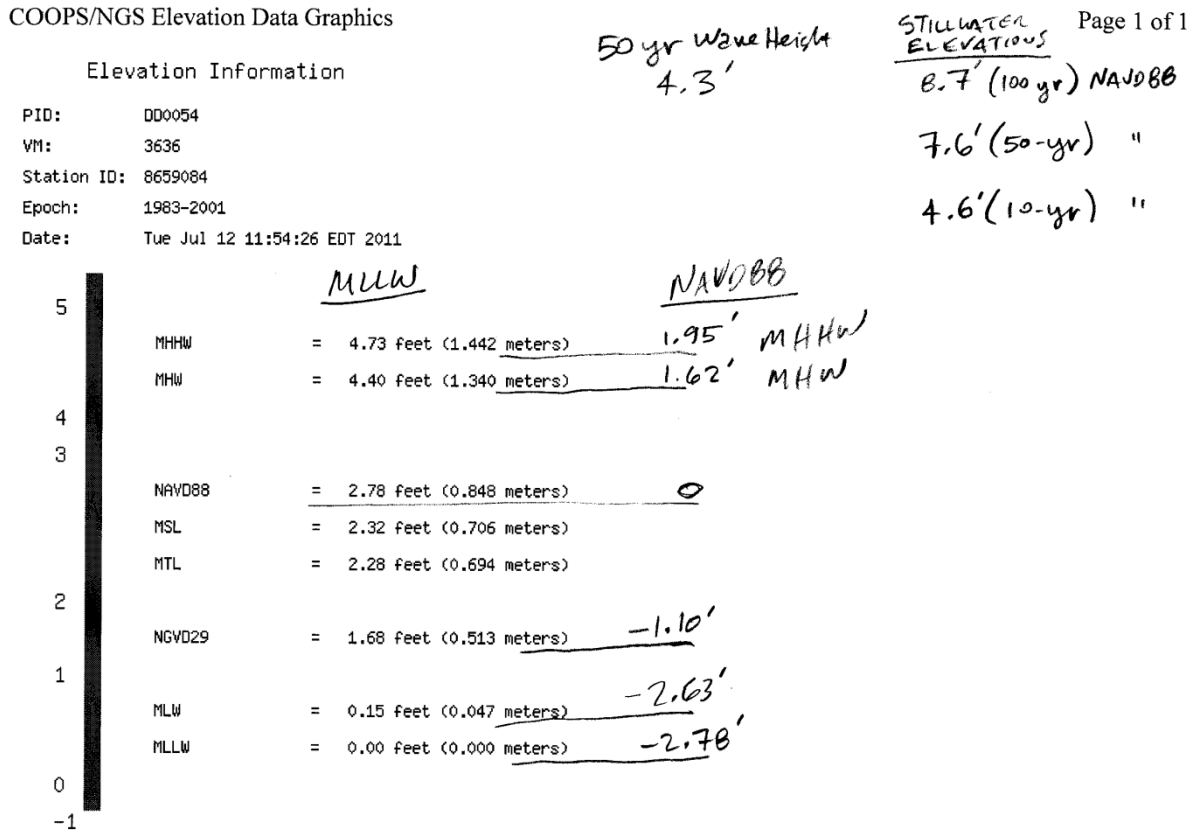


Figure 7.02 Water level statistics in MLLW and NAVD88 datums

Accelerated Sea Level Rise Scenarios:

The Intergovernmental Panel on Climate Change (IPCC) projects accelerated global warming which corresponds to accelerated sea level rise. USACE guidance (EC 1165-2-212) requires consideration of these various accelerated sea level rise scenarios for water resources projects. The sea level rise scenarios evaluated include 1) the historical rate of sea level rise – from tide data shown in Figure above, 2) projections using the updated National Research Council (NRC) curve 1 – representing global eustatic sea-level rise of 0.5 meters (1.64 ft) by the year 2100, and 3) projections based on NRC curve 3 – representing sea level rise of 1.5 meters (4.92 ft) by the year 2100.

