

MEMORANDUM FOR CECW-SAD (ATTN: Stacey Brown)

SUBJECT: Savannah Harbor Expansion Project (SHEP) General Reevaluation Report and EIS (July 2012) – Documentation of Review Findings

1. This memorandum forwards the documentation of policy compliance review findings for the subject project. In the opinion of the policy compliance review team, all policy review concerns have been adequately addressed for this phase of project formulation and development.

2. Office of Water Project Review consideration of subject Final GRR and Environmental Impact Statement is complete. Questions concerning the HQUSACE policy compliance review of this project proposal may be discussed with the review manager, Lee Ware, at 202-761-0523.

Encl


for WESLEY E. COLEMAN, JR.
Chief, Office of Water Project Review
Planning and Policy Division
Directorate of Civil Works

DOCUMENTATION OF REVIEW FINDINGS

HQUSACE, Office of Water Project Review

SAVANNAH HARBOR EXPANSION PROJECT

Chatham County, GA and Jasper County, SC

**Final General Re-evaluation Report and
Environmental Impact Statement**

(July, 2012)

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DOCUMENTATION OF REVIEW FINDINGS

SAVANNAH HARBOR EXPANSION PROJECT Chatham County, GA and Jasper County, SC

General Reevaluation Report and Environmental Impact Statement July 2012

1. REVIEW HISTORY

Savannah District submitted the Draft General Reevaluation Report and Draft Environmental Impact Statement (EIS), dated July 2008, for review and comment on 3 July 2008 in preparation for the Alternative Formulation Briefing. HQ provided draft comments to the District on 19 August 2008. Responses to the comments were not available prior to the AFB. HQUSACE South Atlantic Division hosted the AFB in Savannah, Georgia on 26-27 August 2008. Attendees included representatives from the offices of the Assistant Secretary of the Army for Civil Works and the following US Army Corps of Engineer offices: HQUSACE, CESAD, CESAS, CESAM, and CESAW. Representatives of the following agencies attending the meeting included: US EPA Region 4, US Department of the Interior, US Fish and Wildlife Service, Southeast Region, NOAA Fisheries, Southeast Region, and the Georgia Ports Authority. Representatives of the following state natural resource agencies also attended: Georgia Department of Natural Resources, South Carolina Department of Natural Resources, and South Carolina Department of Health and Environmental Control.

The District provided preliminary responses for the many of the comments during the conduct of the meeting. However, due to significant economic issues that could not be effectively resolved during the AFB, a breakout session was held during the AFB and a follow-on economic meeting was held in Mobile, AL on 9-11 September, 2008. Further coordination meetings were held with the vertical team, the PCX, the sponsor, shippers and consultants, and IWR to discuss the model, assumptions, and economic analyses on 23 April and 15-16 July of 2009. Further coordination on Agency Technical Review occurred on 19-20 August 2009 in Portland and 13-15 April 2010 in Mobile. Additional review actions on issues related to sea level change and its effect on wetland mitigation were completed and are documented as part of this record. A white paper was developed and provided for review in April 2009, which explained the rationale for the designation of most likely without-project conditions as a basis for determining mitigation requirements. Review of the white paper led to further concerns regarding the consideration of sea-level rise in light of the guidance in ER 1105-2-100, Section IV, E-24.k. and later guidance contained in EC 1165-2-211, dated 1 July 2009. The white paper was coordinated with CECW-CE and CECW-CP during the period 30 July 2009 to mid-September 2009 and feedback was provided to the District on 14 September 2009 regarding the white paper in light of the new EC requirements. Coordination continued between the SAD-RIT, CECW-CE, and CECW-CP through October 2009. Subsequently, the SAD-RIT requested formal policy review on 2 December 2009 regarding the white paper, revised engineering appendix text, and post-AFB coordination on the sea-level rise issue as a back check on issue resolution. A HQUSACE assessment on the issue of sea-level rise and the conditions used as a basis for impact assessment relative to mitigation was provided 28 January 2010. This led to a further back check review that

was completed on 19 July 2010. The FRC draft review package was received in September 2010. This resulted in the 10 November 2010 approval of the draft report and DEIS for coordination pending two text changes. During public coordination, an errata sheet was distributed to clarify the presentation of the tentatively selected 47-foot NED plan and the Maximum Authorized 48-foot plan supported by the sponsor. It was reiterated that the final GRR and FEIS will contain a recommended plan that is agreed to by the Secretaries of the Army, Commerce, and Interior, and the Administrator of EPA [as required in the conditional authorization of the project in Water Resources Development Act of 1999 (Section 102(b)(9)].

The coordination draft of the report was logged in for concurrent HQ review on 23 November 2010. HQ provided the results of its review in a Policy Compliance Review Assessment, dated 11 January 2011. This document incorporates the results of that assessment and resolution of the comments.

The final General Reevaluation Report and Environmental Impact Statement was logged in for HQ policy review on 23 February 2012. An initial fatal flaw review was conducted in preparation for the Civil Works Review Board and a teleconference was held on 6 March 2012 to discuss the identified concerns, none of which were significant enough to preclude holding the CWRB. Two primary issues were the need for a signed recommendations section in the report and the agency letters provided in regard to the report recommendations, which raised concern regarding agency concurrence in the recommended plan. These were addressed by SAD and SAS before the Civil Works Review Board on 22 March 2012, resulting in approval to begin State and Agency Review.

Policy review of the final report was being still completed at the time of the CWRB, resulting in the comments noted below in Section 3. The district addressed these comments and provided responses and a modified report on 18 and 20 July 2012, respectively, resulting in the final HQ policy review and concurrence. Sections 3 through 7 provide the complete record of concerns raised during policy review of the various documents from the final report to Alternative Formulation Briefing, the District responses, discussions, actions required, actions taken, and a HQUSACE assessment as appropriate until resolution was achieved on each concern. A separate document describes the HQUSACE views, dated 21 October 2011, of the project's policy compliance of the mitigation measures and associated monitoring. ASA (CW) subsequently concurred in the mitigation measures and monitoring in a Memorandum dated 28 November 2011.

Section 2 presents updated information on the Project Background based on the final report submission.

2. PROJECT BACKGROUND

A. STUDY AREA. Savannah Harbor is a deep-draft harbor located on the South Atlantic U.S. coast, 75 miles south of Charleston Harbor, South Carolina, and 120 miles north of Jacksonville Harbor, Florida. The harbor comprises the lower 21.3 miles of the Savannah River and 11.4 miles of channel across the bar to the Atlantic Ocean. Within the harbor limits the Savannah River is generally divided into two channels by a series of islands. From the Atlantic Ocean to River Mile 10, where the river converges, the navigation channel is maintained in the North Channel. After divergence of the river into Front and Back Rivers at River Mile 11, the

navigation channel is maintained in Front River and passes by the business district of the City of Savannah. The navigation channel is maintained in Front River to the upper limits of the harbor at River Mile 21.3. The Savannah River and its tributaries generally form the boundary between Georgia and South Carolina with the study area located in Chatham County, Georgia and Jasper County, South Carolina.

The authorized dimensions of the existing project are as follows:

<u>Segment</u>	<u>Length</u>	<u>Depth (ft. below MLW)</u>	<u>Width (ft.)</u>
Atlantic Ocean to Entrance Channel	8.7 miles	44	600
Entrance Channel to Harbor Entrance	2.7 miles	42	500
Harbor Entrance to Kings Island TB	19.5 miles	42	500*
Kings Island TB to Argyle Island TB	0.4 miles	36	400
Argyle Island TB to Upstream Limit	1.4 miles	30	200

(* 400 ft. width currently maintained between stations 58+000 and 59+000)

B. PROBLEM. Savannah Harbor is currently the second largest container port on the U.S. East Coast by twenty-foot equivalent Units (TEU) volume and the fourth largest in the Nation by TEU volume. However it currently has one of the shallowest controlling depths for a major port with unrestricted access limited to 38 feet and a 42-foot controlling depth. Although this is similar to the current Panama Canal constraints, other major U.S. east coast ports currently possess, or are planning deeper access. After planned improvements at the Garden City Terminal it will be the largest single container facility in the Nation. The volume of TEUs handled at the Garden City Terminal is expected to increase in the future. Under the without-project conditions, the fleet calling at the terminal is expected to shift in the future to larger vessels, predominantly in the Panamax and Post-Panamax sizes as the Panama Canal is expanded. Vessel operations will be constrained by the existing channel dimensions. As the industry shifts to these larger vessels, considerable efficiency of navigation will be lost in Savannah Harbor unless channel modifications are implemented. The need to protect environmental resources in the study area is related to the high concentration of significant coastal wetland habitats. In addition, there is concern over potential effects of channel modifications on increased salinity, fisheries, dissolved oxygen levels, and cultural resources in the area.

C. STUDY AUTHORIZATION. The General Reevaluation Report was prepared under the authority provided in Section 101(b)(9) of the Water Resources Development Act of 1999 (WRDA99), which provided the contingent authorization of a 48-foot deepening project. The authorization was contingent on completion of a General Reevaluation Report, an EIS, a final mitigation plan, and an incremental analysis of the channel depths from 42 to 48 feet, and agency approvals as noted above in the review history. The Chief's Report states:

When the findings and conclusions of these additional evaluations are complete, a special report and Tier II environmental impact statement will be prepared and receive full public review. Review of the Tier II EIS and the GRR documents

would serve as the basis for obtaining the required approvals, certifications, and permits, as appropriate, from the natural resource agencies for the channel improvement that would be implemented.

