

1. Administrative Details

Proposal Name: Brunswick Harbor Improvements, Glynn County, Georgia

by Agency: Georgia Ports Authority

Locations: GA

POC Name:

POC Phone:

POC Email:

Date Submitted: 09/23/2015

Confirmation Number: 8cd3d4eb-cba5-4b91-9827-5a97f8be5f9e

Supporting Documents

File Name	Date Uploaded
GPA Brunswick letter of support.pdf	09/23/2015
Brunswick Letter Report 7-21-11.pdf	09/23/2015

2. Provide the name of the primary sponsor and all non-Federal interests that have contributed or are expected to contribute toward the non-Federal share of the proposed feasibility study or modification.

Sponsor	Letter of Support
Georgia Ports Authority(Primary)	The Georgia Ports Authority supports the modification of the current federal navigation channel in Brunswick Harbor, Glynn County, Georgia, to address two areas identified by the Brunswick Harbor Pilots as problems for vessel maneuverability. The first area of concern is the area at the intersection of Cedar Hammock Range and the Brunswick Point Range. The turn in this area needs to be widened to accommodate the larger ships that are calling in Brunswick sooner than anticipated by the Brunswick pilots. The second area with which the Pilots are concerned is at the South Brunswick River Turning Basin, the full use of which is severely impeded. The Georgia Ports Authority is willing to serve as the non federal sponsor should the study for the modifications proceed and is capable of fulfilling the financial obligations associated with the study.

3. State if this proposal is for a feasibility study, a modification to an authorized USACE feasibility study or a modification to an authorized USACE project. If it is a proposal for a modification, provide the authorized water resources development feasibility study or project name.

[x] Modification to an Authorized USACE Project : Brunswick Harbor, Georgia

4. Clearly articulate the specific project purpose(s) of the proposed study or modification. Demonstrate that the proposal is related to USACE mission and authorities and specifically address why additional or new authorization is needed.

This project proposes to make changes to the existing federal navigation project in Brunswick Harbor, Glynn County, Georgia. The purpose of this proposed project is (1) to widen the existing bend widener in the federal navigation channel at the intersection of Cedar Hammock and Brunswick Point Cut Ranges and (2) to extend the northwest side of the existing South Brunswick River Turning Basin. These navigation features are designed for vessels with a maximum length of 660 feet, a maximum design beam of 106 feet and the authorized design draft of 36 feet. However, when the large vessels slow to maneuver turns such as the bend at Cedar Hammock and Brunswick Point Cut Ranges or in the turning basin, safety and handling concerns exist in these confined areas and are amplified in adverse current and winds.

These modifications were evaluated as part of a Letter Report for Small Navigation Projects under the Continuing Authorities Program (CAP), Section 107 by the Savannah District, USACE, in July 2011. While the letter report identified a federal interest in the project, it recommended terminating the study under CAP, Section 107, as the construction costs of widening the two areas of concern exceeded the Federal cost limit at that time for Section 107 projects of \$7,000,000. The Savannah District recommended that this study be pursued as a specifically-authorized study.

5. To the extent practicable, provide an estimate of the total cost, and the Federal and non-Federal share of those costs, of the proposed study and, separately, an estimate of the cost of construction or modification.

	Federal	Non-Federal	Total
Study	\$1,500,000	\$1,500,000	\$3,000,000
Construction	\$24,830,000	\$13,370,000	\$38,200,000

Explanation (if necessary)

The estimated costs above are drawn from the Section 107 Letter Report completed by the Savannah District, USACE in July 2011. The Rough Order of Magnitude (ROM) cost included dredging cost, mobilization cost and a 25 percent contingency cost for a 30-inch sand dredge. The estimated costs for the improvements at Cedar Hammock and Brunswick Point Cut Ranges and South Brunswick River Turning Basin were \$8.9 million and \$7.4 million, respectively. However, the letter report stated that there was certainty that some rock will be present, so a 30-in rock dredge was used to estimate the cost of the alternatives. At Cedar Hammock Range and South Brunswick, the estimated first cost construction ROM estimate was \$26.2 million and \$12 million respectively. To improve both locations, the total project first ROM estimate was \$38.2 million.

6. To the extent practicable, describe the anticipated monetary and nonmonetary benefits of the proposal including benefits to the protection of human life and property; improvement to transportation; the national economy; the environment; or the national security interests of the United States.

The estimated monetary benefits described here are drawn from the Section 107 Letter Report completed by the Savannah District, USACE in July 2011.

“Most of the economic benefits of the with-project condition can be derived by transportation cost savings. For example, if larger vessels call to the port, that would result in fewer vessels providing the same amount of cargo, and ultimately would reduce the unit costs of the vessels. Additionally, some economic benefits of the with-project condition can also be derived from reduced delays.”

With a 50-year period of analysis at an interest rate of 4.125, the average annual transportation cost is estimated at \$1.7 million. A transportation cost savings benefit caused by a reduction in unit cost by using larger vessels can be realized in the future with project condition. Approximately 500 vessels travel through the channel per year. In terms of the number of vessels, a reduction in calls of about 1.2 percent would have to be realized in the future with project condition to justify a \$1.7 million average annual construction cost. With an estimated cost of \$300,000 per call, it would take 6 less calls per year to provide an annual transportation cost savings benefit in the amount of \$1.8 million to economically justify this project.

In addition, benefits from reduced delays for the 500 calls per year would likely be realized. Using an average hourly operating cost of \$1,500, if each one of these calls experience a half-hour less delay in the future with-project condition versus the future without-project condition, this would provide an additional \$375,000 in average annual benefits.”

Additionally, the proposed channel modifications would result in improved safety for the vessels and better environmental protection. Car carriers, which constitutes the majority of the vessels that call in Brunswick, are very susceptible to wind.

7. *Does local support exist? If ‘Yes’, describe the local support for the proposal.*

Yes

Local Support Description

The modifications are supported by the Georgia Ports Authority. Additionally, the Brunswick Harbor Pilots have pursued these modifications and support the project as well.

8. *Does the primary sponsor named in (2.) above have the financial ability to provide for the required cost share?*

Yes

Primary Sponsor Letter of Support

(As uploaded)

GPA Brunswick letter of support.pdf



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P.O. Box 2406
Savannah, GA 31402
USA

James C. McCurry, Jr.
*Senior Director of Administration
and Governmental Affairs*

Email: jmccurry@gaports.com
Call Direct: 912.963.5562
Fax: 912.966.3615

September 23, 2015

Mr. Steve Stockton
Director of Civil Works
United States Army Corps of Engineers
441 G Street, NW
Washington, DC 20314

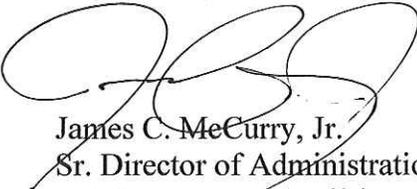
RE: Brunswick Harbor Navigation Channel - Glynn County, GA

Dear Steve,

Please accept this letter of support for modifications to the Brunswick Harbor Federal Navigation Channel in Glynn County, Georgia. As the largest port terminal operator at the Port of Brunswick, the Georgia Ports Authority is acutely aware of the current and future navigation restrictions imposed by the existing Federal Navigation Channel in Brunswick as newer, larger, more efficient vessels utilize the rapidly growing port. Through discussions with the Brunswick Pilots and other experts, it is apparent that significant safety and operational improvements would be gained if modifications are made to the South Brunswick River Turning Basin and the Cedar Hammock Bend Widener.

