FEASIBILITY REPORT
AND
ENVIRONMENTAL ASSESSMENT

WILMINGTON HARBOR NAVIGATION IMPROVEMENTS
Appendix E - Cultural Resources

June 2014

US Army Corps of Engineers

Wilmington District

Appendix E

Cultural Resources

Contents

Assessment of Effects to Historic Properties Associated with the Proposed Wilmington Harbor Navigation Improvements at the Entrance Channel and Battery Island Turn

Proposed Project Description

The Wilmington Harbor project is a 42 to 44 foot deep draft port located in the Cape Fear River near the city of Southport in Brunswick County on the southeastern coast of North Carolina. The project requires improvements in order to address navigation inefficiencies and potential safety issues being faced by vessels currently calling on the existing Port of Wilmington. The current alignment of the entrance channel near Bald Head Island is subject to rapid and persistent shoaling and is problematic for navigation under typical wind and tidal conditions. Realignment of a portion of the entrance channel 150 feet to the west is proposed (Figure 1).

The Battery Island navigation channel turn is problematic for some container vessels under certain conditions of wind and tide. Realignment and modification of the turn is being proposed to a maximum of 350 feet to the east (Figure 1). None of the improvements in these areas would involve deepening beyond the currently authorized depths.

Area of Potential Effect (APE) and Previous Investigations

The proposed action includes channel realignment at the entrance channel near Bald Head Island and channel modification at the Battery Island Turn. The APE at the entrance channel is approximately 285 acres in size and includes the area east of channel realignment to the Bald Head Island shoreline and west of the current channel to Jay Bird Shoals (Figure 1). The APE at the Battery Island Turn is approximately 280 acres in size and includes the area east and west of the current channel at the proposed realignment to the Battery Island and Southport shorelines respectively (Figure 1).

The Lower Cape Fear River has been the subject of numerous cultural resource investigations. Eight such investigations between 1975 and 1999 occurred within the project APE. A 1975 field school directed by Gordon Watts in conjunction with the University of North Carolina at Wilmington involved bathymetric profilers and a magnetometer to locate the ironclad CSS *North Carolina* (TAR 1999). The Underwater Archaeology Unit of the North Carolina Division of Archives and History conducted a magnetometer survey at Battery Island in an effort to reconfirm the wreck's location. At least six magnetic targets were recorded west of the island during the survey (UAU 1980).

A 1993 remote sensing survey and diver target assessment was conducted at the Bald Head entrance channel (Figure 2). Three targets were recorded with the current project's APE. None of the three targets were recommended for further investigation (TAR 1993).

Eleven targets were identified during a 1995 remote sensing survey and diver target assessment investigation along the Smith Island Channel (Figure 2). Signatures of four of the eleven targets indicated potentially significant cultural resources. Diver assessment revealed the four targets were associated with an abandoned power cable (TAR 1995).

A comprehensive survey of the Northeast Cape Fear and Cape Fear Rivers was undertaken by the North Carolina Underwater Archaeology Unit in 1993 and 1994. Because of the large study area, investigations were limited to twelve priority areas identified as having a high potential for containing submerged cultural resources. Two of these study areas, Priority Areas 1 and 2, are within the current project's APE (Overton et al. 1996). Priority Area 1 was located on the western and southern sides of Battery Island. The survey area extended from the east side of the channel prism to the high-water mark on Battery Island (Figure 3). Five of ten targets located within Priority Area 1 required diver investigation. Targets 1-C and 1-D were identified as the Civil War ironclad CSS *North Carolina* (0052CFR). Target 1-E was believed to be the remains of the *Belfast* (0081CFR), an early-twentieth century schooner barge. Target 1-G was identified as a boiler (0085CFR). Target 1-J was associated with the remains of a late-nineteenth/early-twentieth century barge (0038CFR) (Overton et al. 1996). Priority Area 2 encompassed the west channel toe the high-water mark on the west bank at the Southport waterfront (Figure 3). Two targets were identified in the current project's APE as modern debris (Overton et al. 1996).

The *North Carolina* was damaged in 1995 when dredge equipment was staged at the wreck site. The Corps contracted Tidewater Atlantic Research, Inc. (TAR) to identify and assess the extent of damage to the wreck. TAR's 1996 investigation revealed the vessel remains had sustained significant damage but retained enough integrity to allow comprehensive documentation of the wreck's archaeological data (TAR 1999). Documentation of the *North Carolina* was carried out in June and July of 1997 (TAR 1999).