D. SELECTED PLAN. The Final GRR and FEIS identified the recommended plan as the National Economic Development (NED) Plan. The plan consisted of navigation channel improvements, various mitigation measures, adaptive management and monitoring, and a dredged material management plan (DMMP) that includes upland dredge material containment areas (DMCAs), isolation of naturally-occurring cadmium-laden sediments, and offshore placement. The plan calls for deepening the Savannah Harbor project to a depth of -47 feet MLLW with selective widening at three bends, two meeting/passing areas, and an enlarged turning basin, to meet the NED objective. The project would modify the existing Savannah Harbor as follows:

- Extending the existing entrance channel 7.1 miles from Stations -60+000B to -97+680B and deepening to -49 feet MLLW from the new ocean terminus to Station -14B+000B, then deepening to -47 feet MLLW from Station -14B+000B to Station 0+000 and, deepening the inner harbor to -47 feet MLLW from Station 0+000 to 103+000;
- Widening bends on the entrance channel at one location (Stations -23+000B to -14+000B) and in the inner harbor channel at two locations; (Stations 27+700 to 31+500, and Stations 52+250 to 55+000);
- Constructing two meeting areas (Stations 14+000 to 22+000 and Stations 55+000 to 59+000);
- Deepening and enlarging the Kings Island Turning Basin to a width of 1,600 feet;
- Restoring dredged material volumetric capacity in existing DMCAs; and
- A mitigation plan which includes the features described below.
Other prior authorized features of the existing Savannah Harbor Navigation Project would remain unchanged by the selected plan of improvement and would remain components of the Savannah Harbor Navigation Project.

The mitigation plan includes the following features:

- Construction of a fish bypass around the New Savannah Bluff Lock and Dam in Augusta, Georgia. Construction of this feature would compensate for loss of Shortnose sturgeon habitat in the estuary, by allowing the endangered Shortnose sturgeon access to historic spawning grounds at the Augusta Shoals that are currently inaccessible;
- To minimize impacts to ecologically unique tidal freshwater wetlands in the estuary, construction of a series of flow re-routing features in the estuary to include a diversion structure, cut closures, removal of a tidegate structure, and construction of a rock sill and submerged sediment berm;
- Acquisition and preservation of 2,245 acres of wetlands;
- Restoration of approximately 28.75 acres of tidal brackish marsh;
- Installation of an oxygen injection system, to compensate for adverse effects on dissolved oxygen levels in the Savannah River estuary;

- Construction of a raw water storage impoundment for the City of Savannah’s industrial and domestic water treatment facility, to offset increased chloride levels at the intake on Abercorn Creek during periods of low flow and high tide.;
- Construction of a boat ramp on Hutchinson Island to restore access to areas in Back River made inaccessible due to construction of the flow re-routing features;
- One-time payment to Georgia Department of Natural Resources (GA DNR) for a Striped bass stocking program, to compensate for loss of Striped bass habitat;
- Recover, document, and curate the items of historic significance of a Civil War ironclad (*CSS Georgia*), listed on the National Register of Historic Places;
- Monitoring to ensure that (1) the impacts described in the FEIS are not exceeded, and (2) the dissolved oxygen and wetland mitigation features function as intended. Monitoring will occur pre-construction, during construction, and up to 10 years post-construction; and
- Adaptive management be implemented as outlined in the FEIS to 1) review the results of DO monitoring as well as the success of wetlands mitigation, and 2) modify features if necessary. In accordance with the FEIS, an Adaptive Management Team will be established, with the active participation of the cooperating agencies, for the purpose of effectively implementing the monitoring and adaptive management plan related to dissolved oxygen levels in the system and wetlands mitigation, and to ensure that the wetlands mitigation requirements and DO levels are met in the system.

E. ECONOMICS. At October 2011 Price Levels, the estimated first cost of all project components in the 47-foot NED Plan totals as \$652,000,000. The total investment cost is \$709,000,000 (rounded), including \$7,700,000 for associated costs and IDC of \$49,000,000. With annualized benefits of \$213,100,000 and annualized project costs of \$38,900,000 the NED plan has a benefit cost ratio of 5.5:1 and net benefits estimated at \$174,200,000.

The Federal share of the project first costs is approximately \$454,000,000 rounded. This value is subject to change. The non-Federal share would be \$198,000,000 rounded. The project cost-share amounts are allocated according to General Navigation Features (GNF) and Lands, Easements, Rights-of-Way and Relocations (LERR). Associated project costs of \$7,700,000 include \$2,600,000 non-Federal costs for local service facilities and \$5,100,000 Federal (U.S. Coast Guard) costs for Aids to Navigation. The GNF costs are further broken down by costs attributed to the project depths of 45 feet and less and depths greater than 45 feet. GNF costs for deepening between 42 and 45 feet are cost shared at 25 percent non-Federal and 75 percent Federal; costs for deepening beyond 45 feet are cost shared at 50 percent non-Federal and 50 percent Federal. The GNF costs include additional items such as mitigation and mitigation lands, preconstruction engineering and design, construction management, and historic preservation costs in excess of the initial Federal costs for data recovery (up to 1% of funds authorized to be appropriated). Credit is afforded for (non- F&W mitigation) LERR against the additional 10 % non-Federal cash payment required over time.

F. STATE AND AGENCY REVIEW. The Final General Reevaluation Report and Environmental Impact Statement was approved for State and Agency Review on 22 March 2012. The review period began on 11 April 2012 and ended on 5 June 2012 following an extension. The final NEPA review began 21 April 2012 and also ended on 5 June 2012. State and agency comments received during review of the final report/environmental assessment included

comments from federal agencies as well as tribal governments and agencies from both the states of Georgia and South Carolina. Concerns expressed by the National Ocean and Atmospheric Administration's National Marine Fisheries Service (NMFS) included funding priorities for the mitigation features, the recent listing of the Atlantic sturgeon and the possible presence of hard bottoms in or near the project footprint. The current status of the Atlantic sturgeon has been updated in the report and surveys are underway to determine if any hard bottoms are in or near the project area. The United States Environmental Protection Agency (USEPA) expressed concerns regarding the funding of Operations and Maintenance of the oxygenation system and for the rest of their concerns acknowledged that work or coordination was currently underway to address those concerns. Concerns expressed by the Department of Interior generally centered on details surrounding real estate transfers to their subagencies. All comments were addressed through changes to the report or explanations in a letter of response. The state of Georgia had several agencies that provided comments which were generally in support of the project and recognized that earlier comments had been addressed in the final document. Two entities from the state of South Carolina provided comments expressing their preference for the 45-foot alternative and their concerns regarding the environmental effects. Responses were provided reiterating the considerations during the planning process and the extensive coordination that occurred regarding environmental effects and mitigation with the natural resource agencies.

3. CONCERNS IDENTIFIED DURING REVIEW OF THE FINAL REPORT.

A. COST SHARING OF NON DEPTH-SPECIFIC FEATURES. Section 15.2 states that for several cost items, including Mob and Demob, Preconstruction Engineering and Design, Construction Supervision and Administration, and Lands and Damages for Mitigation, the costs were distributed to the depth zones in proportion to the dredging costs assigned to each zone. This is appropriate for non-depth specific items in accordance with PGL 62 and ER 1165-2-131. However examination of the line items in Table 15-6 showed that this was not done. All costs for Sunk PED Costs, Planning Engineering & Design, and Construction Supervision & Administration, were attributed completely to the 45' and less depth zone with 75%/25% cost sharing applied. About 85% of mitigation land costs and 93% of Mob and Demob costs were attributed to the -45' and shallower depth zone, whereas 61% of the dredging quantities and costs were associated with that depth zone and 39% to the zone deeper than -45'. The cost shares for non depth-specific items should be prorated by dredging quantities as noted in the text in accordance with PGL 62. HQ believes the costs for mitigation lands should be based on depth specific design and cost evaluations similar to the mitigation construction costs. These changes were to be made to the final report prior to S&A review. Please confirm.

District Response (July 2012): Concur. The non-depth specific costs for Sunk (Planning, Engineering and Design) Costs, Engineering During Construction, and Supervision and Administration were reallocated in accordance with dredging yardage quantities (61% = 75/25%, 39% = 50/50%). This update was made to the final report documents as shown on page 286 in Table 15-6 of the General Re-Evaluation Report published in the Federal Register and circulated for State and Agency reviews April 2012.

HQUSACE Assessment (July 2012): The concern is resolved based on the changes to the text as noted in the response.

B. COST SHARING OF HISTORIC PRESERVATION/DATA RECOVERY FEATURES. The data in Table 15-6 shows that costs for historic preservation of the CSS Georgia are \$4,488,212 Federal initially and then additional costs beyond that are cost shared 75%/25% based on the depth zone of -45' and less. It is not clear how the cost value was derived for the initial 1% and whether the value shown is consistent with the requirements of local cooperation which call for the Federal government to pay for the first 1% of funds authorized to be appropriated for data recovery and additional costs to be cost shared similar to GNF if approved by an ASA(CW) waiver and the Secretary of Interior. Please clarify the extent to which historic preservation costs are for data recovery. Confirm the cost sharing calculation and provide a discussion on the basis for the initial 1% value including what actions are considered to be part of the data recovery efforts and their costs. A waiver would be required for cost sharing data recovery costs beyond the 1%. See C-4 of ER 1105-2-100.

District Response (July 2012): Concur. Costs for the CSS Georgia were re-evaluated. Galveston District concurred in our estimates for the cost of the archeological recovery work and noted that the potential costs for work related to unexploded ordnance (UXO) could be low. The amount of that work cannot be completely known until the work is conducted. The 2003 investigation conducted as part of this project concluded that numerous UXO no longer remain on the site. A single iron round shot was observed in the wreck site and historical research suggests three cannon may still remain on site. As a result, the District believes the work to address this issue will not be substantial and that the project contingencies are sufficient to cover potential project cost increases on this item. Similarly, the findings of the 2003 investigation indicate that numerous artifacts of historical value no longer remain on the site. The number of items that need to be conserved and curated cannot be known until the data recovery work is complete. It will only be after the significant items are identified that the curation costs can be precisely determined. The District is comfortable that the estimated curation cost of \$300,000 is reasonable and that the large project cost contingency is sufficient to cover the costs of curating the artifacts of historical value.