The Georgia Ports Authority respectfully requests that your office favorably consider these modifications in order that important safety and operational efficiencies can be enjoyed and in order that the substantial historical investments by the Federal government can be maximized.

Respectfully Submitted,



James C. McCurry, Jr.
Sr. Director of Administration
and Governmental Affairs

www.gaports.com

+ Port of Savannah
+ Port of Brunswick

Additional Proposal Information

(This is as uploaded, a blank page will show if nothing was submitted)

Brunswick Letter Report 7-21-11.pdf



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

JUL 21 2011

Executive Office

Mr. Curtis Foltz
Executive Director
Georgia Ports Authority
Post Office Box 2406
Savannah, Georgia 31402

Dear Mr. Foltz:

The Savannah District, United States Army Corps of Engineers, (USACE) is writing in response to the enclosed letter dated February 22, 2008, regarding two locations in the Brunswick Harbor where larger ships are currently experiencing difficulties with vessel maneuverability. The letter requested USACE's involvement in addressing the Brunswick Harbor Pilots' (pilots) concerns under Section 107 of the Continuing Authorities Program (CAP).

USACE performed an initial study on the areas of concern as documented in the enclosed letter report. Alternatives were identified that included widening the two areas to different widths, including widths proposed by the pilots. Rough cost estimates have been identified in the letter report using a sand dredge and a rock dredge for each alternative, the latter being a more expensive route that would be required if rock exists in the proposed widening areas. Based on our most recent borings of the channel, there is potential that a rock dredge would be needed; however, more borings will be needed to verify this assumption. The rough cost estimate to widen both areas ranges from \$10.7 million to \$43.4 million. USACE recommends terminating the study under CAP, Section 107, as the construction costs of widening the two areas of concern exceed the Federal cost limit for Section 107 projects of \$7,000,000.

In summary, the letter report (1) identified water resource problems that warrant Federal investigation, (2) identified a Federal interest in solving those ongoing deep-draft navigation problems, (3) except for estimating the costs of the feasibility phase, fulfilled the requirement of a Section 905(b) Analysis for a specifically authorized study, and (4) determined that the Georgia Ports Authority is interested in serving as a non-Federal study sponsor. The Savannah District believes that this investigation should transition into the feasibility phase under a specific authorization.

Upon receipt of your concurrence of our recommendation to terminate the study under Section 107, we will send the report to the USACE South Atlantic Division Office in Atlanta to

complete the closeout of this study. If you have any further questions, please contact Ms. Priya Desai, Project Manager, at 912 652-5214 or Mr. Alan Garrett, Chief, Civil Works Programs and Project Management, at 912-652-5172.

Sincerely,

A handwritten signature in black ink that reads "Jeff M. Hall". The signature is written in a cursive style with a large, stylized initial "J".

Jeffrey M. Hall
Colonel, US Army
Commanding

Enclosures



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DE
PLI

Doug J. Marchand
Executive Director

February 22, 2008

Colonel Edward J. Kertis, Jr., District Engineer
U.S. Army Corps of Engineers, Savannah District
Attention: CESAS-PD
Post Office Box 889
Savannah, Georgia 31402-0889

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OC
5:3

Dear Colonel Kertis:

The Georgia Ports Authority would like to bring to your attention two areas in the Brunswick Harbor identified by the Brunswick Pilots as problems for vessel maneuverability. The first area of concern is the area around turning buoy number 24 at the intersection of the Cedar Hammock Range and the Brunswick Point Range. The turn in this area needs to be widened to accommodate the larger ships that are calling in Brunswick sooner than was anticipated by the Brunswick Harbor Deepening Study. The second area with which the Pilots are concerned is located at the Colonels Island turning basin where the South Brunswick River and the Turtle River converge. The northern side of the South Brunswick River extends out towards the basin and severely impedes the full use of the turning basin.

I request that the U.S. Army Corps of Engineers, Savannah District, undertake an investigation of the two areas mentioned above located in Brunswick Harbor, Georgia, under the authority of Section 107 of the River and Harbor Act of 1960. The Georgia Ports Authority is willing to serve as the study sponsor, dependent upon the project scope and costs as will be determined by the Section 107 study requested within this letter.

I understand that the study would be 100 percent Federally funded to the limit of \$100,000. If the total cost of the study exceeds \$100,000, I understand that remaining study costs will be shared equally between the Corps and the Georgia Ports Authority. The Authority is capable of fulfilling our financial obligations should the Authority agree to proceed as the local sponsor for any project resulting from this Section 107 study; in general, providing a minimum of 20 percent of the construction cost for the general navigation facilities including furnishing lands, easements, rights-of-way, relocations, dredge material disposal areas, and berthing and fleeting areas. The Authority is also aware that both the Corps and the Authority responsibilities will be delineated in a Project Cooperation Agreement, which both parties will execute before any project construction commences.

Very truly yours,

Doug J. Marchand

Encl. 3

**Letter Report for
Small Navigation Projects
Continuing Authorities Program Section 107**

**Brunswick Harbor Improvements
Glynn County, Georgia
(P2 #152138)**

PROJECT AUTHORIZATION:

Brunswick Harbor Improvements, Brunswick, Glynn County, GA Small Navigation Improvement Study (Study), P2 #152138 decision document developed under Section 107, *River and Harbor Act of 1960*, as amended:

Section 107- Navigation Improvements is authorized by the River and Harbor Act of 1960 as amended and authorizes the US Army Corps of Engineers (Corps) to study, adopt, construct and maintain navigation projects. This is a Continuing Authorities Program which focuses on water resource related projects of relatively smaller scope, cost and complexity. Unlike the traditional Corps' civil works projects that are of wider scope and complexity, the Continuing Authorities Program is delegated authority to plan, design, and construct certain types of water resource and environmental restoration projects without specific Congressional authorization. The Federal share of costs for any one project may not exceed \$7,000,000.

In the event this project is pursued under a Section 107 authority, the cost share will be 65% Federal and 35% non-Federal sponsor. Additionally, the non-Federal sponsor is required to pay for 100% of all costs that exceed the \$7,000,000 maximum federal expenditure.

NON-FEDERAL SPONSOR:

The potential sponsor, Georgia Ports Authority (GPA), understands the study and cost-sharing principles as outlined in the applicable model Feasibility Cost Share Agreement and model Project Partnership Agreement.