Mid-Atlantic Technology and Environmental Research (MATER) identified ten targets within or near the current APE during a remote sensing survey at the entrance channel near Bald Head Island (1999a). A diver assessment of the ten targets revealed nine were modern debris and one (Target 1-14) was a historic shipwreck (Figure 2). The wreck was described as appearing to be a mid- to late-nineteenth century sailing vessel almost entirely buried. A portion of the wreck was scattered over an area 50 feet wide and 140 feet long and oriented N/NE by S/SW. MATER (1999b) recommended a no impact zone 500 feet in radius around the wreck.

Project Effects

There are no known historic properties east of the proposed entrance channel realignment within the project APE. One historic property, a mid- to late-nineteenth century shipwreck (Target 1-14), lies approximately 730 feet west of the current entrance channel prism (Figure 2). Realignment of the channel 115 feet to the west is proposed at this location. The top of slope of the proposed realignment would increase the area of disturbance 100 feet for a total of disturbance area of 215 feet west of the present channel prism. The proposed project action

would occur outside the 500 foot no impact zone for Target 1-14 and no effects to historic properties are anticipated for the entrance channel realignment.

Three shipwrecks and one engine boiler, state site numbers 0038CFR, 0052CFR, 0081CFR, and 0085CFR respectively, are within the APE east of the proposed realignment at the Battery Island Turn (Figure 3). The barge (0038CFR) south of Battery Island is approximately 730 feet from the current channel prism. The proposed realignment would move the channel prism 250 feet closer, placing the top of slope approximately 430 feet from the wreck. The remains of the Confederate ironclad *North Carolina* (0052CFR) lie approximately 715 feet from the current channel prism. The proposed realignment would move the current channel prism 30 feet to the east and place the top of slope approximately 625 feet from site 0052CFR. The *Belfast* (0081CFR) is located approximately 865 feet from the existing channel prism. The proposed channel realignment would move the current channel prism 350 feet towards Battery Island and place the top of slope of the approximately 460 feet from site 0081CFR. No project effects from channel realignment are expected for sites 0038CFR, 0052 CFR, 0081CFR, and 0085CFR based on the distances between disturbance areas and the four sites.

The current channel lies within the Southport Historic District approximately 1,300 to 1,650 feet southwest of the Southport waterfront where three historic structures, Fort Johnston (BW004), Avery House (BW017), and the Quarantine Office (BW144) have southern property boundaries terminating at the river's edge (Figure 4). The proposed realignment would move the channel 100 feet closer at one point in the outside turn before tapering to the current alignment 1,600 feet to the north (Figure 3). Modification of the current western channel slope would not be required due to the depth to channel bottom. No effects to historic properties along the Southport waterfront are anticipated based on the distance of the current channel from the Southport waterfront, the slight realignment of the channel, and negligible increase in ship-induced waves at the Battery Island turn (see Appendix A. for Desktop Analysis of Ship-Induced Waves).

The existing Ocean Dredged Material Disposal Site would be used for material disposal. No project effects on historic properties are expected for dredged material disposal.

In consultation with the SHPO, a determination of no adverse effects on historic properties is anticipated for the proposed improvements to the navigation channel at Bald Head Island and Battery Island. Contractors will be made aware of areas of avoidance to be determined in consultation with the SHPO. Should unknown cultural, historic, or archaeological material be encountered during project implementation, work in that area will cease and the Wilmington District Archaeologist and the Underwater Archaeology Branch (UAB) at Kure Beach will be notified immediately. No work in the area of any unanticipated find will resume until cultural resource investigation and SHPO consultation has been completed.

References Cited

Mid-Atlantic Technology and Environmental Research (MATER)

1999a Phase 1 Remote Sensing Archaeological Survey: Proposed Cape Fear River Entrance Channel Alternatives, Ocean Dredged Material Disposal Site, and Navigation Channels Near Southport, NC.

1999b Underwater Archaeological Identification Survey at the Cape Fear River Entrance Channel Alternatives, Ocean Dredged Material Disposal Site, and Navigation Channels Near Southport, NC. Submitted to U.S. Army Corps of Engineers Wilmington District Office, Wilmington, NC.