Some costs were re-categorized in accordance with PL 93-291 (Section 7a) and ER 1105-2-100, Appendix C-4.h(3). The Department of Interior defines *data* as 'evidence about historic or prehistoric periods which are buried in the ground'; *recovery* is defined as 'the scientific excavation or removal and preservation of that evidence.' Data Recovery cost is now estimated to cost \$2,431,500 (which is less than 1% of the total project GNF costs). The remaining estimated \$11,792,800 in costs are shown as "Other Costs", as the total work required for the CSS *Georgia* did not change. This change resulted in \$527,550 shifting from Federal to Non-Federal responsibility). This change was made and underlined in Tables 15-5, 15-6 and 15-7.

In follow-on discussions with HQUSACE/OWPR, staff requested additional details on the removal work plan for the CSS *Georgia*. This additional detail was to include information regarding recent coordination with individuals with related experience, both within the Corps and other interested parties. To address this request, EIS Appendix F (Cultural Resources) was updated to include additional information. A summary of the recent coordination and tentative plans regarding acquisition strategy and resource availability is outlined in the paragraphs below.

Data recovery and mitigation costs for the CSS *Georgia* were developed based on steps that would most likely occur during the data recovery and mitigation process. Previous work on the CSS *Georgia* in 2003 provided information regarding the site conditions and remains, and ultimately laid out the path for archaeological data recovery and recovery of the vessel. Discussions with Ms. Janelle Stokes, Galveston District, regarding the recovery of the USS *Westfield*, directed and confirmed the District's approach to the mitigation process. The District also coordinated with underwater archaeology professionals from other federal agencies such as the US Navy and National Park Service, who confirmed that the use of a cofferdam was not needed and that previous research from the 2003 investigation had determined that sufficient archaeological data remained of the site for excavation and recovery of the vessel.

The 2003 in-situ archaeological investigations revealed that the 1983 advanced maintenance dredging and box cutting of side slopes, combined with the opening of the Tide Gate destroyed major portions of the site and resulted in erosion of sediments at the site. Most of the vessel now rests directly on the Miocene clay, a well indurated, tightly packed geologic formation that underlies much of the harbor. The only remaining unconsolidated sediments, if any, may be located under the large piece of casemate on the east end of the site. Smaller artifacts such as glass, ceramics and lighter weight metals have likely been removed and redeposited elsewhere due to site deflation and the strong river currents. Actual excavation of sediments on the site would be limited to areas beneath the casemate and recent sediment deposits in dredge scars. The majority of the data recovery and mitigation effort will be mapping the site and using the pattern of the remains and the remains themselves to answer research questions. The entire wooden hull, as well as other organic items such as the wooden backing of the casemate, leather, wool, cotton, etc., have been destroyed by marine organisms. Most of the material remains will be limited to the heavier iron and other metal items, such as propellers, railroad iron, cannons, ordnance, boiler pieces, engine pieces, etc. Some proportion of redundant artifacts with limited archaeological research potential, such as the railroad iron, may not be conserved. Preliminary discussions with the consulting parties have indicated that burial in a site agreeable to all will be appropriate for such items.

No ordnance will be recovered by the archaeological contractor during the data recovery and mitigation efforts. Archaeologists will use hand-held magnetometers during site mapping to locate ordnance and other ferrous artifacts. All ordnance encountered will be left in place and the locations will be noted on the site plan. This information will be provided to a qualified unexploded ordnance contractor that will be responsible for clearing the ordnance after the archaeological mapping and recovery is completed. It is possible that a clam bucket could be used for the removal of ordnance, as was the case with the recovery of the USS *Westfield* by Galveston District. Final decisions on the details of the UXO clearance will be made in direct coordination with the consulting parties prior to initiation of work.

Savannah District recognizes that coordination, review and interaction with other preservation experts within the US Army Corps of Engineers and other Federal agencies will be vital to successful completion of the project, as demonstrated by previous coordination throughout development of the plan. As the project moves forward, the District will continue to seek assistance from Corps personnel for UXO matters (Galveston District) and curation (Mandatory Center of Expertise for Curation at St. Louis District). The US Navy has offered assistance with

marine salvage and recovery and conservation based on their lessons learned with the CSS *Hunley* and the USS *Westfield* projects. The District plans to request assistance from the National Park Service's Submerged Resources Unit for overall project planning and implementation.

Several conservation facilities, including Texas A&M University Conservation Research Lab (USS *Westfield*) and the Warren Lasch Conservation Lab (CSS *Hunley*) have expressed interest in conserving artifacts that may be recovered from the CSS *Georgia*. Additional conservation expertise has been offered from recognized experts in the field, including the Vasa Museum in Sweden. As a result of this coordination, the District believes that it will be able to use existing conservation facilities to process the artifacts that the consulting parties determine are worthy of being preserved.

HQUSACE Assessment (July 2012): The concern is resolved based on the changes to the text noted in the response.

C. O&M QUANTITIES AND COSTS. The incremental increases in maintenance dredging quantities and costs, which are anticipated following the expansion project appear to be relatively low compared to what might be expected with such a significant modification. There is a only a minor increase in dredging quantities projected due to the 7-mile outer channel extension to reach deep water in the ocean and no quantity increase for the inner harbor channels. In addition, inconsistent values are shown for the O&M in different sections of the report. (Page vi shows additional maintenance cost to US is \$5.1M, Table 10-7 shows an O&M cost of \$5.05M that includes \$506,000 for chloride impoundment, which was to be a city cost. Page 277 doesn't discuss impoundment or provide total O&M cost. CWRB slides showed O&M cost as \$4.6M). The district should clarify in the O&M text what the basis was for projecting the minimal increase in O&M dredging and should monitor what actually occurs following construction to determine what the actual quantities and costs are associated with the deeper project and channel extension as a basis for cost sharing. Inconsistencies in text should be corrected to avoid any confusion on the O&M requirements which are to be fully accounted for in the NED analysis per D-3.e.(10) of ER 1105-2-100.

District Response (July 2012): Concur. Engineering analysis using pre- and post-dredging quantities from past Savannah Harbor deepening has shown that significant increases in sedimentation in areas where the existing channel would be deepened and expanded are not likely. The 7-mile channel extension would be added seaward from the existing 12-mile outer-harbor channel. That offshore area does not experience significant shoaling/sedimentation. The raw water storage impoundment O&M costs are not included in certain sections because that cost will be the responsibility of the City of Savannah, as specified in the existing 1999 Chief's Report. The inconsistency in O&M totals was an error that has been corrected. Future dredging O&M costs will be monitored by the District. After sufficient comparable actual quantities are collected, the incremental increase in O&M Costs attributable to the project being deeper than 45 feet will be reevaluated and if different than estimated in the GRR, the Federal and Non-federal cost-sharing will be adjusted accordingly.

HQUSACE Assessment (July 2012): The concern is resolved based on the changes to the text noted in the response.

D. O&M COST SHARING. It is not clear whether the current analysis adequately captures the incremental O&M costs associated with depths greater than 45 feet, which will be a cost-shared Federal/non-Federal responsibility. When actual O&M quantities and costs are determined following construction, the appropriate quantities and cost percentage attributable to the depth zone greater than 45 feet should be reevaluated to assure that the appropriate non-Federal sponsor's share of the incremental O&M costs is provided. Non-Federal sponsors are responsible for 50% of the incremental cost of operation and maintenance over 45 feet in accordance with paragraph 2.c. in Appendix G of ER 1165-2-131. In addition, the summary tables for future O&M cost-sharing do not include all the incremental increase in mitigation requirements attributable to maintaining a project deeper than 45 feet.

District Response (July 2012): Concur. After sufficient comparable actual quantities are collected, the incremental increase in O&M Costs attributable to the project being deeper than 45 feet will be reevaluated and if different than estimated in the GRR, the Federal and Non-federal cost-sharing will be adjusted accordingly.

HQUSACE Assessment (July 2012): **The concern is resolved** based on the changes to the text noted in the response.

E. REAL ESTATE COSTS FOR USFWS LANDS. The following sections of the Real Estate Plan are to be revised as shown (by underline) in order to resolve related previous review comment 5.D.(3) below.

(1) Page 5 of RE Plan.

Category one will consist of acquiring approximately seven acres of land necessary for the deepening phase of the project. This phase requires channel wideners that will be acquired using the non-standard channel improvement\sloughing easement at the locations identified on Table 4-1 and shown on Figures 4.1-1 thru 4.1-3. Approval of this non standard estate was recommended in order to stay consistent with existing easements previously acquired throughout the harbor. Approval of this non-standard estate is addressed in Section 15 of this report. Of the seven acres needed for the deepening phase, approximately six acres of uplands identified on Figure 4.1-1 and 4.1-2 are managed by the USFWS. The loss of these uplands will be offset through a land exchange with the USFWS. The estimated land cost for this category excluding contingencies and administrative cost is \$70,500. The actual land cost of the exchange will be based on an approved real estate appraisal meeting Federal Appraisal Standards conducted at the time of the transfer.

(2) Bottom of Page 6 of RE Plan

4.1 CHANNEL WIDENERS

Three areas consisting of 6.6 acres above the ordinary mean high water mark along the harbor will be impacted by dredging. The mean high water mark was established by survey over a nineteen year (Jan 1983- Dec 2001) National Tidal Datum Epoch. These three areas are identified on Table 4-1 and Figures 4.1-1 and 4.1-2 and will be acquired using the non-standard Channel Improvement\Sloughing Easement. The uplands on the north side of Kings Island

Turning Basin, station 97+000 and at station 102+000 are vested in the United States of America (USA) and managed by the USFWS and comprise a combined six acres of uplands. The loss of these uplands will be offset through a land exchange with the USFWS. The uplands on the north side of station 88+500 are vested in the Chatham County Economic Development Authority and consist of 0.60 of an acre above the ordinary mean high water mark. Approximately 7.2 acres of wetlands will be lost as a result of these wideners and turning basin thus requiring mitigation.

(3) Bottom of Page 34 of RE Plan

9. GOVERNMENT OWNED PROPERTY

Approximately sixty-seven (67) acres of lands owned by the United States of America are within the LERRD required for the project. Of the sixty-seven (67) acres, approximately eight acres are located on the Georgia side of the tide gate structure, approximately five acres are located on the South Carolina side of the New Savannah Bluff Lock & Dam and the remaining fifty-four (54) acres are located in various locations throughout the Refuge. Credit will not be allowed for the sixty-seven (67) acres of government owned lands.