DESCRIPTION OF THE PROJECT:

The Brunswick Harbor Pilots (Pilots) expressed concern to GPA over difficulty in maneuvering large vessels in the following two areas of the channel: (1) the bend widener at the intersection of the Cedar Hammock and the Brunswick Point Cut Ranges in the vicinity of Coast Guard Buoy 24, and (2) the South Brunswick River Turning Basin where the South Brunswick River and Turtle River converge. Through the enclosed letter (Enclosure 1) dated 22 February 2008, GPA requested that the Corps' Savannah District identify and implement solutions to the navigation problems identified by the Pilots.

Problem and Opportunity Statement

The existing bend widener at the intersection of Cedar Hammock and Brunswick Point Cut Range and the width of the South Brunswick River Turning Basin near Colonel's Island Docks are designed for vessels with a maximum length of 660 feet, a maximum design beam of 106 feet (width) and the authorized design draft of 36 feet (depth). The effect of both wind and current (magnitude and direction) on large vessels is amplified when vessels slow to maneuver turns. Safety and handling concerns exist in these confined areas even without adverse current and winds. Based on information that has been provided by the Brunswick Pilots, both wind and current affect the set (the depth of the vessel sitting in the water) and drift (effect of wind pushing the vessel out of the intended path) of a large vessel even while traveling at a normal speed. This is amplified in turns or at very low speeds. Wind direction is typically less of a factor. However, wind velocity is a concern for high profile vessels. The prevailing winds are NE in the winter season and these are cause for concern. NE storms can last days or longer. Other seasonal high wind velocity conditions also affect ship navigation. There are also hydrodynamic effects on large vessels as they make way in narrow channels. These concerns have led to an agreement between the pilots and shipping lines to move vessels through those areas only when there is high water and low current. These conditions are a concern for the existing design vessel as well as larger vessels using the channel.

At the South Brunswick River Turning Basin, approximately twelve percent of the current fleet exceeds the design vessel length. The percentage of this size within the fleet is expected to grow in the near future, as well as the number of vessel calls. This information was provided by GPA and the Brunswick Pilots' logs. The problem is that these choke points delay the fleet of vessels that navigate the channel (approximately 500 calls annually). These areas of concern do not accommodate some of the vessels that currently navigate through the channel, as well as larger vessels that are anticipated to use the channel in the future. The larger vessels wait for favorable channel conditions to avoid potential groundings that could lead to environmental damage if there is a breach of the hull. The potential damage to the vessel or an oil spill in the pristine marshes of Glynn County could be catastrophic. Oil spills not only negatively impact large animals, birds, turtles, dolphins, and fish by covering them in oil, but they also negatively impact invertebrates such as shrimp, crabs, sea stars, sea urchins, clams, snails and worms which are critically important to the ecosystem. Other economic impacts could occur due to blockage of the navigation channel and temporary closure to the port. On 13 February 2008, the Centaurus Leader hit the side slope while transiting under pilotage from the widener at the intersection of Cedar Hammock and Brunswick Point Cut Ranges after passing Coast Guard Buoy 24. The vessel's #1 starboard fuel tank was breached and filled with sea water. The impact was attributed to the vessel transiting outside of the authorized Federal channel alignment when it made contact with the side slope.

This Letter Report investigates opportunities in Brunswick Harbor to increase safety and reduce tidal delays, transit times, the number of calls, and transportation costs. See the vicinity map in Figure 1 below.

U.S. ARMY

CORPS OF ENGINEERS

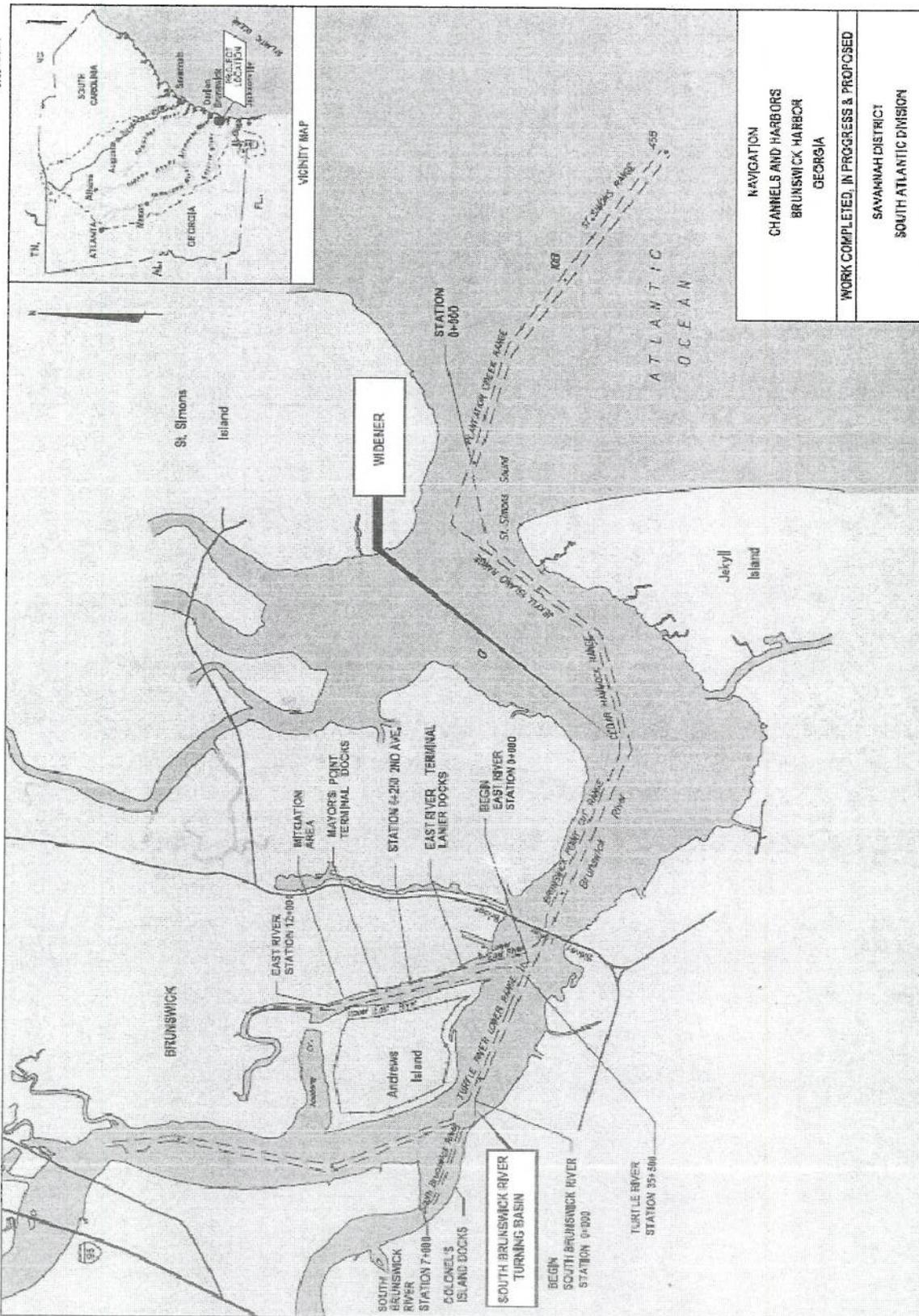


Figure 1 Vicinity Map

ENGINEERING:

Widener at intersection of Cedar Hammock and Brunswick Point Cut Ranges

This area is located at the juncture of Cedar Hammock Range and Brunswick Point Cut Range (approximate Station 21+750). Coast Guard Buoy 24 is located in this area. There is an existing bend widener on the north side of the channel which the Pilots indicate is inadequate for navigation by the larger ships now transiting the channel. Two alternatives have been developed to address the navigation problem (Figure 2).