Overton, Glenn, Richard Lawrence and Claude Jackson III

1996 The Cape Fear – Northeast Cape Fear Rivers Comprehensive Study: A Maritime History and Survey of the Cape Fear and Northeast Cape Fear Rivers, Wilmington, North Carolina, Volume 2, Submerged Cultural Resource Survey. Underwater Archaeology Unit, prepared for the NC Dept of Cultural Resources and the University of NC at Wilmington and U.S. Army Corps of Engineers, Wilmington District.

Tidewater Atlantic Research (TAR)

1993 A Submerged Cultural Resource Survey for Bald Head Shoal Channel Vicinity of Wilmington, North Carolina. Submitted to U. S. Army Corps of Engineers Wilmington District Office, Wilmington, NC.

1995 An Archaeological Remote Sensing Survey and Diver Investigation at Smith Island Channel, Cape Fear River, Wilmington Harbor, NC. Submitted to Environmental Resources Section, U. S. Army Corps of Engineers Wilmington District Office, Wilmington, NC.

1999 Underwater Archaeological Documentation of the Remains of the Ironclad "CSS North Carolina, Brunswick County, North Carolina. Submitted to U. S. Army Corps of Engineers Wilmington District Office, Wilmington, NC.

Underwater Archaeology Unit (UAU)

1980 Magnetometer Survey of Battery Island and the CSS North Carolina Wreck Site. Field notes on file North Carolina Division of Archives and History, Underwater Archaeology Unit, Kure Beach, NC.