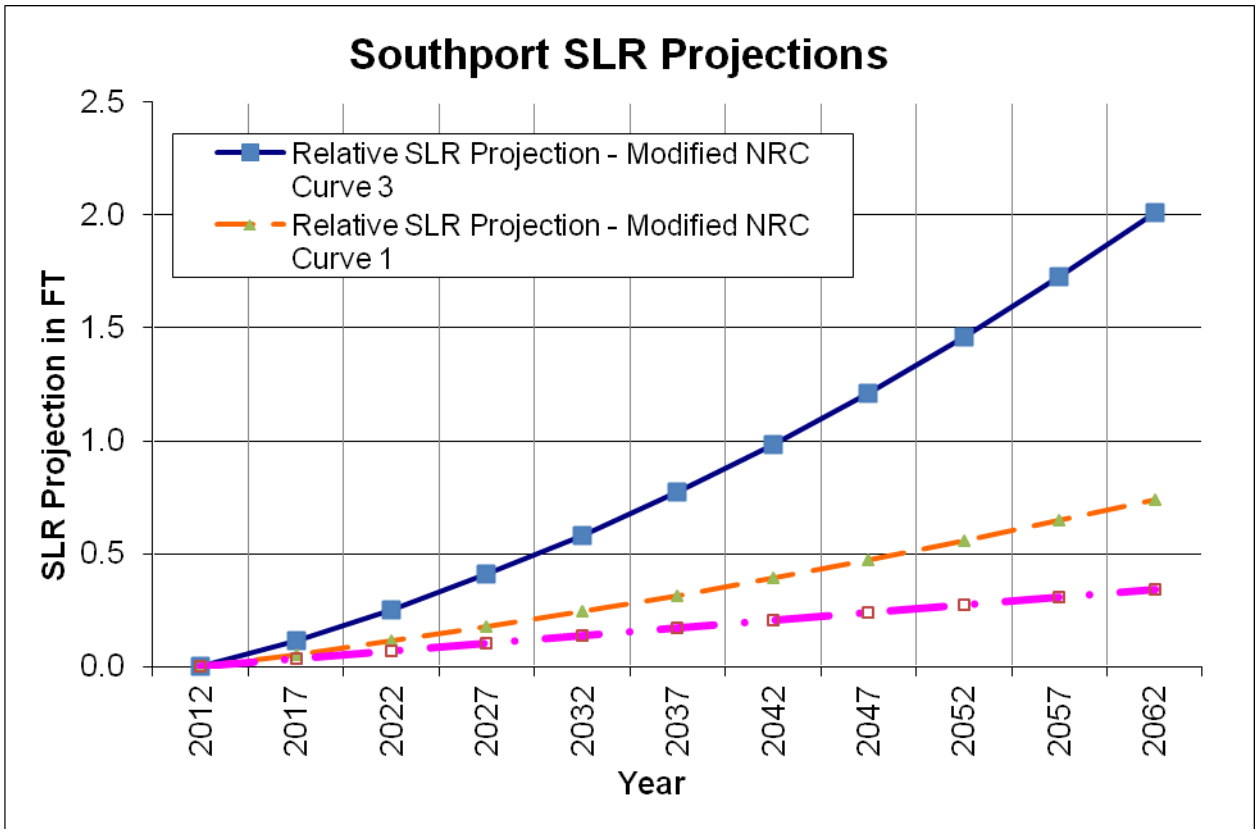


Figure 7.03 Plot of Sea-Level-Rise 50-Year Projections based upon historical and accelerated rates

The NRC curves in Figure 7.03 above have been adjusted to account for local subsidence rates for the Southport, NC area. Curves 1 and 3 project an accelerated sea level rise of 0.74 feet and 2.0 feet 50 years, respectively. Considering stillwater elevations, an extreme rise of 2 feet would be accommodated by the design since the shoreline nearest the pumping station is protected up to about 6.5 feet above current MHHW, or 8.5 feet NAVD88.

8.0 HYDRAULIC ANALYSIS

The project shoreline is subject to erosive forces caused by waves and currents present along the lower Cape Fear River. Variations in water levels are due to regular astronomical tidal changes and those associated with coastal storm surges. Regular tides at Southport are semi-diurnal with a mean and spring range of 4.2 ft and 4.8 ft, respectively, based on NOAA tide tables. During storm conditions, water levels can be significantly greater, primarily associated with coastal storm surges which can inundate the lower Cape Fear region. Storm still water elevations for the project site are given in Figure 8.01, with respect to NAVD 88 datum (FEMA Rev. 2008). This figure shows the still water levels (in feet) for various return periods, namely: 4.6 ft (10-yr or 10% recurrence); 7.6 ft (50-yr or 2% recurrence), 8.7 ft (100-yr or 1% recurrence) and 11.4 ft (500 yr or 0.2% recurrence). The project falls within the 100-year flood zone with local elevations in the vicinity of the pump station being 7-8 feet, NAVD 88.