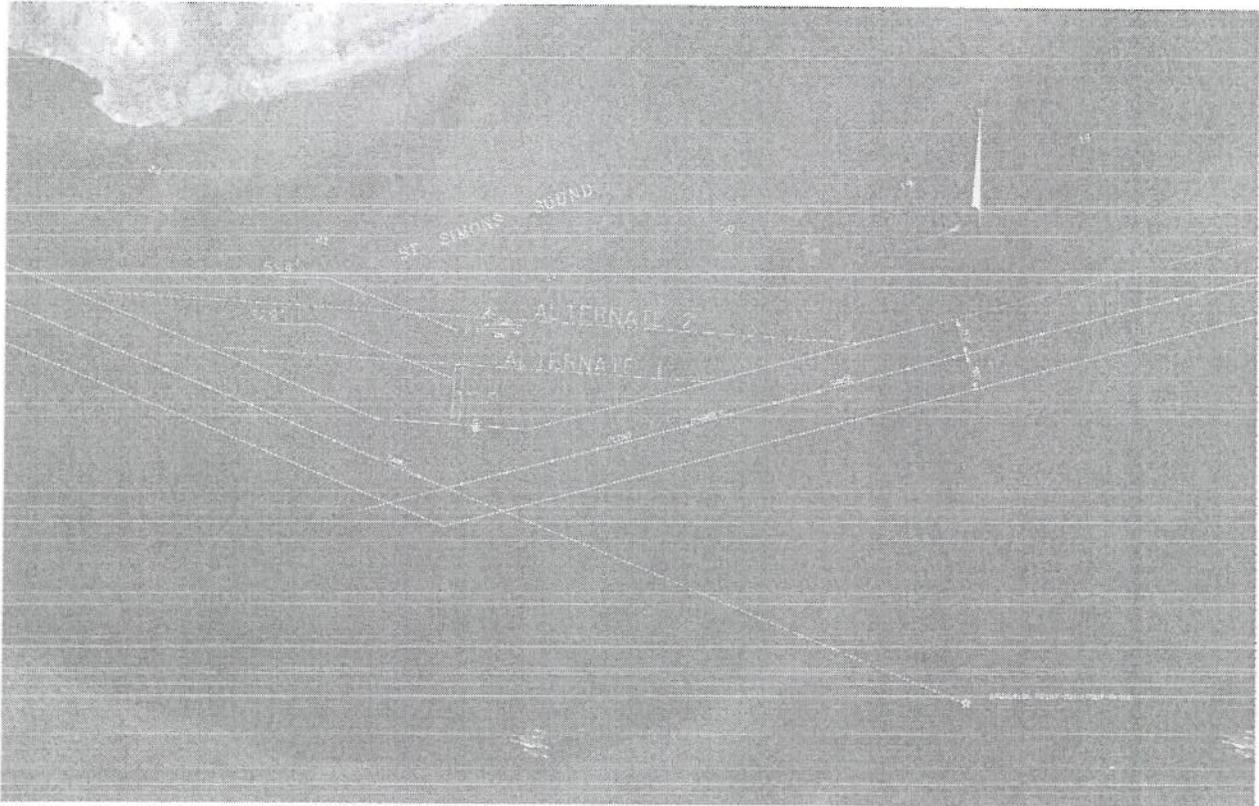


Figure 2 – Intersection of Cedar Hammock and Brunswick Cut Ranges Alternatives 1-2

Alternative 1 is proposed by the Pilots. This alternative consists of widening the existing bend widener to match the dimensions of the bend widener at the preceding intersection of Jekyll Island Range and Cedar Hammock Range. This can be accomplished by widening the existing bend widener by approximately 350 feet and lengthening it by approximately 2,000 feet. The west, south, and east sides of the widening area would be defined by the north toe of the existing channel. The north side would be defined by a line beginning at the north toe of the Cedar Hammock Range near Station 20+250 (GA State Plane, 1983 NAD coordinates: $x = 881473$, $y = 402832$) and ending at the north toe of the Brunswick Point Cut Range near Station 23+350 (GA State Plane, 1983 NAD coordinates: $x = 878733$, $y = 403012$). The new work dredging area encompasses an area of approximately 14 acres and approximately 229,000 CY would be removed. A more thorough description of the material type is located under the paragraph titled "Description of Materials to be dredged".

Alternative 2 was formulated by Savannah District using the Engineering Manual (EM) 1110-2-1613 *Hydraulic Design Guidance for Deep Draft Navigation Projects* and is larger than the area proposed in Alternative 1. According to the EM, the larger turning area is needed to accommodate vessels with lengths up to 900 feet, a size that regularly calls at the port. Alternative 2 consists of widening the existing bend widener by approximately 600 feet and lengthening it by approximately 3,500 feet. The west, south, and east side of the widening area would be defined by the north toe of the existing channel. The north side would be defined by a line beginning at the north toe of the Cedar Hammock Range near Station 19+500 (GA State Plane, 1983 NAD coordinates: x – 882284, y - 403051) and ending at the north toe of the Brunswick Point Cut Range near Station 24+250 (GA State Plane, 1983 NAD coordinates: x – 877992, y - 403320). The new work dredging area encompasses an area of approximately 35 acres that includes the approximate 14-acre area comprising Alternative 1. Approximately 682,000 CY would be removed. A more thorough description of the material type is located under the paragraph titled “Description of Materials to be dredged.”

South Brunswick River Turning Basin

The South Brunswick River Turning Basin is located at the confluence of Lower Turtle River and South Brunswick River (approximate Lower Turtle River Station 45+100). There is an existing turning basin on the north and south sides of the channel which the Pilots indicate is inadequate for turning 900 foot long ships before docking at the Colonels Island docks. Three alternatives have been developed to address the navigation problem (Figure 3).