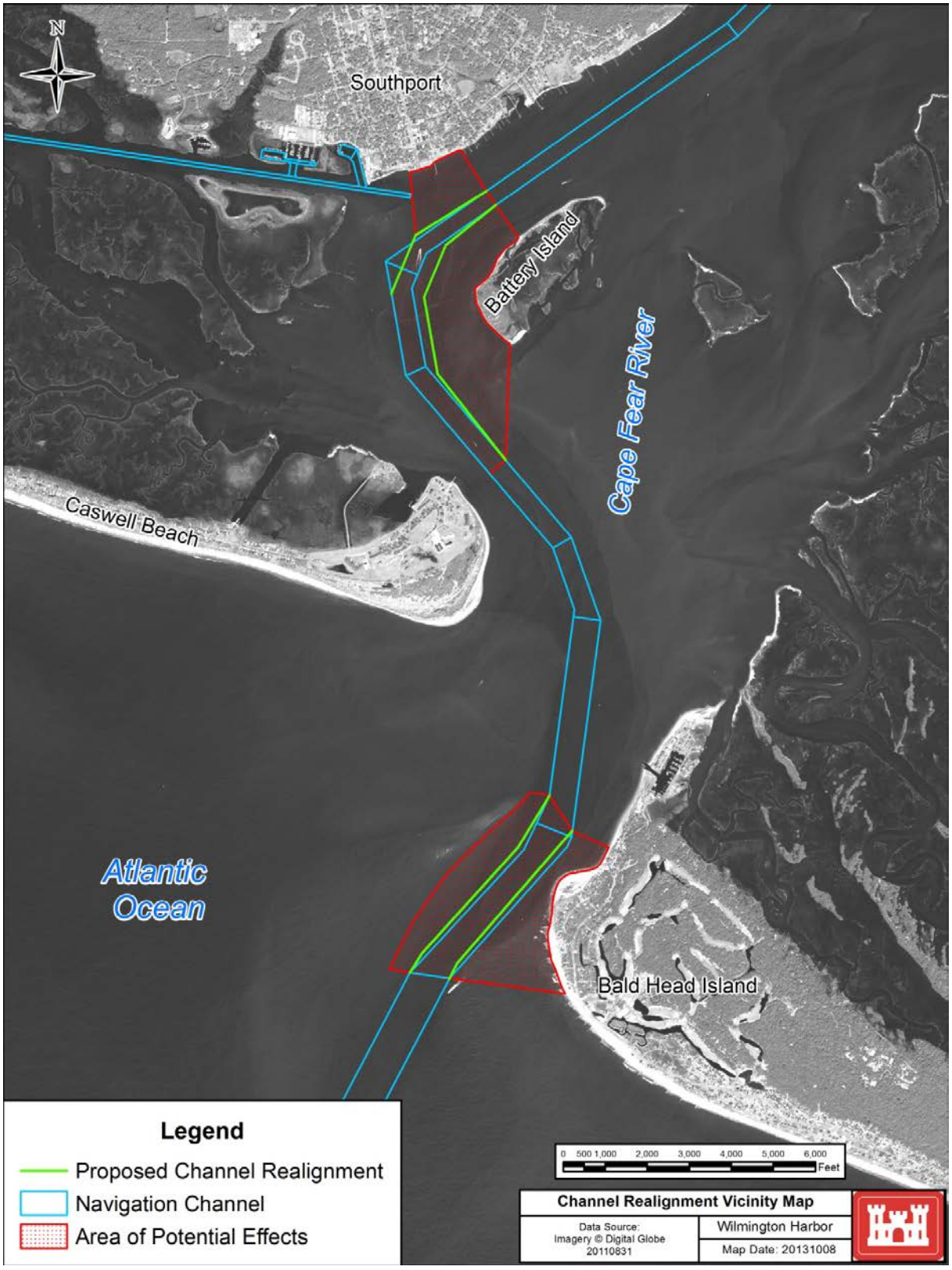

Figure 1. Project Vicinity Map and Area of Potential Effects

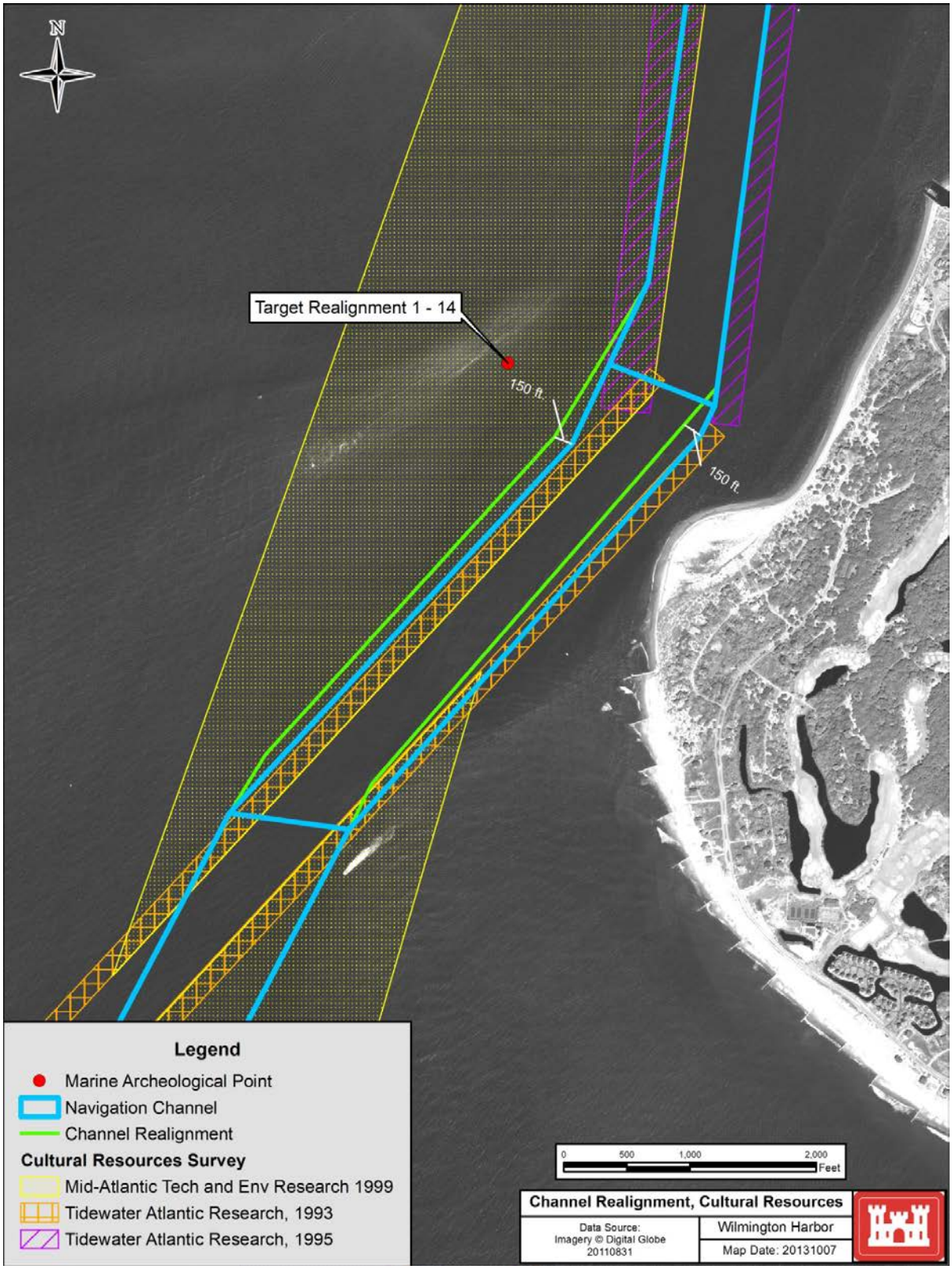

Figure 2. Entrance Channel Surveys and Target 1-14 Locations

Figure 3. Battery Island Turn Surveys and Cultural Resource Locations

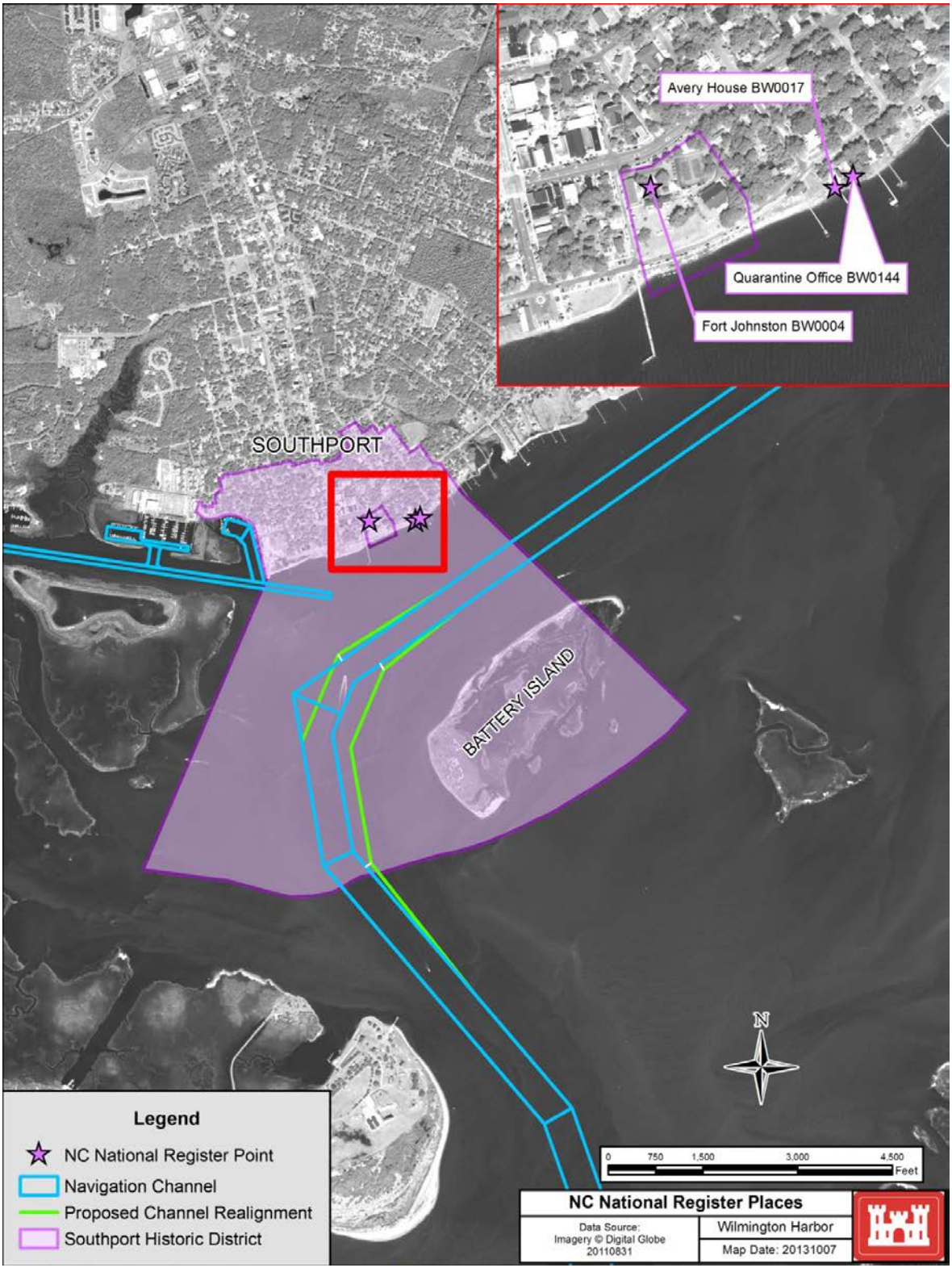

Figure 4. Southport Historic District

Attachment 1. Desktop Analysis of Ship Induced Waves in the area of Proposed Improvements in the Battery Island Channel

A basic desktop analysis was conducted to investigate potential changes in ship induced waves in the area of the proposed Battery Island turn widening improvements. Literature referenced:

- *Ship-Induced Waves and Sediment Transport in Gota River*, Jonas Althage, 2010
- *An empirical model for ship-generated waves*, D.L. Kriebel and W.M. Seelig, 2005
- EM 1110-2-1100 Part 2 (*USACE Coastal Engineering Manual*)

General factors which affect the wave system are:

1. Ship dimensions and hull design to include length, width and slenderness/bluntness
2. Ship draught – affects displacement of water within the channel
3. Ship speed through the water – major wave generating factor - ship speed is not forecast to change
4. Depth and width of river/channel – only width is proposed to be changed
5. Distance from the sailing line – widener allows ship to sail closer to shoreline