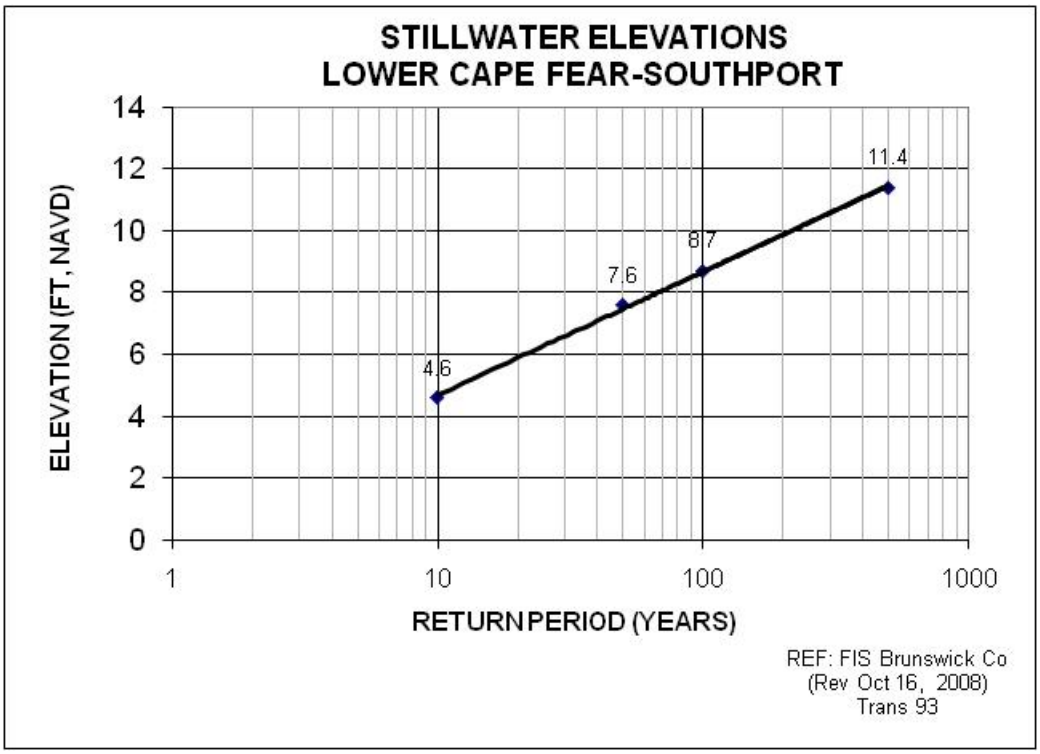
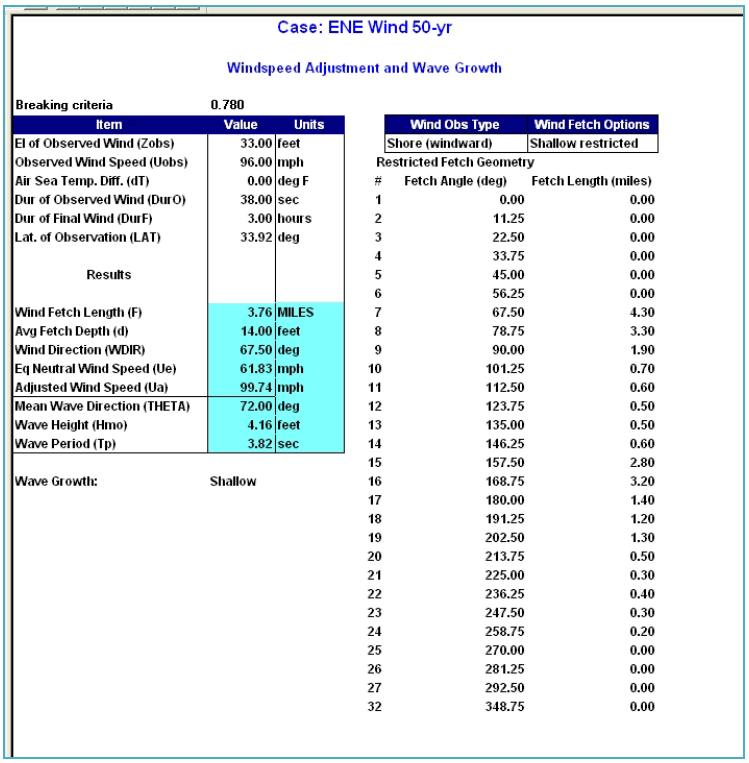


Figure 8.01 Stillwater Storm Elevations-Southport, NC

Waves present in the area are generated by winds blowing over the open fetches of the lower Cape Fear River and also by locally generated ship and boat traffic. Regular transit of large vessels from the ocean entrance to the Wilmington State Ports plus numerous smaller commercial and recreational traffic generate local wake activity at the site. This regular ship and boat wake activity contributes to the shoreline erosion along the Southport waterfront, but is not as significant as the persistent and more dominate wind waves generated over the area. The orientation of the shoreline and configuration of the river make the site most exposed from wind waves from the North-Northeast and South-Southeast as shown in Figure 8.02. The NNE fetch length is about 5 miles with an average water depth of about 14 feet. The SSE fetch measures about 3 miles with an average depth of about 24 feet.