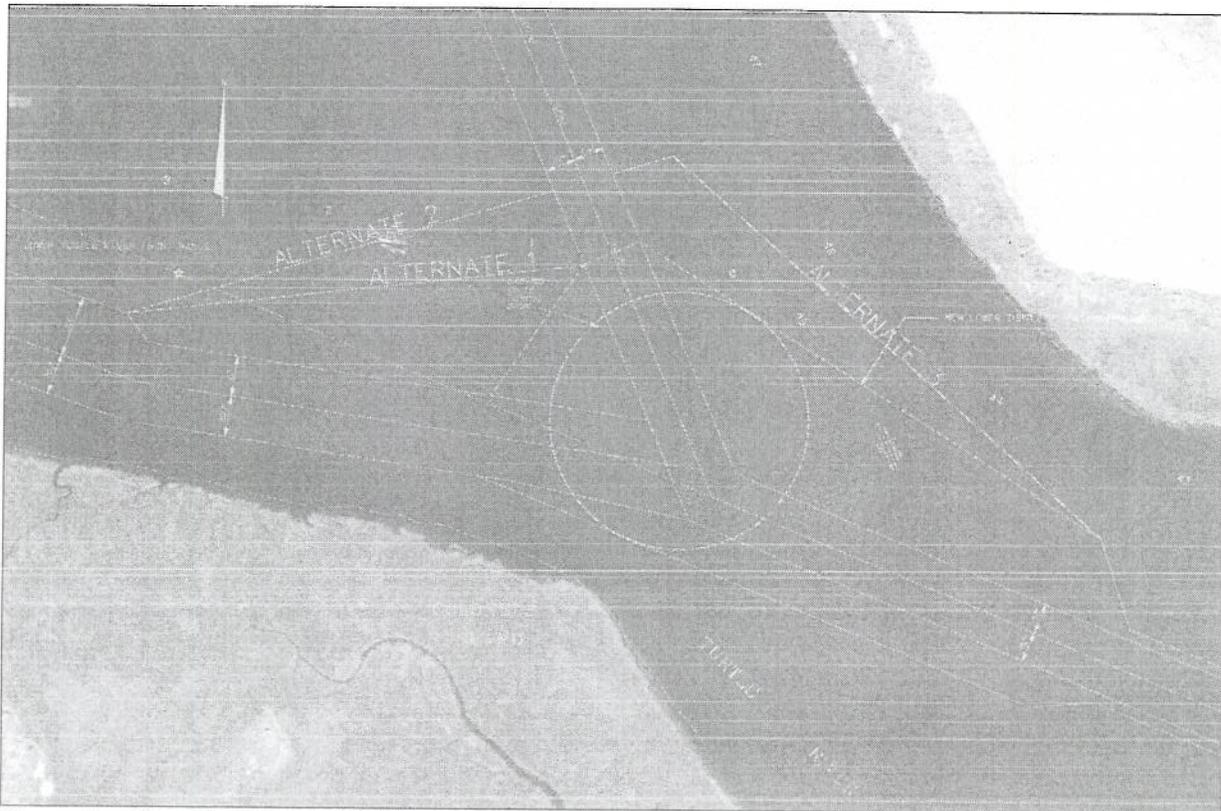


Figure 3 – South Brunswick River Turning Basin Alternatives 1-3

Alternative 1 is the minimum design proposed by the Pilots. This alternative consists of extending the existing northwest side of the turning basin. The south side of the turning basin is defined by the south side of the existing turning basin and south toe of the South Brunswick River. There is no change to the existing northeast side of the turning basin. The northwest side would be defined by a line beginning at the north toe of the South Brunswick River near Station 3+200 (GA State Plane, 1983 NAD coordinates: x – 855739, y - 412048) and ending at the south toe of the Lower Turtle River near Station 46+375 (GA State Plane, 1983 NAD coordinates: x – 857965, y- 412301). The new work dredging area encompasses an area of approximately 18 acres. Approximately 484,000 CY would be removed. A more thorough description of the material type is located under the paragraph titled “Description of Materials to be dredged.”

Alternative 2 is the preferred design proposed by the Pilots. This alternative consists of extending the existing northwest side of the turning basin. The south side of the turning basin is defined by the south side of the existing turning basin and south toe of the South Brunswick River. There is no change to the northeast side of the turning basin. The northwest side would be defined by a line beginning at the north toe of the South Brunswick River near Station 3+200 (GA State Plane, 1983 NAD coordinates: x – 855739, y - 412048) and ending at the south toe of the Lower Turtle River near Station 46+750 (GA State Plane, 1983 NAD coordinates: x – 857811, y- 412669). The new work dredging area encompasses an area of approximately 28 acres that includes the approximate 18-acre area comprising Alternative 1. Approximately 722,000 CY would be removed. A more thorough description of the material type is located under the paragraph titled “Description of Materials to be dredged.”

Alternative 3 was formulated by Savannah District using the Engineering Manual (EM) 1110-2-1613 *Hydraulic Design Guidance for Deep Draft Navigation Projects*. The existing channel was designed to accommodate a vessel fleet dominated by vessels with a length of 660 feet. This design revision would allow the project to serve a fleet dominated by vessels with a length of 900 feet, which more accurately represents vessels currently calling on the harbor. Ship simulation using the more recent design vessel for the harbor is recommended over use of design standards in this area because the turning basin is located in an open unprotected area and is exposed to cross winds from all directions and experiences cross currents approximately 3.2 feet per second from the merging rivers. Both the wind and current conditions cause the vessels to drift significant distances during turning. Alternative 3 consists of the area to be widened in Alternative 2 and extending the northeast side of the turning basin. The south side of the turning basin is defined by the south side of the existing turning basin and south toe of the South Brunswick River. The northwest side of the turning basin is the northwest side as defined in Alternative 2. The northeast side would be defined by a line beginning at the north toe of the Lower Turtle River near Station 46+750 (GA State Plane, 1983 NAD coordinates: x – 858100, y - 412755), an interim point of intersection (GA State Plane, 1983 NAD coordinates: x – 858399, y - 412845), and ending at the north toe of the existing turning basin near Station 43+200 (GA State Plane, 1983 NAD coordinates: x – 860500, y- 410971). The new work dredging area encompasses an area of approximately 43 acres that includes the approximate 28-acre area comprising Alternative 2. Approximately 978,000 CY would be removed. A more thorough description of the material type is located under the paragraph titled “Description of Materials to be dredged.”

Final Channel Design Requirement

Design guidance provides conservative channel design parameters which can often be reduced based on results from ship simulation. For both locations, a ship simulation model will be required. Paragraph 7c of ER 1110-2-1403, Studies by Coastal, Hydraulic, and Hydrologic Facilities and Others, 1 January 1998 states that "Hydraulic design studies associated with the planning, design, construction, operation, and maintenance of navigation channels will include a ship or tow simulation investigation unless omission of such an investigation is approved by HQUSACE". The Savannah District contacted the US Army Engineer Research and Development Center (ERDC) to determine if ship simulation would be required to approve changes in channel design for Brunswick Harbor. ERDC informed the Savannah District that only in circumstances where a waiver was approved would simulation not be required; ERDC anticipates that under these conditions simulation would be necessary. All of the proposed alternatives would require verification by ship simulation. Ship simulation studies for this project are estimated to cost approximately \$450,000.