District Response (July 2012): Concur. The referenced sections of the Real Estate Appendix have been changed to include the underlined language.

HQUSACE Assessment (July 2012): **The concerns are resolved** based on the changes to the text noted in the response.

4. RESOLUTION OF CONCERNS IDENTIFIED DURING CONCURRENT REVIEW OF THE DRAFT GRR AND DEIS.

A. FEDERAL FUNDS ALLOCATION.

Section 13.2 Section 902 Cost Limitation (Table 13-1), page 242. The dollar figures for Federal Funds Allocation appear to be in error. For instance, look at the figure for FY10 for Construction; it appears to be less than the amount that was allocated. (*Committee Report + Reprogramming into the Project earlier in the year*). Please clarify and revise as needed.

District Response (January 2012): Concur. Table 15-1 has been updated in the Final GRR. The total Federal expenditures through FY12 shown have been updated to \$15,548,000 and the total in the Construction column has been updated to \$9,334,000.

HQUSACE Assessment (April 2012): **The concern is resolved** based on the changes to the text noted in the response.

B. ECONOMICS.

(1) Mitigation LERR Cost Sharing. Reference is made to three cost sharing tables: (1) GRR page 247 – Table 13-5; (2) GRR page 254 - Table 13-6; and (3) the Real Estate Appendix B page 43 – Table 17-1. On Table 17 -1 the amount of \$63,125 is shown as a Federal acquisition cost. However, over \$16,000,000 is shown as a non-Federal cost. The concern is that the cost sharing for mitigation LERR's was not included in Table 17-1. For guidance refer to the CECW-P/CECC-G Memorandum for Major Subordinate Commands dated September 19, 2006. The

Subject was “Cost Sharing for Lands Associated with Fish and Wildlife mitigation”. It was pointed out in paragraph 3, “Rather than treating LERR’s needed for fish and wildlife mitigation as part of the non-Federal responsibility to provide LERR’s, the cost of LERR’s needed for mitigation are assigned to the project purpose(s) causing the need for such mitigation and are subject to construction cost sharing established for that project purpose.” Therefore, the Table 17-1 and the Table 17- 2 need to show the LERR’s needed for mitigation as a cost shared item like construction in order to be in conformance with the Memorandum dated September 19, 2006. The cost allocation for Tables 13-5 and 13-6 conforms to the mitigation cost sharing discussed in the memorandum. However, the non-Federal costs on Table 13-6 do not match either Table 13-5 or Table 17-1. The non-Federal costs need to be reconciled and consistent between tables.

District Response (January 2012): Concur. Real Estate Appendix Table 17-1 was not intended to refer to Federal vs. non-Federal cost share allocations. It has been renamed to avoid confusion. GRR Tables 15-5 and 15-6 specify cost allocations.

HQUSACE Assessment (April 2012): **The concern is resolved** based on the changes to the text noted in the response.

(2) *Vessel Transits Key Input to Transportation Cost Savings.* The cost per thousand miles is the same for the general range of operating drafts; therefore, sailing drafts are not used for the computation of circuit distance operating costs and savings. On the other hand, the load factor analysis assumption, on maximum draft and cargo capacity directly affects the number of vessel transits. The reduction in vessel transits is the key input in determining transportation cost savings. Also, sailing drafts are needed for estimating the impacts and costs of tidal delays and passing lanes, therefore they are used in the HarborSym analysis. Please clarify if the load factor analysis had a role in reducing the number of transits in the transportation cost savings model.

District Response (January 2012): The load factor analysis has a significant role in determining the number of transits by vessel class in the transportation cost savings model (TCSM). As discussed in the final Economic Appendix beginning in paragraph 3.4.4, the load factor analysis is input to the TCSM and is used to inform predictions on vessel deployments by trade route and to aid in estimating the amount of Savannah cargo, on average, that would be expected to be carried on various classes of vessels for each channel depth and for each trade route. The actual estimation of number of vessel calls by depth is done by the TCSM. Tables in the final Economic appendix display the number of vessel calls by depth estimated by the TCSM and show them decreasing for channel depths up to a 47-foot channel which, with tidal usage, accommodate the largest representative vessels expected to call at their maximum practical capacity (MPC), which is at design draft for the heaviest cargo routes.

HQUSACE Assessment (April 2012): **The concern is resolved** by the response.

(3) *Vessel Operating Costs Key to Determine Benefits.* Reference is made to Economics Appendix page 68. The USACE Vessel Operating Costs are a key factor in determining economic benefits from loading vessels deeper and shifts to vessels with greater economies of scale. The updating and verification is of great importance for the accurate identification of the National Economic Development (NED) Plan for all deep draft navigation improvement

proposals. The analysis should utilize the latest available vessel operating costs as the project progresses through feasibility report completion and preconstruction engineering and design.

District Response (March 2011): The latest published vessel operating costs are used in the draft report. When new costs are published, a decision will be made depending upon the SHEP report status and schedule as to when the updated vessel operating costs should be incorporated.

HQUSACE Assessment (March 2011): The response has not resolved the concern. Reference is made to Savannah Harbor Expansion Project Transportation Cost and Savings Model: Model Documentation page 91. As an example, applying a simple regression relationship to costs for at-sea service speed and at-sea economic speed according to DWT class allows for the calculation of unit costs per DWT and TEU.

Service Speed; Constant of \$198.72 + (.0386922 * DWT) [R-Sqrd of .964];
 Economic Speed; Constant of \$211.79 + (.031864 * DWT) [R-Sqrd of .977].

			DWT	Hourly Cost At Sea
Service Speed	\$198.72	0.0386922	103000	\$4,184
Economic Speed	\$211.79	0.031864	103000	\$3,494

The hourly cost at sea for Freeport Harbor, Texas was provided in the Feasibility Study Volume 1 page 9-57, Table 46. A 103,000 DWT Foreign Flag Container Vessel hourly costs at sea are \$3,310. Explain why the Savannah hourly costs at sea for both the service and economic speed are higher than Freeport for the same ship DWT.

District Response/Actions Taken (January 2012): Freeport Harbor used FY2008 VOC. The VOC table explicitly provided estimated costs for a 103,000 DWT Foreign Flag Container Vessel. Whenever an analyst requires the VOC for a DWT vessel that is not explicitly estimated in the tables, a straight line interpolation is enacted.

The Transportation Cost Savings Model (TCSM) used a generalized regression equation that estimates VOC using the least squares method in lieu of interpolation. This becomes necessary to the modeling task of estimation VOC for many various DWT vessels during the computational model runs which is more efficient estimating various VOC while minimizing computational overhead. A review of the costs involves a marginal difference of slightly over five percent for the largest vessel, which contribute virtually all the transportation cost saving benefits. The final report used the same VOCs as in the draft report for the formulation evaluation, however, as new VOCs were issued in FY11, the benefits of the recommended plan were updated using values derived from EGM 11-05 and the results can be found in paragraph 6.5.1. of the final Economic Appendix.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the final Economic text noted in the response.

(4) Lightweight Displacement & Vessel Operating Costs. Reference is made to Economics Appendix page 149 and Table 115. The PPX2 vessel has similar deadweight 103,000 metric

tonnes as the design vessel the Susan Maersk at 104,696 metric tonnes. However, the lightweight displacement for the PPX2 vessel is shown as 51,416, while the design vessel lightweight displacement (displacement 142,800 – deadweight 104,696) is 38,104. Clarify why the design vessel’s lightweight displacement was not used in determining operating costs.

District Response (January 2012): The specific issue raised by the comment deals with use of lightweight displacement (LDT) for determining vessel operating costs. This is a question that perhaps should be more directed to CEIWR than to the SHEP PDT as the SHEP study uses operating cost values issued by HQUSACE and CEIWR in accordance with regulations. However, the study team coordinated with CEIWR to address the point raised as it pertains to the SHEP. First and foremost, the LDT values shown in the referenced table of the draft Economic Appendix (table 115) were incorrect. Those values have been removed from what is now table 110 in the final Economic Appendix and replaced with the more meaningful and correct TEU values from the published vessel operating cost (VOC) tables. Secondly, CEIWR states that estimates for lightweight displacement tonnage (LDT) are a relatively recent addition to the VOC tables and are largely presented for basic information and general perspective for measures of vessel size and capacity. While ideally the measure of LDT by definition is a more direct measure of materials employed for hull fabrication and arguably the costs of new build construction, acceptably accurate statistics for LDT have not been historically or readily available for the world fleet. The most significant measures for industry evaluation, planning and fleet forecasts have been the carrying capacity of vessels, most notably the measures of deadweight tonnage (DWT) and volumetric capacity. Accordingly, statistics for these measures of the world cargo fleet are relatively well-researched and have been an emphasis of data compilation by maritime data sources both historically and through the present time. Due to general acceptance by industry analysts that DWT typically exhibits an explanatory association with both LDT and capital investment costs of shipping, DWT has been used as the delineating criteria for both capacity and general estimation of capital costs. As more verifiable information on LDT becomes available, it may ultimately become the preferred measure for correlation to hull investment costs in future edition of vessel operating costs. For additional information and clarification on this issue, the reviewer should contact CEIWR.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(5) TEU Capacity of Vessels. Reference is made to Economics Appendix pages 51 & 76. Per page 76 paragraph 3.5.2.2, “The average TEU capacity of PPX1 vessels is 6,200, while the average TEU capacity of PPX2 vessels is 8,700 (8700/6200 =140%).” However, the design vessel the Susan Maersk is described on page 51 as having a capacity of 8,200 TEU’s. In order to insure that the 1.4 ratio between PPX1 & PPX2 vessels is correct the Table 32 information showing the TEU rating nominal capacity needs to be verified for the seven vessel groups shown on this table. Also, Table 32 was used in the load factor analysis which points out further need of verification of key inputs.