Figure 8.02 Exposed fetch conditions for Southport, NC

Design wave parameters were computed using the "Wind Adjustment and Wave Growth Option" available in the CEDAS-ACES computer program suite. Two basic design conditions were analyzed by assuming that the wind field was coincident with either the NNE or SSE fetch alignments. The design wind speeds were based on the estimated fastest mile hurricane winds which are listed in Table 8.01 for a range of return periods. A 50-yr return period was selected for design purposes. The table includes a summary of the computed wave heights and periods for each of the return periods and associated NNE and SSE fetches. Figures 8.03 and 8.04 give the computation details for the wave parameters for the respective ENE and SSE cases, for the 50-yr event. The results show that the waves generated over the shorter but deeper SSE fetch are slightly larger and therefore were selected for design. The selected 50-yr design wave has a height of 4.3 feet and period of 3.8 sec as shown graphically in Figure 8.03.



Case: ENE Wind 50-yr

Windspeed Adjustment and Wave Growth

Breaking criteria 0.780

Item	Value	Units
El of Observed Wind (Zobs)	33.00	feet
Observed Wind Speed (Uobs)	96.00	mph
Air Sea Temp. Diff. (dT)	0.00	deg F
Dur of Observed Wind (DurO)	38.00	sec
Dur of Final Wind (DurF)	3.00	hours
Lat. of Observation (LAT)	33.92	deg
Results		
Wind Fetch Length (F)	3.76	MILES
Avg Fetch Depth (d)	14.00	feet
Wind Direction (WDIR)	67.50	deg
Eq Neutral Wind Speed (Ue)	61.83	mph
Adjusted Wind Speed (Ua)	99.74	mph
Mean Wave Direction (THETA)	72.00	deg
Wave Height (Hmo)	4.16	feet
Wave Period (Tp)	3.82	sec

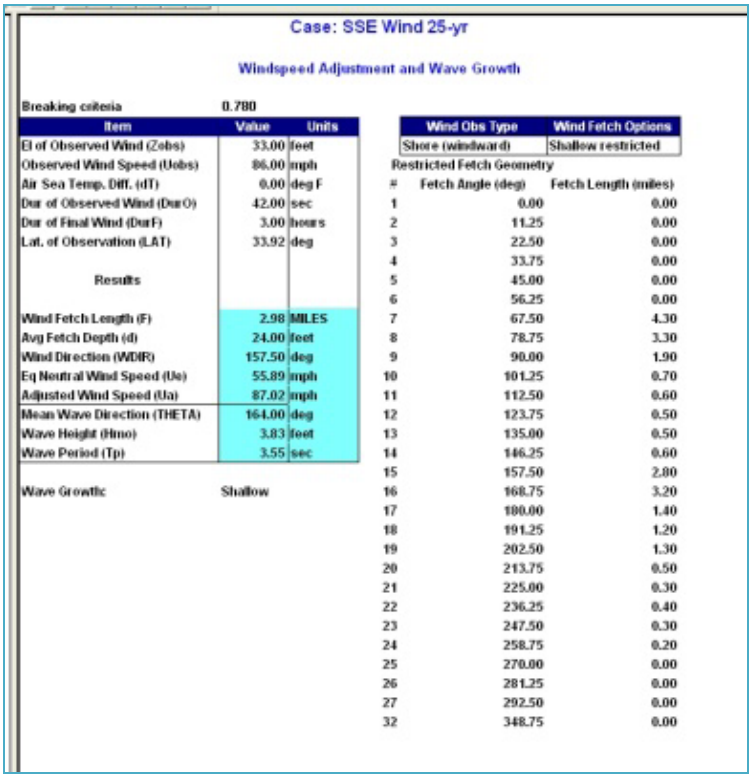
Wave Growth: Shallow

Wind Obs Type	Wind Fetch Options
Shore (windward)	Shallow restricted

Restricted Fetch Geometry

#	Fetch Angle (deg)	Fetch Length (miles)
1	0.00	0.00
2	11.25	0.00
3	22.50	0.00
4	33.75	0.00
5	45.00	0.00
6	56.25	0.00
7	67.50	4.30
8	78.75	3.30
9	90.00	1.90
10	101.25	0.70
11	112.50	0.60
12	123.75	0.50
13	135.00	0.50
14	146.25	0.60
15	157.50	2.80
16	168.75	3.20
17	180.00	1.40
18	191.25	1.20
19	202.50	1.30
20	213.75	0.50
21	225.00	0.30
22	236.25	0.40
23	247.50	0.30
24	258.75	0.20
25	270.00	0.00
26	281.25	0.00
27	292.50	0.00
32	348.75	0.00