Note that a project purpose for the widened channels at Battery Island is to allow the ***existing*** ship fleet to pass thru the Battery Island turns without waiting for a high tide. Factors 1 through 3 above do not change with or without the widener project. The river pilots have informed the District that the proposed improvements will not increase the ship's speed, factor 3, through the turn. Only factors 4 and 5 will change slightly since a widening is proposed (no deepening is proposed) and the widener can allow the ship to sail about 350 feet closer to Battery Island or about 100 feet closer to the waterfront at the town of Southport.

The existing ship fleet includes both large vessels such as the 950' by 106' container ship used for harbor geometric design (design vessel) and many smaller vessels such as tankers and bulk haulers (500' to 700' long by 106' width). The existing ship fleet is forecast to call with or without the improvements to Battery Island turn. The shorter tankers and bulk haulers generate larger waves than the larger design vessel.

The ***existing*** ship fleet forecast includes likely transits from a Generation 1 Post-Panamax vessel which has the dimensions of 953' length and 131' width. This size of vessel was analyzed as well. The shorter tankers and bulk haulers generate larger waves than the Gen 1 Post-Panamax ship.

Ship speed through the water has a major affect on the maximum wave height generated. Using information requested from the US Coast Guard, ship position data was analyzed for a 2 year

period to determine average speed in the area of Battery Island. The data was filtered to include only ships with maximum draughts of more than 30 feet that passed thru the Battery Island channel area. The average speed of the nearly 2,000 data points is 10.7 knots. A speed of 11 knots was used for wave height calculations.

A conservative assumption is that ships could sail 1) up to 100' closer to the Southport waterfront and 2) up to 350' closer to the Battery Island shore due to the widening. It is estimated that shorter distance would increase the maximum wave heights by about 16% on Battery Island and only 2% along the Southport waterfront. However, a more likely scenario is that the ships will continue to sail as close to the revised channel centerline as possible, resulting in 1) effectively no closer distance to Southport waterfront and 2) up to about 320' closer to Battery Island. The likely scenario results in 1) no change to ship waves at Southport waterfront since revised channel centerline is no closer to shore, and 2) maximum wave heights on the southern shore of Battery Island of about 14% higher due to 320' shift of centerline toward the island shore. For these calculations, a 500' tanker ship, a 950' container ship and a 953' Gen 1 Post-Panamax ship were considered at speed of 11 knots with the greatest increase in wave height calculated to be just less than 1.5 inches. This small of an increase is deemed negligible.