District Response (January 2012): There are slight differences in dimensions of the design vessel used in the engineering modeling studies and the representative PPX2 vessel used in the economic analysis. The engineering design vessel is a specific vessel. The economic model uses representative vessels, but key dimensions such as width are essentially the same. The 1.4 ratio between PPX1 and PPX2 vessels is as described based on comparable replacement capacity and is a general approximation. Sensitivity 4 in the draft report used a 120% (or 1.2 to 1

replacement ratio) and shows insignificant differences in overall benefits and no change in depth optimization results. Scenario 2 in the draft report used a 1 to 1 replacement ratio and results in somewhat higher overall benefits, but again, no change in depth optimization. For the final report, the sensitivity analyses were reorganized, renumbered and rerun. For example, Sensitivity 13 employs a 1 to 1 replacement ratio of PPX1 for PPX2, along with some other adjustments, and the 1.2 to 1 replacement ratio was dropped from consideration. Also note that the baseline condition has changed in the final report to reflect PPX2 vessel deployments in the without condition. Actual draft report values are presented as Sensitivity 17 in the final report for comparison purposes,

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(6) TEU Capacity of PPX2 Vessel. Reference is made to Economics Appendix page 82. The PPX2 vessel does not match the design vessel specifications. The design vessel on page 51 has a nominal TEU capacity of 8,200, while the nominal TEU capacity of the PPX2 vessel is 8,670. Also, the design vessel is 32-feet longer, but two feet less in width. Since the design vessel is larger, the expectation would be that the TEU capacity would be greater rather than less. Please clarify.

District Response (January 2012): While it may appear that a longer vessel would presumably provide a higher TEU capacity, there are many other specifications that need to be considered. For example, a vessel's draft, breadth, and moulded depth all have a bearing in its overall capacity. Ship design can vary significantly from one ship to the next, even if they appear to be comparable. In addition, there are variations in container stowage, ballast requirements, stacking height and requirements for visibility.

For a given displacement two containerhips may be notably different across the dimensions of length, breadth, and draft and more often than not some combination thereof. Thus, it is perfectly reasonable to see a shorter-length vessel with a higher TEU capacity, and vice versa.

If possible, the reviewer is encouraged to undertake a cursory review of the world fleet. This will help to validate the variability of specifications relative to relationships or variation in carrying capacity. Recall that the applied design vessel (in this case, the Susan Maersk) was selected since it reasonably represented the largest physical size of vessels servicing Savannah. Accordingly, it was used in the engineering models and computerized simulations as part of the waterway layout and design. There is no mandate to reapply the same design vessel used in the engineering simulation to the economic evaluation. Also recall that there is much variation surrounding the vessel design. As such, the PDT decided to stratify vessel classes based on maximum summer loadline draft ranges and to apply aggregate statistics within each range. The ranges and vessel characteristics were reviewed by naval architects and were found to be representative of practical ship design, both presently and for the foreseeable future.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(7) Panamax Vessel Draft Capabilities. Reference is made to Economics Appendix page 141. Fourteen percent of Panamax vessels have drafts greater than 38-feet. Discuss the feasibility of including these deeper draft Panamax vessels in the Transportation Savings Cost Model and the HarborSym model. An additional reference is made to GRR page 47. The text pointed out that,

“Some Panamax vessels have draft capabilities of 44-feet or more.” Therefore, economic benefits from deepening beyond 44-feet may accrue to Panamax ships as well as PPX1 and PPX2 vessels. Please clarify the extent to which Panamax vessels are expected to benefit from plans of 44 feet and deeper.

District Response (January 2012): Panamax vessels with design drafts of 44-feet are currently employed on some of the trade routes. That is expected to continue in the future where they are currently present. Whether or not they accrue TCSM benefits is a function of the estimated Maximum Practicable Capacity and Draft (MPC/D) derived thru the load factor analysis. As shown in Table 5-17 of the final GRR, two of the benefiting trade routes, ECUS MED and ECUS EU GULF have changes in MPD from 42 to 44 feet channel depths; therefore, they would be attaining benefits from the TCSM. In addition, Panamax vessels are likewise affected by tidal delays and are therefore including in the HarborSym analysis in which benefits are attained from the reduction in harbor delays.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(8) PPX1 Vessels Draft Greater than 46-Feet. Reference is made to Economics Appendix page 145 and Table 111. For PPX1 vessels there were 15 calls at 46-feet, 10 calls at 47-feet and 1 call at 48-feet. The text states, “The sailing draft distribution for the 46-foot alternative was then held constant for the 47-foot and 48-foot alternatives as the design draft of the PPX1 is 46-feet.” An additional reference is made to the Mediterranean Shipping Company letter of July 6, 2009. “MSC has deployed post panama vessels on services which have called at Savannah the past two years. These vessels were the 5,900 TEU and 6,700 TEU classes of vessels with an overall length of 983-feet a width of 131-feet and a maximum draft of 47.5-feet throughout 2007. The current 41-foot maximum draft restriction at Savannah, translates into 18,000 tons less cargo on board one of our 6,700 TEU class vessels.” Discuss the feasibility of including these deeper draft PPX1 vessels in the Transportation Savings Cost Model and the HarborSym model.

District Response (January 2012): The load factor analysis includes 15 PPX1 vessels ranging in design draft from about 40 to 48 feet, widths of about 123 to 132 feet, and nominal TEU capacities ranging from about 5900 to 6700 TEUs. The PPX 1 vessel used for the economic analysis was selected to be representative of the general class of ships, recognizing both small and larger ships are likely to call. The representative vessel used reflects the predominate characteristics of the projected fleet. Larger ships could be added to the TCSM but if included it would stand to follow that smaller ships should also be added. However, such model refinements would not have any significant affect on overall benefits or plan optimization. A factor more relevant to optimization would be whether there are likely to be deeper drafting PPX 2 vessels, which is addressed in a separate comment herein.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(9) LNG Vessel BU SAMRA Drafts 41-Feet. Reference is made to GRR pages 131 and 132. “All vessels modeled at a 40-foot operating draft.” The LNG vessel BU SAMRA IMO # 9388833 (266,000 bcm) has a draft of 41-feet or 12.5 meters. This vessel was built in April 2008 and represents large cost effective LNG ships. More of these vessels of even larger sizes can be expected in the future. An additional reference is made to Economics Appendix pages 148 and 149. The text states, “For modeling purposes, all LNG vessels were input with a 40-foot sailing

draft.” The LNG vessel BU SAMRA IMO # 9388833 (266,000 bcm) has a draft of 41-feet or 12.5 meters. This vessel was built in April 2008 and represents large cost effective LNG ships. More of these vessels of even larger sizes can be expected in the future. The GRR assumption that LNG vessels all draft at 40-feet needs to be revised. Because of underkeel requirements, a 41-foot LNG vessel is subject to tidal delay.

District Response (January 2012): The 266,000 bcm vessels are included in the HarborSym model runs conducted for the passing lane analysis. While the BU SAMRA does have a design draft of 41 feet, all LNG vessels were input at 40 feet, regardless of size, to ensure that all LNG calls would operate in the HarborSym model as close to possible as current operations within Savannah Harbor. Georgia Port Authority and the Bar Pilots have stated that regardless of the size of an LNG vessel or its sailing draft, a vessel will not be allowed to transit the system until such time that it would reach the dock and begin turning during slack high tide. Therefore, all LNG vessels were given one sailing draft depth so that only one underkeel clearance input was necessary. This ensures that regardless of the channel depth, an LNG vessel will not enter the system till the above scenario occurs.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(10) LNG Terminal Expansion. Reference is made to GRR page 50. The Elba Island LNG expansion is from 4.0 billion cubic feet to 7.7 billion cubic feet. It is not clear if this expansion was taken into account for the vessel meeting analysis. Please clarify.

District Response (January 2012): The expansion of the Elba Island facility is accounted for in the HarborSym analysis. The anticipated number of calls for LNG vessels increases from a total of 120 in 2015 to 167 in 2030. The fleet consists of a range of vessels from 135,000 bcm to 266,000 bcm. However, the facility does not reach capacity during the period of analysis. This is a result of empirical data that demonstrates that currently, domestic LNG facilities operate around 30 to 50 percent of their capacity. The increase in LNG traffic over the period of analysis to 167 calls represents approximately 75/80 percent of the Elba Island facility’s future capacity.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(11) Tidal Delay, Queuing, and HarborSym Model.

(a) Reference is made to GRR page 43. The Mediterranean Shipping Company has left Savannah for Charleston because of concerns about dependable depth. This departure contributed to a further loss of export cargo vessel space that is needed. Since import cargo is generally lighter than export cargo the use of an average draft masks the greater need of the export cargo. Determine if use of average drafts masks the need for deepening.

District Response (January 2012): Average drafts were not used in the analysis. Average amounts of Savannah cargo relative to estimates of total cargo carried on ships when they arrived and departed Savannah harbor were used. These arrivals and departures had a range of drafts, and all sailings from 2005 and 2007 actual calls were used. The data also included differences in inbound and outbound sailing drafts.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(b) Reference is made to GRR page 56. The text notes that, “a 42-foot drafting vessel has only a one hour window before and after high tide.” The tidal delay analysis needs to explain how benefits are derived from this very short window of opportunity.

District Response (January 2012): The tide delay analysis was conducted using the HarborSym model. The model will not allow a vessel to make the transit from the sea buoy to the dock unless there is sufficient channel depth, regardless of the vessel class. HarborSym takes into account the sailing draft and the underkeel clearance inputs along with the channel depth and the allowable tide. The tide data is incorporated in the model using NOAA tide stations. Using this data, the model will determine if a vessel can transit from the sea buoy to its corresponding dock. If the vessel cannot make the transit without violating the tide rule restriction, the vessel is delayed until such time that the rule no longer is triggered.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(c) Reference is made to GRR page 133. It is not clear if the full magnitude of landside dock delays were included in the tidal delay analysis. Please expand on the extent to which landside dock delays were included in the analysis.