Figure 8.03 Wave Height and Period Computations for ENE Wind Fetch (50-yr return)



Case: SSE Wind 25-yr

Windspeed Adjustment and Wave Growth

Breaking criteria 0.780

Item	Value	Units
El of Observed Wind (Zobs)	33.00	feet
Observed Wind Speed (Uobs)	86.00	mph
Air Sea Temp. Diff. (dT)	0.00	deg F
Dur of Observed Wind (DurO)	42.00	sec
Dur of Final Wind (DurF)	3.00	hours
Lat. of Observation (LAT)	33.92	deg
Results		
Wind Fetch Length (F)	2.98	MILES
Avg Fetch Depth (d)	24.00	feet
Wind Direction (WDIR)	157.50	deg
Eq Neutral Wind Speed (Ue)	55.89	mph
Adjusted Wind Speed (Ua)	87.02	mph
Mean Wave Direction (THETA)	164.00	deg
Wave Height (Hmo)	3.83	feet
Wave Period (Tp)	3.55	sec

Wave Growth: Shallow

Wind Obs Type	Wind Fetch Options
Shore (windward)	Shallow restricted

Restricted Fetch Geometry

#	Fetch Angle (deg)	Fetch Length (miles)
1	0.00	0.00
2	11.25	0.00
3	22.50	0.00
4	33.75	0.00
5	45.00	0.00
6	56.25	0.00
7	67.50	4.30
8	78.75	3.30
9	90.00	1.90
10	101.25	0.70
11	112.50	0.60
12	123.75	0.50
13	135.00	0.50
14	146.25	0.60
15	157.50	2.80
16	168.75	3.20
17	180.00	1.40
18	191.25	1.20
19	202.50	1.30
20	213.75	0.50
21	225.00	0.30
22	236.25	0.40
23	247.50	0.30
24	258.75	0.20
25	270.00	0.00
26	281.25	0.00
27	292.50	0.00
32	348.75	0.00

Figure 8.04 Wave Height and Period Computations for SSE Wind Fetch (50-yr return)

Table 8.01- Southport Wave Prediction Data

ESTIMATED MAXIMUM HURRICANE WIND SPEED (MPH) Station 2050 (CETN-I-36)		PREDICTED WAVE HEIGHT AND PERIOD CEDAS-ACES			
	Fastest Mile Wind Speed (mph)[1]	East Northeast Wind		South Southeast Wind	
Return Period	At Coast	Wave Height (ft)	Wave Period (s)	Wave Height (ft)	Wave Period (s)
10	68	2.96	3.22	2.95	3.15
25	86	3.74	3.61	3.83	3.55
50	**96**	**4.16**	**3.82**	**4.34**	**3.76**
100	105	4.53	3.99	4.78	3.93

[1]Definition: Fastest mile wind speed averaged over the duration it takes the wind to travel one mile