Deep-draft vessels sailing in confined channels with relatively shallow banks create long period surge waves (related to the vessel drawdown or squat) and these waves are more pronounced than the short period waves at the bow and stern. Squat (or drawdown) for a 950' by 106' design vessel in a confined channel will reduce if the channel is widened. Calculations show a range of 15% to 40% ***reduction*** in the ship squat for 106' wide vessels after widening the channel. For the wider, Gen 1 Post-Panamax ship (953' x 131'), the squat is reduced about 5% to 25%. Only reductions in ship squat are expected with the widened channel. The reduction in ship squat with a widened channel would point to a reduced surge wave generated by the vessels as compared to the existing channel.

In conclusion, the ship-induced waves along the Southport shoreline are not expected to be significantly changed from the existing condition by implementing the proposed channel wideners. The southern shore of Battery Island could experience somewhat higher ship waves since the channel is moved closer (increase of about 14%), however for existing vessel speeds, a 14% wave height increase is less than 1.5 inches and is considered negligible. The river pilots have informed the District that the proposed improvements will not increase the ship's speed.

Although larger vessels are expected to call to Wilmington's port (Gen 1 Post Panamax) with or without the project, these are not expected to generate larger waves in the area of the Battery Island turn improvements.

Attachment 2. Letter TO SHPO and Response

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF

December 2, 2013

Environmental Resources Section

Ms. Ramona Bartos
Administrator and Deputy
State Historic Preservation Officer
North Carolina Division of Archives and History
4617 Mail Service Center
Raleigh, North Carolina 27699-4617

Dear Ms. Bartos:

Enclosed for your review are two copies of documentation of our assessment of adverse effects to historic properties associated with proposed Wilmington Harbor navigation improvements. Our finding of no adverse effect is based on coordination with the Underwater Archaeology Branch, a review of past archaeological investigations and navigation improvements within the area of potential effects, and application of criteria of adverse effects.

Pursuant to Section 106 of the National Historic Preservation Act, I am seeking your concurrence with my finding of no adverse effect to historic properties for proposed Wilmington Harbor navigation improvements.

If you have any questions about this project or our finding, please contact me at (910) 251-4505 or email elden.j.gatwood@usace.army.mil, or Mr. John Mayer, Archaeologist, Environmental Resources Section, at (910) 251-4696 or email john.l.mayer@usace.army.mil.

Sincerely,

Elden J. Gatwood
Chief, Planning and Environmental Branch

Enclosures

North Carolina Department of Cultural Resources
State Historic Preservation Office
Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

February 4, 2014

John Mayer
US Army Corps of Engineers
Environmental Resources Section
69 Darlington Avenue,
Wilmington, NC 28403

RE: Wilmington Harbor Navigational Improvements Project Proposal,
New Hanover and Brunswick Counties, ER 12-1152

Dear Mr. Mayer:

Thank you for your December 2, 2013, letter concerning the above-referenced undertaking.

We have reviewed the proposed project description for channel realignment at the Cape Fear River entrance channel near Bald Head Island and channel modification at the Battery Island Turn.

All of the proposed changes fall within areas previously surveyed for submerged cultural resources. The work should therefore have no impact on unknown submerged resources. As noted in the numerous survey reports, there are several known historic shipwrecks within the APE that must be considered.

The realignment of the entrance channel 115 feet west, away from Bald Head Island, places the top slope of the channel prism within 515 feet of an identified but unassessed mid-late 19th century sailing vessel. This distance maintains the recommended minimum 500 foot no impact buffer zone for this site.

The modification/realignment of the turn at Battery Island moves the channel between 250 and 350 feet closer to three shipwreck sites. Realignment places the maximum extent of the channel prism approximately 430 feet from 38CFR (late 19th - early 20th century barge), 625 feet from 52CFR (CSS *North Carolina*), and 460 feet from 81CFR (*Belfast*, early 20th century schooner barge). Given the channel depth, prism slope, and angles of the turn it has been determined that the realignment maintains an adequate cultural buffer to protect the nearby historic wrecks. The change in alignment is minor with respects to historic terrestrial sites (BW4, BW7, and BW144) within the Southport National Register Historic District. Given the distance from the Battery Island turn to the Southport shoreline, the undertaking should have no significant impact on these resources

Extreme care should be taken during all dredging operations for channel realignment and all personnel should be aware of restrictive buffer zones around these shipwreck sites. CSS *North Carolina* sustained significant damage in 1995 when dredge equipment was staged over the wreck site. Continued close collaboration with professional staff at the Underwater Archaeology Branch is recommended as the project proceeds to insure there are no adverse impacts to potentially significant cultural resources.