District Response (January 2012): The PDT explored the issue of obtaining information on landside costs of tide delay from the GPA. Following coordination with the USACE chief economist it was determined that this information would not qualify as NED benefits. However, while vessel delays due to landside reasons were not accounted for, the delays for ocean side are. A vessel can be delayed for a variety of reasons, for example, insufficient channel depth, another transiting vessel, etc. Also, the unloading rate at the dock is a variable input. The user inputs the likely loading/unloading scenarios (Minimum, Most Likely, Maximum) that ensure a vessel's time at the dock varies slightly throughout the period of analysis.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(d) Reference is made to Economics Appendix page 151. The text pointed out; “Meeting area benefits are calculated using the reduction in the average transit cost for each of the affected vessel classes and the number of vessel calls for each class” An additional reference is made to the CMA CGM letter of July 6, 2009. “Frequent fog on the river can impede navigation. Discuss the feasibility of including queuing in the Harbor Sym model to measure the compounding effect of delays caused by heavy traffic and fog.

District Response (March 2011): Heavy traffic is measured by including all anticipated vessel calls into the analysis. A general cargo class was developed consisting of all vessel classes not anticipated to significantly benefit from the deepening of the harbor, or the inclusion of the passing lanes. The General Cargo class was included in the model runs so that the Container and LNG classes would have to interact with these additional vessels within the system, thereby reflecting a more realistic operating condition. Currently there is not a function in the model that allows for fog. The assumption was made that fog would occur in both the with- and without project scenarios.

HQUSACE Assessment (March 2011): The response has not resolved the concern. The frequency and duration of fog on the river was not discussed. Fog may add to the queuing time.

District Response/Actions Taken (January 2012): Fog is an environmental condition that is anticipated to delay vessel traffic with and without a project in place. According to Environmental Data Service, Monthly Fog *Frequency* in the Continental United States, heavy fog is reported on a particular day in Savannah, GA approximately 9.04% annually. The following table displays the percent chance of heavy fog being reported for each month. For the purposes of this inquiry, heavy fog is defined as restricting visibility to ¼ mile or less.

Month	Percentage
January	9.68%
February	10.71%
March	9.68%
April	13.33%
May	6.45%
June	6.67%
July	9.68%
August	6.45%
September	10.00%
October	12.90%
November	6.67%
December	6.45%
Annual	9.04%

As shown in the table, the percentage of time reaches a high of 13.33 percent and a low of 6.45 percent.

There is a dearth of information on fog duration in our literature search, except to say that the subject is very problematic as evidenced by this excerpt from a NOAA abstract which can be obtained in its entirety @: <http://www.srh.noaa.gov/images/mob/pdf/fogwaf-abs.pdf>

“The prediction of fog *occurrence, extent, duration, and intensity* remains difficult despite improvements in numerical guidance and modeling of the fog phenomenon. This is because of the dependency of fog on microphysical and mesoscale processes that act within the boundary layer and that, in turn, are forced by the prevailing synoptic regime.”

Currently, fog is not an input available in the HarborSym model, however, the inclusion of meeting areas would help to alleviate additional congestion due to a transit delay related to fog. The meeting areas allow for two way transit of Post Panamax vessels. Therefore, including fog in the analysis could potentially increase the benefits associated with the meeting areas. Since the meeting area proportion of project total benefits are so small the PDT suggests that the very

small difference in benefits is dwarfed by the time and expense to attempt quantification and will most certainly not result in a plan formulation effect.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(e) Reference is made to the Maersk letter of July 6, 2009. “Vessel transit time itself is close to time of tidal changes. The transit time to berth 3 is 3-4 hours and the time from low water to high water is 6 hours. Discuss how the HarborSym model incorporates the tidal cycle and the vessel transit times in the channel.

District Response (January 2012): The transit times included in the HarborSym model are based on the distance a vessel must travel along with the anticipated speed. HarborSym includes a minimum and maximum speed for each vessel class within each reach constructed by the model user. The vessel speeds were developed with the assistance of the Savannah Bar Pilots. Once the inputs were entered into the model, the corresponding transit times were evaluated by the bar pilot and adjustments to those speeds were made to ensure an accurate transit time for each vessel class. The tidal cycle is built into the model using NOAA tide stations. The longitude and latitude of a specific area are entered into a model and the surrounding tide stations are populated into the user input. The model will not allow a vessel to transit the system unless that vessel can reach its destination with the necessary depth.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(12) Vessel Call List. Reference is made to Economics Appendix page 137. The vessel call list for Savannah Harbor includes the following specific information about the fleet: arrival date; arrival time; vessel name; entry point; exit point; arrival draft; import/export; dock name; dock order; commodity; units; origin/destination; vessel type; Lloyds Registry; net registered tons; gross registered tons; deadweight tons; capacity; Length overall; beam; draft; flag; and tons per inch immersion factor. If this information is original data it could have been used instead of the synthetic capacity and draft information derived for the load factor analysis. Clarify, if this specific vessel information is original or has been derived.

District Response (January 2012): The call list information included in the HarborSym model has been derived from the data developed throughout the study process. All of the inputs mentioned on page 133 in the final Economics Appendix are necessary to complete a model run. The inputs are not specific to the historic fleet, but generic information provided by the study team.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(13) Less Efficient PX Vessel Trips Increase & Efficient PPX1 Vessel Trips Decrease (Test 3). Reference is made to Economics Appendix page 94. In Sensitivity Test 3, the PPX2 vessels were deployed at 44-feet for all routes. In 2032 at 47-feet, the PPX1 vessel trips decreased from 977 to 716. For the same year and depth, the less efficient PX vessel trips increased from 1,137 to 1,162. An explanation is needed as to why the less efficient vessel trips increase while the more efficient vessel trips decrease.

District Response (January 2012): It is presumed that the commenter intends to refer to 44-feet in 2032 as the number of trips for each vessel class is the same at 47-feet in Sensitivity 3 and

the Baseline in the draft report. The reason for the differences at 44-feet are because the cargo weights, minimum empty containers, and minimum vacant slots, result in MPC/D of PPX2 vessels on some trade routes to be so constrained in a 44-foot channel that PPX1 vessels at a 1.4 to 1 replacement ratio can actually carry more total and more Savannah cargo than PPX 2 vessels. As the TCSM “solves” for number of PX vessel calls, they would naturally tend to increase. Please note that for the final report, the baseline condition has been revised to incorporate more recent information and changed deployment assumptions, and the sensitivity analyses have been reorganized, renumbered and rerun.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(14) Cargo Weight & Export Projections. Reference is made to GRR page 52. During the period 2005 to 2009 the growth of import and export commodities was similar. Yet the long-term exports are expected to double while the long-term imports are expected to triple. Since export commodities are heavier, the projections may understate the need for vessel space for the heavier exports originating at Savannah.

District Response (January 2012): The TCSM was run for both import and export commodities. Because imports exceed exports in both tonnage and TEUs in future years, more vessel calls were needed to meet the import commodity demands. Therefore, import vessel calls were used in the overall analysis. As more calls are needed to meet import demands it is expected that there would be sufficient vessel space to meet the export demands in future years.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(15) Financial Capability & State Legislation. Reference is made to GRR page 68. As noted in the text, legislative appropriations are required by each state for 50% of the costs associated with acquiring replacement dredged material disposal sites. Are there any issues with dredge disposal sites in South Carolina and Georgia? Also, are there any financial capability issues since the 50% share are dependent upon legislative appropriations.

District Response (January 2012): The Georgia Department of Transportation (the non-Federal sponsor) has provided the dredged material disposal sites needed by the Savannah Harbor Navigation Project and has consistently provided the funds needed to expand the capacity of the existing confined dredged material containment areas. Georgia DOT has successfully obtained the funds needed to fulfill its responsibilities as the sponsor. Savannah District has no concerns about the State of Georgia’s support for the Savannah Harbor Navigation Project.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(16) Talmadge Bridge Air Draft Height. Reference is made to Appendix C Engineering Investigations. The air draft of the Susan Maersk and the air draft height of the Talmadge Bridge on the Savannah River are discussed on pages 65 and 67. The Talmadge (Savannah River) bridge has an air draft height of 185-feet above MHHW, as per design drawings provided by Georgia DOT. One carrier interviewed stated they use 3-feet as minimum allowance for air draft. With the antenna up and minimum light draft of 29-feet the air draft of the Susan Maersk is 184.3-feet. Therefore, with the antenna up air draft problems start at 32-feet. With the antenna back and minimum light draft of 29-feet the air draft of the Susan Maersk is 151.4-feet. The ship discussed in the text on page 68 does not match the design vessel. The Maersk upper limit air

draft at design draft of 47.6-feet was 165.7-feet air draft with the antenna up. The air draft for the ship on page 68 was 157-feet for the design draft of 47.6-feet. However it is not clear if the antenna was up. Are there PPX1 and PPX2 vessels with fixed antennas in the projected Savannah Harbor fleet that could not use cargo or ballast to reduce air draft to fit under the Talmadge Bridge air draft height of 185-feet?

District Response (January 2012): Concur. GRR-Appendix C, Engineering Investigations, Section 6.2.4 stated that the maximum height of the Susan Maersk is 65 meters (213.3 feet) with its antenna up. Review of schematic provided by Maersk Line shows that the maximum height (antenna up) is actually 60.56 meters, so we have revised the report. This revision alters the air draft used for the Susan Maersk with antenna up and minimum light draft of 29-feet to 170 feet, which is within the air draft height clearance of the Talmadge Bridge. The minimum height with the maximum 47.6 draft has been revised to 151.4 feet. The fleet mix developed by the economics team includes the air draft limit of the Talmadge Bridge for all vessels.

There are sufficient PPX1 and PPX 2 vessels in the world fleet of less than about 9500 TEU to fulfill the number of vessel calls projected at Savannah harbor that can fit within the air draft restrictions of the Talmadge Bridge under loaded conditions.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(17) Sensitivity Testing.

(a) SPX Vessel Trips Decrease Response with More Cargo Available (Test 7a). Reference is made to Economics Appendix page 103. In Sensitivity Test 7a, the commodity growth rate increases 1% a year. In 2032 at 47-feet, the SPX vessel trips decrease from 633 to 559. However, for the three larger vessel categories the vessel trips increase significantly in response to the availability of more cargo. Explain why the SPX vessel trips decrease with more cargo available.