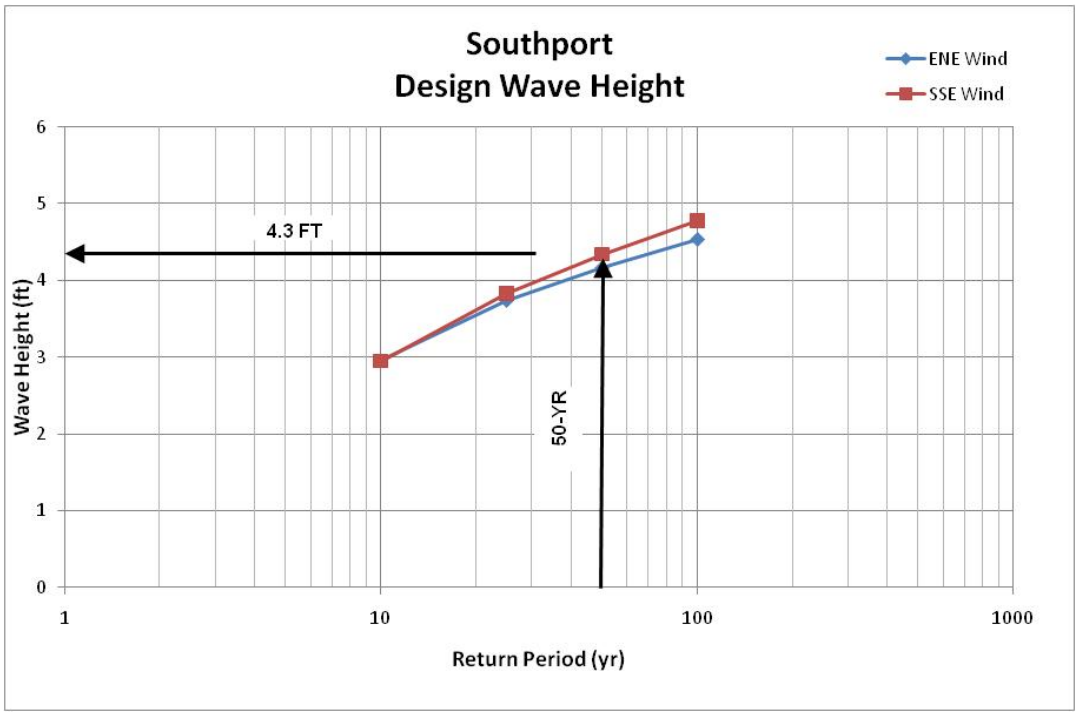


Figure 8.05 Southport Design Wave Height

From the above selected design wave height, the design armor stone for use in the shore protection alternatives was sized using the Structural Design/Hudson stability formula contained in the CEDAS-ACES computer program suite. The calculations are summarized in Table 8.02. The design stone would be granite having a unit weight of 165 pcf placed on a maximum side slope of 2H:1V. Using this design criteria results in a stable stone size of 833 lbs rounded up to 850 lbs for design purposes. A weight range of +/- 25% was selected to maintain a uniform armor stone gradation for design, resulting in a range of 600 lbs to 1,100 lbs, with 50% being equal to or greater than 850 lbs. The armor layer would consist of two units having an overall layer thickness of about 3.5 ft. The armor would be founded on a bedding layer of 5”-12” granite (8 lb-108 lb) corresponding to NCDOT Class B stone with a minimum layer thickness of 12”. The bedding layer in turn would be placed on a layer of geotextile fabric.

Table 8.02- Armor Stone Calculations

Breakwater Design Using Hudson and Related Equations

Armor unit weight (Wr):	165.000	lb/ft³
Wave height (Hi):	4.300	ft
Stability coefficient (KD):	2.000	
Layer coefficient (k delta):	1.000	
Average porosity (P):	37.000	%
Cotan of structure slope (cot theta):	2.000	
No. of units comprising thickness of layer (n):	2.000	

Single armor unit weight (w):	833.573	lb
Minimum crest width (B):	5.14764	ft
Average layer thickness (r):	3.43176	ft
No single armor units per unit surface area (Nr):	427.954	per 1000 ft²

9.0 DETAILED COST ESTIMATE FOR SELECTED ALTERNATIVE

PREFERRED ALTERNATIVE, "SLOPED ROCK REVETMENT"
SOUTHPORT, NC SECTION 14 EMERGENCY STREAMBANK
AND SHORELINE EROSION PROTECTION PROJECT

ESTIMATED PROJECT COSTS
(all costs include 25% contingency)

	1 Oct 2012 Price Level
	Prices
Direct Construction Costs	$331,000
Review/Certify Real Estate	$6,000
Lands and Damages, Permits/ ROE	$58,000
Planning, Engineering, and Design (PED)	$155,000
Supervision and Administration (9% cost to construct)	$37,000
TOTAL FIRST COST	$587,000

Cost-sharing is based on the TOTAL PROJECT COST (Fully Funded) of $596,000. This Fully Funded cost estimate includes inflation ($9,000) through the mid-point of construction, and also includes feasibility phase costs of $88,000 which are 100% Federally funded and bring TOTAL PROJECT COSTS to $684,000:

ESTIMATED FEDERAL COST:	$387,000 (65%)
ESTIMATED NON-FEDERAL COST:	$209,000 (35%)
Subtotal	$596,000
FEASIBILITY STUDY COSTS	$88,000 (100% Federal)
TOTAL PROJECT COST	$684,000

10.0 ECONOMIC COSTS FOR SELECTED ALTERNATIVE

ESTIMATED ECONOMIC COSTS FOR PROJECT ALTERNATIVES
(Oct 2012 Prices and Conditions)