Cost Engineering

Construction costs were estimated using the latest Corps of Engineers Dredge Estimating Program (CEDEP). These models were developed through years of research, calibrated against historical records and have been successfully used by the Corps for many years. Quantities were provided by the Savannah District, Hydrology and Hydraulics Branch, and are the result of numerous hydrographic surveys. In addition to channel condition surveys of the navigation channel, surveys were conducted in December 2010 in areas outside of the existing navigation channel.

Material classifications were provided by the Savannah District Geotechnical Branch, and are the result of numerous borings taken over the years. Additional borings in the immediate vicinity of the study area would increase the accuracy of the classifications, but were determined to be time and cost prohibitive for this study. Additional borings would help determine if a rock dredge would be required and any investigation beyond this study phase should include additional borings.

During the latest specifically-authorized Brunswick Harbor Deepening Project, both 30-inch sand and 30-inch rock dredges were used successfully in areas adjacent to both study areas. The use of a rock dredge would substantially increase the project cost. It is expected that most of the material in the harbor could be removed by a heavy duty 30-inch sand dredge; however, recent experience of some dredging companies indicates otherwise. Cost estimates for dredging these areas were performed using both types of dredges to develop an accurate range of project costs.

Mobilization costs were determined using the CEDEP program and verified against recent historical records for Savannah and Brunswick Harbors. Mobilization costs for the Widener at the intersection of Cedar Hammock and Brunswick Point Cut Ranges study area are higher than the mobilization costs at the Widener at South Brunswick River Turning Basin, since the use of booster pumps is required, as well as the need for approximately 25,000 feet of pipe compared to

approximately 5,000 feet for the sites adjacent to the South Brunswick River turning basin. Mobilization costs and the cost to dredge each individual area are depicted in the following tables.

Fuel prices of \$2.95 per gallon were used for all dredging models in this study. This price was the latest official price in the distillates website for off-road diesel and was current as of 15 Jan 2011. The volatility of conditions in the Middle East as well as recent price increases must be considered and monitored for effects on the cost and cost/benefit ratio.

Static economic factors such as the economic index, the full cost of money rate, the annual availability of equipment are set by Corps dredging cost estimating experts in Walla Walla, Washington and have not been changed. Labor and equipment databases are frequently updated and the latest rates provided by the East Coast Dredging Team are being used.

Corps guidance recommends that cost estimates prepared during reconnaissance or feasibility phase studies use a 25% contingency to address uncertainties and unknown risks. Additionally, since no additional borings were taken for this study, the exact nature of the materials is somewhat unknown at this time. Also, costs (including fuel costs) could vary depending on the time of construction and the mid-point. Please see tables 1 and 2 below.

**Table 1
Widener at Intersection of
Cedar Hammock and
Brunswick Point Cut Ranges**

Mobilization Costs

30" Sand Dredge \$1,772,000

30" Rock Dredge \$2,332,000

Alternative 1

	Volume CY	Cost \$/CY	Cost \$	Contingency 25%(cost+mob)	First Cost Mob+Cost +Contingency	PED (8%)	S&A (5.6%)	Total Project Cost
30" Sand Dredge	229,200	\$8.21	\$1,881,732	\$913,433	\$4.6M	\$368,000	\$257,600	\$5.2M
30" Rock Dredge	229,200	\$30.65	\$7,024,980	\$2,339,245	\$11.7M	\$936,000	\$655,200	\$13.3M

Alternative 2

	Volume CY	Cost \$/CY	Cost \$	Contingency 25%(cost+mob)	First Cost Mob+Cost +Contingency	PED (8%)	S&A (5.6%)	Total Project Cost
30" Sand Dredge	681,700	\$7.85	\$5,351,345	\$1,789,836	\$8.9M	\$712,000	\$498,400	\$10.1M
30" Rock Dredge	681,700	\$27.32	\$18,624,044	\$5,239,011	\$26.2M	\$2.1M	\$1.5M	\$29.8M

**Table 2
Widener at South Brunswick River
Turning Basin**

Mobilization Costs

30" Sand Dredge \$1,493,000

30" Rock Dredge \$1,846,000

Alternative 1

	Volume CY	Cost \$/CY	Cost \$	Contingency 25%(cost+mob)	First Cost Mob+Cost +Contingency	PED (8%)	S&A (5.6%)	Total Project Cost
30" Sand Dredge	484,000	\$4.92	\$2,381,280	\$968,570	\$4.8M	\$384,000	\$268,800	\$5.5M
30" Rock Dredge	484,000	\$9.71	\$4,669,640	\$1,636,410	\$8.2M	\$656,000	\$459,200	\$9,315,200

Alternative 2

	Volume CY	Cost \$/CY	Cost \$	Contingency 25%(cost+mob)	First Cost Mob+Cost +Contingency	PED (8%)	S&A (5.6%)	Total Project Cost
30" Sand Dredge	722,000	\$4.82	\$3,480,040	\$1,243,260	\$6.2M	\$496,000	\$347,200	\$7.0M
30" Rock Dredge	722,000	\$9.01	\$6,505,220	\$2,087,805	\$10.4M	\$832,000	\$582,400	\$11.8

Alternative 3

	Volume CY	Cost \$/CY	Cost \$	Contingency 25%(cost+mob)	First Cost Mob+Cost +Contingency	PED (8%)	S&A (5.6%)	Total Project Cost
30" Sand Dredge	978,300	\$4.49	\$4,392,567	\$1,471,392	\$7.4M	\$592,000	\$414,400	\$8.4M
30" Rock Dredge	978,300	\$7.95	\$7,777,485	\$2,405,871	\$12.0M	\$960,000	\$672,000	\$13.6M

Description of Materials to be Dredged

The sediments to be removed for these channel improvements are principally unclassified new work dredging and consist predominantly of undisturbed soils that have not previously been dredged. Information on material to be removed has been extracted from nearby existing borings taken for other work performed by the Corps. Logs for three existing borings in the Cedar Hammock and Brunswick Point Cut Ranges were used to determine material types for the proposed Bend Widener at the intersection of Cedar Hammock and Brunswick Point Cut Ranges. Logs for fourteen existing borings near the South Brunswick River Turning Basin were used to determine material types for the proposed South Brunswick River Turning Basin Widener.

Rock was identified in some of the nearby borings within the required depths of the project and is described as ranging from hard to soft limestone, and is sometimes found in layers ranging from about 1 inch to 1 foot in thickness. Sediments similar to those that would be removed as part of this project have successfully been removed under previous projects.