District Response (January 2012): This discrepancy is a result of an error in the model on the ECSA-WCSA trade route commodity sensitivity forecast. This trade route is a non-benefiting trade route and does not affect the TCSM benefits. This was corrected when the sensitivity analysis was performed for the final report.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the final text as noted in the response.

(b) Tons Per TEU Were Increased but Vessel Calls Increased (Test 10). Reference is made to Economics Appendix page 117. In Sensitivity Test 10, the tons per TEU were increased by (0.5) tons for the routes with light TEU's. The additional weight should have caused fewer vessel calls. However, vessel calls increased. For the year 2032 the PX vessel calls increased at all depths between 42-feet and 48-feet. The magnitude of increase is 10% at 42-feet and 44-feet and 8% at 45-feet. There is a small increase at deeper depths. There is no change from the base case for the three other vessel classes. Determine why more tons per TEU resulted in more vessel calls when the ships carry more cargo per trip. Please clarify.

District Response (January 2012): Concur. There were errors in the input data and structure of Sensitivity Analysis 10. These were revised and corrected when the sensitivity analyses were

performed for the final report. Note: the number designated for the various sensitivity analyses are different in the final report than in the draft report.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the final text as noted in the response.

(c) Additional Cargo Weight Did Not Cause Fewer Vessel Calls (Test 11). Reference is made to Economics Appendix page 119, in Sensitivity Test 11, the vessels loaded beyond maximum practicable capacity. The additional weight should have caused fewer vessel calls. However, vessel calls increased. For the year 2032 the PX vessel calls increased at all depths between 42-feet and 48-feet. The magnitude of increase is 10% at 42-feet and 44-feet and 8% at 45-feet. There is a small increase at deeper depths. There is no change from the base case for the three other vessel classes. Determine why more cargo weight resulted in more vessel calls when the ships carry more cargo per trip. Please clarify.

District Response (January 2012): The vessel calls table for Sensitivity 11 in the draft report was incorrect. The correct table is shown below and is included in the final report. As expected, there are fewer Panamax vessel calls for depths beyond 44 feet. Note: the number designated for the various sensitivity analyses are different in the final report than in the draft report.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the text as noted in the response.

(d) Vessel Trips the Same With Different Sensitivity Assumption for Test 10 & 11.

Reference is made to Economics Appendix pages 117, 119 and 131. The vessel trips are identical for all four vessel types, all six channel depths and all five time periods. However, the net benefits are different. For example, in 2032 at 47-feet, net benefits increase 35 % over the base for test 10 and net benefits increase 25% for test 11. Explain why the vessel trips would be the same if there is a different sensitivity assumption for test 10 & 11.

District Response (January 2012): The vessel calls table for Sensitivity 11 is incorrect in the draft report. See revised table above. The revised information is included in the final report. Note: the number designated for the various sensitivity analyses are different in the final report than in the draft report.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the final text as noted in the response.

(e) Less Cargo Available Number of Vessel Transits Increases (Test 12). Reference is made to Economics Appendix pages 121 and 131. In Sensitivity Test 12, the commodity forecast was adjusted downward to reflect less commodity growth in recent years and net benefits decreased about 1.5%. Even though there is less cargo available the number of vessel transits increases for all vessel types, all depths and all time periods. Verify the accuracy of this counter intuitive result.

District Response (January 2012): The commodity forecast increased in this sensitivity analysis for some trade routes and reduced for other routes, thus changing the forecast of vessel calls by route. The overall effect was an increase in total vessel calls. This sensitivity was run with an abbreviated commodity adjustment and should be considered moot at this point as the

entire commodity and fleet forecast has been revised for the final report along with some other assumptions such as deployment by depth. Please note that the baseline condition has changed in the final report and the sensitivity analyses have been reorganized, renumbered and rerun. Actual draft report values are presented as Sensitivity 17 in the final report for comparison purposes.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the final text as noted in the response.

(f) Inefficient PX Vessels Increased when PPX1 & PPX2 Vessels Available (Test 13).

Reference is made to Economics Appendix page 123. In sensitivity Test 13, the PPX2 vessels call in the without project condition. In this test the efficient PPX 1 are reduced from 2,226 to 716 in the 42-foot without project condition. The less efficient PX vessels increase from 1,290 to 1,414 and the light loaded PPX2 vessels increase from 0 to 1,078. The cost performance of a light loaded PPX2 would be less than a light loaded smaller PPX1. Clarify why the inefficient PX vessels were increased when PPX1 and PPX2 vessels were available.

District Response (January 2012): Due to the PPX2 vessel being heavily constrained in a 42-foot channel, PPX1 vessels at a 140% replacement ratio, as included in the baseline condition, actually carry on average more Savannah cargo. This was revised for the final report along with a new baseline condition.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the final text as noted in the response.

(g) Scenario 2 Adjustment to Savannah Cargo. Reference is made to Economics Appendix page 128. The information describing Scenario 2 states, “Includes adjustment to percent of all cargo that is Savannah.” Explain if the Savannah cargo was adjusted upward or downward or remains the same as the base in Scenario 1.

District Response (January 2012): It remains the same as the base in Scenario 1. This footnote also appears in the base case and each sensitivity analysis and was removed from the tables in the final report.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the final text as noted in the response.

(18) Editorial.

(a) Explanatory Notes Source. Reference is made to GRR page 258 – Table 13-7: Cost Sharing Explanations - Explanatory Notes. The second item under the heading *Non-Federal sponsors must:* states “Provide all Lands Easements Right of Way Relocation and Disposal (with exceptions per page 3) for construction and maintenance.” There is no locator document or footnote information for page 3. Information is needed on the source document that includes the exceptions on page 3.

District Response (January 2012): Concur. Text “(with exceptions per page 3)” was included in error and has been removed from the GRR.

HQUSACE Assessment (April 2012): The concern is resolved based on the changes to the final text as noted in the response.

(b) FIGARO the Largest Vessel to Call on Savannah. Reference is made to Economics Appendix page 146, paragraph 6.2.3.1.3.3 and page 147. The text states, “Due to channel draft limitations PPX2 vessels have not called on Savannah Harbor. Note, the Figaro (8,500 TEU), 1,100 feet long, 140-feet wide, and design draft of 49.5-feet was the largest vessel to call on Savannah (August 27, 2010). A PPX2 vessel the Figaro drafts deeper than the 47.6-feet used as an upper limit for PPX2 vessels. The design draft distribution for PPX2 vessels should not be limited to 47.6-feet. Also, HQ suggests that the text be clarified to say that PPX2 vessels have not been deployed on a regular service to Savannah.

District Response (January 2012): At the time the draft report was prepared, the Figaro had just called at Savannah. Reports and articles at that time seemed to indicate that the Figaro call was primarily a test case and not necessarily a long term run deployment decision. Since that time, several PPX2 vessels similar to Figaro have been deployed on Savannah service lines and recent carrier announcements indicate that more will be deployed in the future. For this reason, PPX2 vessel deployments have been incorporated into the without project condition, as explained in the final Economic Appendix.

HQUSACE Assessment (April 2012): The concern is resolved based on the response and revised vessel deployment information incorporated into the without project conditions analysis.

(c) Loaded Vessel Deeper In Water & Needs Less Air Draft. Reference is made to Economics Appendix page 51. “Another major constraint at Savannah is the Tallmadge Memorial Bridge, a 20-year old, cable-stayed bridge, which provides a vertical clearance of 185-feet. The keel-to-mast height of the Emma Maersk is reported to be 251-feet, so even after adjusting for tide and retractable masts, its air draft exceeds the allowable clearance of the bridge. If such vessels do indeed call at Savannah, they would need to be light loaded considerably.” It is noted that a high tide would raise the vessel further above the channel bottom. Also, a light loaded vessel would sit higher in the channel. The text needs to be revised to reflect the air draft requirements of the vessel in relation to the air draft remaining below the bridge. A fully loaded vessel would be deeper in the water and further below the bridge height. See Appendix C Engineering Investigations pages 64 & 65, paragraph 6.2.4 Air Draft Analysis.

District Response (January 2012): We were incorrect to say that light loading will provide the vessels with adequate clearance. We have revised the text accordingly. We may consider adding this information as well: Based on available information concerning specifications of the Emma Maersk and her sister hulls, these vessels have a fixed minimum air draft of approximately 200 feet. Correspondingly, based on discussions with the pilots and vessel operators and with consideration of variability in tide range, these vessels are simply too large to pass under the Tallmadge Bridge (which is stated to have a minimum air draft clearance of 185 feet referenced to mean higher high water (MHHW)). Even at mean lower low water (MLLW) or allowance for extreme predicted low water levels vessels of the subject specification for height are not afforded sufficient clearance to pass under the bridge.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(d) Panama Canal Expansion. Reference is made to GRR page 67. The dimensions of the existing Panama Canal and the planned expansion in 2014 could also be discussed in the needs section of the GRR. An additional reference is made to Economics Appendix pages 29 and 74. Per Economics Appendix page 29, paragraph 2, the Panama Canal Authority “the current project schedule has construction being completed in 2014.” A summary of assumptions is provided on pages 74 & 75, paragraph 3.5.1. Item 2 states, “When the expanded Panama Canal opens (estimated to be 2015) PPX ships will call on Savannah Harbor in both the without - and with-project conditions on the larger trade routes which are currently constrained by the canal.” The Panama Canal Authority when interviewed regarding expansion plans, the representatives noted that the schedule was extremely conservative and construction would likely be completed in 2013, making the expanded canal available for use in 2014. The sensitivity of the recommended plan to early or later opening of the expanded Panama Canal should be discussed.