Protection Alternative

TOTAL FIRST COST	$587,000	
Amortization on 1st Cost (3.75% / 50 yr)		$26,286
Annual Operation and Maintenance Costs		$ 6400
ANNUAL ECONOMIC COST		$32,686

Relocation Alternative

TOTAL FIRST COST	$1,996,000	
Amortization on 1st Cost (3.75% / 50 yr)		$99,242
Annual Operation and Maintenance Costs		$ 0
ANNUAL ECONOMIC COST		$99,242

11.0 ECONOMIC JUSTIFICATIONS FOR SELECTED ALTERNATIVE

The benefit-cost ratio (BCR) of the protection alternative is based on the comparison of the annual cost of relocation of the structure with the cost of the recommended protection alternative.

$$BCR = \frac{\text{Annual Economic Cost of Relocation Alternative}}{\text{Annual Economic Cost of Protection Alternative}}$$

$$BCR = \frac{\$99,242}{\$32,686} = 3.0$$

12.0 REAL ESTATE REQUIREMENTS

The Real Estate Report is contained in Appendix B. The report is tentative, for planning purposes only, and for use with this Final Integrated Detailed Project Report and Environmental Assessment, pending any modifications to the plans during DI phase.

The project would be a proposed Sloping Rock Revetment along 350 linear feet of erosive shoreline at a pumping station site at the intersection of West Bay Street and South Lord Street, Southport, North Carolina. The purpose of the project would be protection of the pumping

station from damage or destruction from continuing shoreline erosion at the site, under authorization of Section 14 of the Flood Control Act of 1946.

Real estate requirements should include rights to construct, maintain, repair, operate, patrol, and replace the structure and associated work. The total footprint of the revetment is approximately 0.18 of an acre. The mean high water line is at approximately the four foot contour. Of the 0.18 of an acre, 0.11 of an acre is above elevation 4 feet and 0.07 of an acre is below elevation 4 feet. Of the 0.11 of an acre above 4 foot elevation, 0.05 acres is on city owned land. The remaining 0.06 of an acre is across three privately owned parcels with each having about 0.02 of an acre impacted. The acquisition of easements by the Sponsor is needed for the 0.06 of an acre of privately owned parcels. A permit from the State of North Carolina is required for the portion of the revetment below elevation 4 feet since that is considered lands of the state. The staging area of about 0.05 of an acre will be located on city-owned land. Access to the site would be by public road. A county landfill is available for disposal of existing rubble.

No facility or utility relocations would be required for the project. No known existing Federal projects lie within the project footprint. There are no adverse environmental impacts expected from construction of the project.

The City of Southport would be the non-Federal Sponsor (NFS). The NFS must acquire all real estate interests required for the project, and would be responsible for operation and maintenance of the completed project. Title to acquired real estate would be retained by the NFS. Prior to advertisement of the construction contract, the NFS would furnish the US Government an Authorization for Entry for Construction, along with evidence of their legal authority to do so.

The non-Federal sponsor is entitled to receive credit against its share of project costs for the value of lands it provides and the value of the relocations that are required for the project except for cases in which required LER is part of the tract of land that includes the facility or structure being protected. In such cases, the NFS shall not receive credit for the value of the LER it provides that are part of the tract of land on which the facility or structure to be protected is located and are owned by either the NFS or the owner of the facility or structure when the PPA for the project is executed.

There is no known property owner opposition to the project. It is expected that real estate acquisitions would take 3 to 6 months. Estates to be used for the project are standard, requiring no special approvals. The Flood Protection Levee Easement would be used for revetment construction, and the Temporary Work Area Easement for the staging area.

Estimated real estate costs would include the land acquisition cost, relocation costs, and Federal and non-Federal administrative costs. The total real estate estimate, including 25% contingency, is $64,000 with projected inflation.

13.0 COMPLIANCE WITH ENVIRONMENTAL PROTECTION STATUTES AND EXECUTIVE ORDERS

The proposed project, construction of the Federally- and Locally-Preferred Alternative, "Sloping Rock Revetment", is in compliance with applicable Federal environmental protection statutes and Executive Orders at the current stage of planning. See Table 6.02, "Compliance of the Proposed Action with Federal Laws and Policies" for details.

14.0 SUMMARY COORDINATION, PUBLIC VIEWS, AND COMMENTS

Public and resource agency coordination was initiated by a scoping letter dated April 27, 2011, which invited comments from all private interests, along with Federal, State, and local agencies with an interest in the project. No comments were received from any private interests. Responses were received from various government agencies, and their comments, along with responses by the USACE, are found in Appendix A, "Review Comments and Responses".