Location: 109 East Jones Street, Raleigh NC 27601 **Mailing Address:** 4617 Mail Service Center, Raleigh NC 27699-4617 **Telephone/Fax:** (919) 807-6570/807-6599

These comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, North Carolina legislation (G.S. 121-22 to 28, Article 3), and the Abandoned Shipwreck Act of 1987 (P.L. 100-298).

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

Attachment 3. Letter to Tribes and Single Response

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO ATTENTION OF

October 17, 2013

Environmental Resources Section

Honorable George Blanchard, Governor
Absentee-Shawnee Tribe of Indians of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74801

Dear Governor Blanchard:

The U.S. Army Corps of Engineers (USACE), Wilmington District is currently studying potential improvements to the Wilmington Harbor project, a 42- to 44-foot-deep draft port located in the Cape Fear River near Wilmington on the southeastern coast of North Carolina. The project requires improvements in order to address navigation inefficiencies and potential safety issues being faced by vessels currently calling on the existing Port of Wilmington. The current alignment of the entrance channel near Bald Head Island (Area 1, Figure 1) is subject to rapid and persistent shoaling and is problematic for navigation under typical wind and tidal conditions. The Battery Island navigation channel turn (Area 2, Figure 1) is problematic for some container vessels under certain conditions of wind and tide. The current anchorage/turning basin (Area 3, Figure 1) dimensions are not adequate to properly accommodate the turning of some of the larger container vessels currently calling at the port. None of the improvements in these areas would involve any deepening beyond the currently authorized depths.

Alternatives to address these problems will be evaluated during a cost-shared feasibility study. This detailed evaluation would include examining multiple alternatives in order to address the issues defined above. The State of North Carolina supports this project and signed a Feasibility Cost Sharing Agreement on April 25, 2012, to participate in the cost-shared feasibility study.

The USACE is consulting with the state's Underwater Archaeology Branch to determine effects to known and suspected underwater cultural resources (shipwrecks) within the proposed project areas. This letter initiates project-specific consultation between the USACE and the Absentee-Shawnee Tribe of Indians of Oklahoma and to identify any issues of importance to your tribe. We welcome any comments you may have pertaining to the project.

Copies of this letter have been sent to the following tribes:

Catawba Indian Nation
Cherokee Nation
Shawnee Tribe
Tuscarora Nation
United Keetoowah Band of Cherokee Indians

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A response within 30 days would be appreciated, should you have concerns about this project and/or wish to be a consulting party. To facilitate discussion between the USACE and the Absentee-Shawnee Tribe of Indians of Oklahoma on these matters, please forward the name and method of contacting your tribal representative or preferred point of contact.

If you have any questions, please feel free to contact me at (910) 251-4501. You may also contact Mr. John Mayer, Archaeologist, at (910) 251-4696 or at john.l.mayer@usace.army.mil. We look forward to working with you.

Sincerely,

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

Enclosure

From: Lisa LaRue-Baker [lisalaruekeyboard@yahoo.com]
Sent: Thursday, November 07, 2013 1:05 PM
To: Mayer, John L SAW
Cc: verna; eberry@unitedkeetoowahband.org
Subject: [EXTERNAL] Improvements: Wilmington Harbor, NC

The United Keetoowah Band of Cherokee Indians in Oklahoma has reviewed your project under Section 106 of the NHPA, and at this time, have no comments or objections. However, if any human remains are inadvertently discovered, please cease all work and contact us immediately.

Thank you,

Lisa C. Baker
Acting THPO
United Keetoowah Band of Cherokee Indians in Oklahoma
PO Box 746
Tahlequah, OK 74465

c 918.822.1952
ukbthpo-larue@yahoo.com

Please FOLLOW our historic preservation page and LIKE us on FACEBOOK <https://www.facebook.com/pages/United-Keetoowah-Band-of-Cherokee-Indians-in-Oklahoma-Historic-Preservation/199767846834850>