Borings indicate the materials within the required depths and any allowable overdepth consist predominantly of soil. At some locations, the drilling action of the splitspoon sampler penetrated and broke apart less competent rock layers so they had the appearance of soil. The descriptions of these soils may indicate rock fragments or nodules of cemented or indurated soils are

contained in the soil matrix of the sample. Sediments in the project area are largely a result of varying depositional environments and are discontinuous both vertically and horizontally. For this reason, variations in the characteristics of the subsurface material can be anticipated within relatively short distances.

In the area of the proposed Bend Widener at the intersection of Cedar Hammock and Brunswick Point Cut Ranges, nearby boring logs indicate the soils to be dredged consist of: high liquid-limit clay (CH), low liquid-limit clay (CL), high liquid-limit silt (MH), low liquid-limit silt (ML), poorly-graded sand (SP), silty sand (SM), high liquid-limit silty sand (SM-H), clayey sand (SC), silty-clayey sand (SC-SM), poorly-graded gravel (GP), silty gravel (GM), and clayey gravel (GC). Laboratory analyses indicate that poorly-graded silty sand (SP-SM), well-graded sand (SW), and well-graded silty sand (SW-SM) were also encountered. The coarse-grained soils encountered may contain varying amounts of fine to coarse sand and gravel-sized shell and rock fragments. The silt and clay constituents of these sands may be dolomitic and cohesive.

In the area of the proposed South Brunswick River Turning Basin Widener, nearby boring logs indicate the soils consist of high liquid-limit clay (CH), low liquid-limit clay (CL), low liquid-limit silt (ML), poorly-graded sand (SP), silty sand (SM), clayey sand (SC), and poorly-graded gravel (GP). Laboratory analyses indicated that well-graded sand (SW), well-graded silty sand (SW-SM), poorly-graded silty sand (SP-SM), silty clayey sand (SM-SC), and high liquid-limit clayey sand (SC-H) were also encountered.

It should be reiterated that these material descriptions are based on borings previously drilled for other work and not located in the actual areas proposed to be dredged. Also, these descriptions are in no way meant to imply the dredgeability of these materials. If the proposed wideners are funded, additional borings should be drilled accordingly.

ECONOMIC ANALYSIS:

Conversations with Shipping Lines, Pilots and GPA

According to the Brunswick Pilots, the Port of Brunswick will lose significant market share in its primary lines of business due to restrictions placed upon the fleet likely to be launched in the next fifty years.

There is an agreement between the Pilots and shipping lines to move vessels through the harbor only when there is high water and low current.

Since January 2011, Mercedes and BMW signed new contracts with GPA. As a result, the number of auto vessels has substantially increased.

Ship Size Data

Georgia Ports Authority and the Pilots of Brunswick Harbor provided the Corps with the ship dimensions of most of the ships that called on Colonels Island Terminals between January 2007 and mid-December 2010. During this time there were 1,454 ships that called on the Colonels Island Terminal. All the ships that called on the terminal can be classified in one of three

exclusive categories compared to the channel: over length, over width, or within the existing design vessel dimensions. Of these ships; 140 were over length, 47 over width, and the remaining 1,267 ships were within the existing design vessel's dimensions. The number of ships that called each year stayed approximately constant, as did the number of ships that fell into each category. This means that 12.9% of the ships that called on the port were larger in length or width than the design vessel for the present channel.

Economic Analysis

The Pilot's logs from 1 January 2007 through mid-December 2010 indicate that there are on average 35 vessels per year that have a length that exceeds the design vessel length. On average, almost 12 vessels per year have a width that exceeds the design vessel width. Most of the vessels that exceed the size for which the channel was designed are Wallenius Wilhelm Logistics (WWL) vessels. The study alternative channel design width using the USACE Design Manual for a vessel 900 feet in length resulted in a Rough Order of Magnitude (ROM) cost estimate which includes dredging cost, mobilization cost and a 25 percent contingency cost for a 30-inch sand dredge at Cedar Hammock and Brunswick Point Cut Ranges and South Brunswick River Turning Basin at \$8.9 million and \$7.4 million, respectively. However, there is certainty that some rock will be present. Hence, a 30-inch rock dredge has been used to estimate the cost of the alternatives. At Cedar Hammock Range and South Brunswick, the estimated first cost construction ROM estimate is \$26.2 million and \$12 million, respectively. To improve both locations, the total project first cost ROM estimate is \$38.2 million.

Most of the economic benefits of the with-project condition can be derived by transportation cost savings. For example, if larger vessels call to the port, that would result in fewer vessels providing the same amount of cargo, and ultimately would reduce the unit costs of the vessels. Additionally, some economic benefits of the with-project condition can also be derived from reduced delays.

With a 50-year period of analysis at an interest rate of 4.125, the average annual transportation cost is estimated at \$1.7 million. A transportation cost savings benefit caused by a reduction in unit cost by using larger vessels can be realized in the future with project condition.

Approximately 500 vessels travel through the channel per year. In terms of the number of vessels, a reduction in calls of about 1.2 percent would have to be realized in the future with project condition to justify a \$1.7 million average annual construction cost. With an estimated cost of \$300,000 per call, it would take 6 less calls per year to provide an annual transportation cost savings benefit in the amount of \$1.8 million to economically justify this project.

In addition, benefits from reduced delays for the 500 calls per year would likely be realized. Using an average hourly operating cost of \$1,500, if each one of these calls experience a half-hour less delay in the future with-project condition versus the future without-project condition, this would provide an additional \$375,000 in average annual benefits.

Non-Economic Justification

A ship simulation model could identify that the existing channel design is not sufficient to safely navigate vessels with lengths of 748, 790, 860, 869, or, the soon to come, Mark V Tonsberg 870-foot length vessel. Because car carriers are very susceptible to wind due to their large sail, this

makes them more difficult to handle in the channel. In this case, safety and environmental concerns would require channel improvement.

ENVIRONMENTAL COMPLIANCE:

Pre-Construction Requirements

Coordination with the National Marine Fisheries Service (NMFS) would be needed to determine if an Essential Fish Habitat (EFH) assessment would be required.

Sediments sampled in 1997 for the Brunswick Harbor Deepening showed no contaminants of concern, so no additional sediment sampling for disposal suitability would be expected to be required for this project.

Construction Expectations

The excavation associated with the project would not impact nearby intertidal flats or result in a loss of intertidal species in the area. Dredged sediments would be removed from the waterway by a pipeline dredge and deposited in the existing Andrews Island Dredge Material Containment Area (DMCA). Resuspension of solids would cause a temporary, localized increase in turbidity, but this is not unusual and would not be greater than routine maintenance dredging occurring in other Brunswick inner harbor navigation channels. The decrease in water quality may cause fish and motile invertebrates to avoid the area but, again, only temporarily. No violation of state water quality standards would be expected from the discharge from the Andrews Island DMCA. The relatively large size of the DMCA would allow the slurried sediments to settle and decant satisfactorily. All terms and conditions of the Migratory Bird Treaty Act of 1918 and Executive Order 13186 (signed January 2001) would be adhered to if migratory birds were found in the disposal area.