15.0 PLAN IMPLEMENTATION

15.1 Non-Federal Responsibilities

The City of Southport, as stated in a letter and resolution dated October 9, 2009 (Appendix C), has expressed support of the project and has agreed to accept the role of non-Federal sponsor in event of approval of a final integrated detailed project report. The City of Southport has statutory authority under the Federal Water Resources Development Law of 1969 (G.S. 143-215.38 et. seq.) to make binding commitments to carry out the non-Federal responsibilities related to USACE projects, including making cash contributions to projects. In order to implement the Selected Alternative, the City of Southport, as non-Federal sponsor, would be responsible for the following:

1. Legal provision, without cost to the U.S. Government, of all necessary land, easements, rights-of-way, and access routes necessary for project construction and subsequent operation and maintenance. Land provisions would include:

    a. construction site to accommodate all emergency streambank and shoreline erosion protection features to be constructed, and

    b. temporary staging area of acceptable location and acreage for contractor's use during construction period.

2. Cash contribution, provided during the period of implementation, toward cost of the project totaling 35% of Total Project Cost, less value of the non-Federal sponsor's real estate contribution and in-kind services (project coordination team activities), as well as Feasibility Phase costs. The amount of cash contribution is currently estimated to be $146,000. This cash amount will vary depending on the actual real estate costs and in-

kind services. The City of Southport has stated their intent by letter dated October 9, 2009 (Appendix C), to accept the non-Federal sponsor's responsibilities as defined in a Project Partnership Agreement, should the project report be approved.

3. Funding of 100% of the cost of Annual Operation and Maintenance required to keep the project in viable condition to satisfy its design function. This funding would not be provided for initial implementation of the project, but would become a yearly responsibility of the non-Federal sponsor upon completion of the construction phase.

4. Satisfy all provisions of the Project Partnership Agreement (PPA) regarding non-Federal sponsor responsibilities in implementing the project.

15.2 Federal Responsibilities

In order to implement the Selected Alternative, the USACE would provide the Federal share of project cost, to equal project first cost less the total non-Federal share, not including Annual Operation and Maintenance expenses. The Federal share of project cost is currently estimated to be $387,000. Cost-shared Federal expenditures on any one project under Section 14 authority may not exceed a total of $1.5 million. The USACE would also provide the following:

1. Review and certification of Real Estate provisions.
2. Planning, Engineering, and Design (PED) of the project.
3. Contracting for project construction.
4. Supervision and Administration of project construction.

15.3 Work-in-Kind

Work-in-Kind is defined as work contributed by the non-Federal sponsor toward implementation of a project, in lieu of payment of a portion of the sponsor's cash contributions toward implementation of the project. In some cases, completed Work-in-Kind may be credited by the USACE to the non-Federal sponsor, resulting in a reduction of their cash contribution on behalf of the project. At this time there is no identified Work in Kind for this project..

15.4 Project Partnership Agreement (PPA)

Upon approval of a final integrated detailed project report for this Southport Section 14 project, a Project Partnership Agreement (PPA) would be executed. A PPA is a legally binding agreement between the Federal government (in this case, the USACE) and a non-Federal sponsor (in this case, the City of Southport) for construction of a water resources project, in this case, the Southport Emergency Streambank and Shoreline Erosion Protection Project. The PPA would describe the project and the responsibilities of the USACE and the City of Southport in the cost sharing and execution of project work.

15.5 Sponsor Views

The City of Southport has expressed support for this project and has agreed, by letter dated October 9, 2009, to accept the role of non-Federal sponsor in event of approval of a final detailed project report. The City of Southport's preference among the alternative plans ("Locally-Preferred Alternative") is the "Sloping Rock Revetment". Since this alternative is also the Federally-Recommended Alternative, it is considered the Selected Alternative.

16.0 RECOMMENDATIONS

Based on the evaluation and screening process, the Sloping Rock Revetment emerged as the single alternative that best meets the combined Planning Objectives of purpose and need and sustainability, and Planning Constraints of technical feasibility, environmental acceptability, and economic feasibility. Therefore, the Sloping Rock Revetment was selected as the Federally-Preferred Alternative. The City of Southport has expressed its support of the project, and is willing and capable of accepting the role of non-Federal Sponsor, as stated in their letter and resolution dated October 9, 2009. In addition, the City has expressed acceptance of the Federally-Preferred Alternative as their Locally-Preferred Alternative.

The Sloping Rock Revetment, as both Federally-Preferred and Locally-Preferred Alternative, is therefore recommended as the Selected Alternative. It is further recommended that implementation of the project proceed, with plans and specifications, execution of a PPA and construction contract, and construction of the Sloping Rock Revetment.

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