There would be potential for presence of West Indian manatees and sea turtles in the project area, but protective measures would be taken to ensure compliance with all specifications and requirements of the Marine Mammal Protections Act of 1972 and the Endangered Species Act of 1973. Additionally, the 1991 South Atlantic Regional Biological Opinion states that the National Marine Fisheries Service (NMFS) has determined that pipeline dredges are unlikely to adversely affect sea turtles.

Based upon the project design and the minimal short-term impacts associated with the dredging, the Corps believes there would be no significant adverse effects to the environment and no mitigation would be warranted.

ARCHAEOLOGICAL RESOURCES:

The river bottoms and resulting side slopes of the areas that would be affected by construction of the proposed alternatives have not been surveyed for historic properties. In compliance with the National Historic Preservation Act of 1966 (P.L. 89-665, as amended) and 36 CFR, Part 800, marine remote sensing surveys will be required to evaluate the potential effect of the alternatives

upon submerged archaeological resources. These investigations should include magnetometer, side scan sonar, and sub-bottom profiler surveys, diver evaluation, data analysis, and preparation of a report by personnel meeting the standards of the Secretary of Interior and the State of Georgia. Savannah District will need to coordinate with the Georgia State Historic Preservation Officer and interested Native American Tribes. If potentially significant historic properties are identified within the survey areas, additional consultation and historic properties investigations will be required. The lands proposed for staging area are regularly used for this purpose for new construction and maintenance dredging in Brunswick Harbor. The surface of this area has been severely disturbed. Archival research and archaeological testing will be required if any new and deeper types of impacts are identified.

REAL ESTATE:

The project consists of widening the navigation channel in Brunswick Harbor to reduce the difficulty in maneuvering and turning of vessels larger than for which the channel was designed. Excavation to widen the channels will be below mean high water. Excavated and dredged material will be disposed of at Andrews Island Placement Area. Andrews Island is owned by the Georgia Department of Transportation. Andrews Island has been and is currently used as a disposal area to support construction, operation and maintenance of the Brunswick Harbor Navigation Project channels, turning basins, and other related transportation facilities. The Georgia Ports Authority will provide an existing staging area at the port facility during construction. The proposed area is shown in figure 4 below. No further real estate is required for the project.

Should it later be determined that an additional real estate interest is required for the project, the non-Federal sponsor is responsible for providing the lands, easements, and rights-of-way (LER) required to implement the project. An estimated Real Estate cost of \$7,500 is provided to certify lands for the project and any other administrative activities that may occur during Planning, Engineering & Design (PED).



Figure 4 - Proposed Staging Area at Georgia Ports Authority, Brunswick

CONCLUSIONS AND RECOMMENDATIONS:

The new contract with Mercedes and BMW and the new Mercedes auto processing center on Colonels Island have recently doubled the number of annual car carrier vessel calls. As more vessels call and a greater percent of them exceed the length for which the channel was last designed (660 feet), the probability for groundings and delays will likely increase, since there will be more exposure to wind and greater adverse impacts on the "sail" effects on ship handling. The Centaurus Leader grounding in 2008 resulted in millions of dollars of damage to the vessel and closure of the Port for about 24 hours. With the proposed improvements to this project, the Pilots could loosen the present transit rules, reducing tidal and transit delays. As the shorter length fleet is replaced by a longer length fleet, there are likely to be transportation cost savings with this project. Measuring how much the vessel fleet and unit costs would change and conducting a ship simulation to determine safety factors would require further analysis for which funding is not available under Section 107. Improvements to the bend at the intersection of the Cedar hammock and the Brunswick Point cut Ranges (near Coast Guard Buoy 24) and the South Brunswick River Turning Basin appear needed and potentially economically justified.

The estimated construction costs are expected to exceed the Federal cost limitation for the Section 107 authority. Savannah District recommends that this study be pursued as a specifically-authorized study.

This Letter Report (1) identified water resource problems that warrant Federal investigation, (2) identified a Federal interest in solving those ongoing deep-draft navigation problems, (3) except for estimating the costs of the feasibility phase, fulfilled the requirements of a Section 905(b) Analysis, and (4) determined that the Georgia Ports Authority is interested in serving as a non-Federal study sponsor. Savannah District believes that this investigation should transition into the feasibility phase once a Project Management Plan (PMP) is prepared and a Feasibility Cost Sharing Agreement (FSCA) negotiated and executed.



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Doug J. Marchand
Executive Director

February 22, 2008

Colonel Edward J. Kertis, Jr., District Engineer
U.S. Army Corps of Engineers, Savannah District
Attention: CESAS-PD
Post Office Box 889
Savannah, Georgia 31402-0889

Dear Colonel Kertis:

The Georgia Ports Authority would like to bring to your attention two areas in the Brunswick Harbor identified by the Brunswick Pilots as problems for vessel maneuverability. The first area of concern is the area around turning buoy number 24 at the intersection of the Cedar Hammock Range and the Brunswick Point Range. The turn in this area needs to be widened to accommodate the larger ships that are calling in Brunswick sooner than was anticipated by the Brunswick Harbor Deepening Study. The second area with which the Pilots are concerned is located at the Colonels Island turning basin where the South Brunswick River and the Turtle River converge. The northern side of the South Brunswick River extends out towards the basin and severely impedes the full use of the turning basin.

I request that the U.S. Army Corps of Engineers, Savannah District, undertake an investigation of the two areas mentioned above located in Brunswick Harbor, Georgia, under the authority of Section 107 of the River and Harbor Act of 1960. The Georgia Ports Authority is willing to serve as the study sponsor, dependent upon the project scope and costs as will be determined by the Section 107 study requested within this letter.

I understand that the study would be 100 percent Federally funded to the limit of \$100,000. If the total cost of the study exceeds \$100,000, I understand that remaining study costs will be shared equally between the Corps and the Georgia Ports Authority. The Authority is capable of fulfilling our financial obligations should the Authority agree to proceed as the local sponsor for any project resulting from this Section 107 study; in general, providing a minimum of 20 percent of the construction cost for the general navigation facilities including furnishing lands, easements, rights-of-way, relocations, dredge material disposal areas, and berthing and fleeting areas. The Authority is also aware that both the Corps and the Authority responsibilities will be delineated in a Project Cooperation Agreement, which both parties will execute before any project construction commences.

Very truly yours,

Doug J. Marchand

Deepwater Terminals - Savannah, Brunswick
Barge Terminals - Bathbridge, Columbus
Trade Development Offices - Savannah, Brunswick, Atlanta
New Jersey, U.S.A.; Tokyo, Japan, Buenos Aires, Argentina, Oslo, Norway

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