District Response (January 2012): As of January 2012, the Panama Canal Authority still indicates that it expects to complete its expansion of the Canal in 2014. Since the Savannah Harbor Expansion Project would not be completed until 2017, a sensitivity analysis of completing the Canal’s expansion earlier than scheduled is not warranted. A sensitivity analysis of a later completion date for the Canal’s expansion is not believed to be warranted, as that work is unlikely to slip the three years required to overlap with completion of the SHEP construction.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(e) Alternative Plans. Reference is made to the bottom of GRR page 34. It indicates that two plans are presented for final consideration, the 47-foot NED plan and the Maximum Authorized 48-foot plan. Note, the project authorization requires agreement in the recommended plan by the Secretaries of the Army, Commerce, Interior, and Administrator of EPA, and the panel is considering an array of alternative plan depths.

District Response (January 2012): The Final GRR & EIS recommends only one plan – the 47-foot depth alternative, which is the NED Plan. Authorization requires agreement prior to construction.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(f) Homogeneous & Nominal TEU Ratings. Reference is made to Economics Appendix page 82. A footnote is needed to explain homogeneous and nominal TEU ratings. Reference is made to page 83. Explain if homogeneous or nominal TEU ratings were used in the TEU capacity input values for table 53.

District Response (January 2012): Nominal TEU ratings were used throughout the report.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(g) Bunkering & Load Factor Analysis. Reference is made to the Maersk letter of July 6, 2009. “We have to choose between bunkering our vessel or reducing cargo intake to meet draft restrictions.” Discuss the role of bunkering in the load factor analysis section of the report.

District Response (January 2012): We will elaborate on the choices operators often need make (evaluating trade-offs between bunkering and cargo) in the revised Appendix, specifically through the following paragraphs:

In the evaluation of vessel loading, draft, and associated needs for waterway depth the vessel operator must account for all factors of deadweight utilization (DWT). In the simplest of contexts, DWT is the weight-carrying capacity of the vessel and includes both cargo and non-cargo components or allowances. Among the non-cargo components are items such as *lubes and stores, potable and gray water, and allowances for stowage of bunkerage*. As such, when a ship has sufficient water depth in which to operate at maximum draft, it may be able to load to its maximum capacity for all components of DWT utilization (stowage or density-to-volume characteristics of cargo notwithstanding). Alternatively, when a vessel is restricted by limited water depth, the operator can sometimes make trade-offs between additional cargo (which typically generates more revenue) and reducing or minimizing some other allowance or constituent of total DWT capacity. Typically the trade-off is between careful adjustment to minimize ballast (related to stability and bending moments) and accommodation of bunkerage versus the loading of marginal cargo. In evaluation of the trade-off for marginal bunkerage, the vessel operator must balance concerns for bunkerage needed for vessel operation plus potential concerns including additional ballast that might be required to maintain trim with too little bunkerage onboard, especially with moderate to heavy cargo capacity utilization.

In the load factor analysis for Savannah Harbor, bunkerage disposition is set or fixed at two-thirds of its capacity. Experience indicates that with heavy cargo capacity utilization or for vessels with loadings approaching their summer loadlines, its bunkerage will generally be one-third to nearly forty percent of its capacity or compensating ballast will often be required for trim. Vessels seldom travel any notable proportion of time with bunkerage disposition above eighty to eighty-five percent of bunkerage capacity, at least for the South Atlantic coast. However, in the load factor analysis full encroachment of unused weight-carrying capacity for bunkerage has been made fully available to\for marginal loading of cargo even with near full cargo loadings, a conservative measure given that the propensity for such practices is often eliminated or reduced and carefully managed when approaching higher cargo capacity use.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(h) Text Regarding Largest Vessel. Reference is made to GRR page 20. The text states, “Largest vessels calling are 6,700 TEU’s, 85,900 DWT, Draft 48-feet, length 984, and beam 131-feet.” The design vessel the Susan Maersk specifications are different. For example the TEU’s should be 8,160, DWT 105,000, length 1,139-feet, and width 141-feet. Since vessels similar to the Susan Maersk currently call on Savannah, the text regarding the largest vessel needs to be revised.

District Response (January 2012): Concur. The final report has been revised.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(i) Channel Depth at Manzanillo, Mexico & Kingston, Jamaica. Reference is made to Economics Appendix page 25. Containership services that transit the Panama Canal have stops at Manzanillo, Mexico or Kingston, Jamaica prior to or after calling at Savannah Harbor. Provide the depth of these harbors that trade with Savannah. According to internet information, Manzanillo, Mexico has a channel depth of 46-feet to 50-feet and the pier depth is 36-feet to 40-feet. Per internet information, the Kingston, Jamaica channel is 36-feet to 40-feet. Dredging contracts have been advertized for Kingston to deepen the navigation channel to 15.7 meters or 51.5-feet

District Response (January 2012): Concur. Channel depths have been added as suggested. It should be noted, however, that the report has been corrected to reference Manzanillo, Panama instead of Manzanillo, Mexico. The channel and pier depths are 46 feet at this location.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(j) Suez Canal Depth. Reference is made to GRR page 45. Provide the current depth of the Suez Canal and discuss if any plans for further deepening are pending. For example, Suez Canal authority is running now a project to increase the depth of western channels of the Suez Canal from 48ft to 52 ft. This project will allow giant containerships heading south to pass through these channels and reduce its total transit time.

District Response (January 2012): Currently, there are no depth issues at the Suez Canal, vessels drafting up to 66 feet can transit the main channel of the Suez Canal.

The Suez Canal Authority completed its planned phase to increase the Canal permissible draft to 66 ft at January 2010. This enabled the Canal to accommodate the following percentages of the fully loaded vessels:

- 62.6 % Of the Tanker Fleet
- 96.8 % Of the Bulk Carrier Fleet
- 100 % Of the Container Ships & Other Ships

The Suez Canal authority is now running now a project to increase the depth of the western channels of the Canal from 48ft to 52 ft. This project will allow giant containerships heading south to pass through these channels and reduce their total transit time. Another project is to widen and improve and the anchorage areas in Great Bitter lake and to construct an emergency garage at the tip of the western channels to be used by giant ships.

Other feasibility studies being conducted by the Suez Canal Authority include:

- Increase the depth of current bypasses, dredging new bypasses to increase the doubled parts of Suez Canal to increase the capacity of Suez Canal and reduce transit time.
- Other planned studies include increasing the allowable draft of ships or doubling Suez Canal.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(k) Saltwater Concerns on Aquifer. Reference is made to GRR page 59. The text states that, “The Engineering Appendix has Aquifer Effects Evaluation.” Due to the importance of the saltwater concerns, a summary of the evaluation should be provided in this section of the report.

District Response (January 2012): Concur. The following paragraph has been added to the GRR on page 52.

The *Aquifer Effects Evaluation Supplemental Study* (see Engineering Appendix, Supplemental Studies DVD) examines the impact of the proposed dredging on the rate of vertical intrusion, which consists of both fresh and salt water, and the resulting groundwater impacts in the Upper Floridan aquifer. Input from various agencies including the USGS, GA DNR-EPD, SC DHEC, the Stakeholders Evaluation Group, and GPA was used to develop a scope of work for the supplemental studies. Study tasks included additional sub-bottom seismic surveys, marine and land drilling, GIS analysis, and 3-D numerical groundwater modeling. The additional investigations provided increased understanding of the geologic and hydrogeologic framework underlying the navigation channel. The overall results of the investigations indicate that Savannah area withdrawals from the Floridan aquifer are the dominant force contributing to the downward movement of salt water through the Miocene protective layer to the aquifer. If the pumping rate remains at present levels, breakthrough of seawater will occur at some downstream locations in approximately 100 to 300 years regardless of the proposed harbor deepening. The proposed deepening would contribute only about 3 to 4 percent increase in total downward flow through the confining layer into the Upper Floridan aquifer and with the much larger lateral flow of freshwater, would have negligible impact on water quality in production wells in the Savannah area.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(l) Real Estate Cost Variation by Depth. Reference is made to GRR page 178 - Table 10-3. The real estate dredging related costs increase between 44-feet and 45-feet. However, these costs go down between 45-feet and 46-feet and also decrease between 47-feet and 48-feet. These costs remain the same between 46-feet and 47-feet. A verification of the non-linear movement of these costs is needed or explain the basis for the high degree of variation in the real estate requirements.

District Response (March 2011): The version of Table 10-3 included in the Draft GRR was in error. It has been revised and updated in the Final GRR.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(m) O&M Costs & Depth. Reference is made to GRR page 181 – Table 10-7. The table title is Total Annual O& M Costs Incremental Deepening. The costs for inner and outer harbor dredging stay the nearly same over the range of depths from 44-feet to 48-feet. However, information on page 209 shows deepening plans require an increase in maintenance. Please clarify for consistency.

District Response (January 2012): Table 10-7 is titled “Total O&M Costs: Incremental Deepening Alternatives (October 2010 dollars)”. In this table the costs for inner and outer harbor dredging stay nearly the same over the range of depths from 44- to 48-feet. In the Inner

Harbor, the amount of O&M material to be removed remains the same for all depths (based upon the sedimentation analysis). The only thing that changes is where the material settles out, resulting in an increase dredging cost due to increased pumping distances. In the Outer Harbor or Bar Channel, the amount of O&M material also remains the same for all depths except for the increase attributable to the entrance channel extension from Stations -60+000B to -98+680B. These two impacts alone account for only \$2,699,000 of the increase in O&M costs, while the other five items account for the remainder of the increased O&M costs.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(n) List of Figures. The revised draft GRR does not have a list of figures. This should be included in the final report.

District Response (January 2012): Concur. A list of figures has been added to the GRR.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(o) Footnote on Draft & Beam. Reference is made to Figures 22, 23 & 24 on Economics Appendix pages 48, 49 & 50, and Table 27 on page 46. The figures and table make reference to ship sizes represented by letter. A footnote is needed to provide the vessel draft and beam associated with each letter. In the absence of size information, the figures are difficult to understand.

District Response (January 2012): The referenced figures from the draft report have been removed in the final Economic Appendix. The fleet forecast was revised for the final report and tables now present fleet information by TEU bands. All tables with ship sizes represented by letter codes have been removed.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

5. RESOLUTION OF CONCERNS FROM REVIEW OF THE DRAFT GRR AND DEIS PRIOR TO COORDINATION.

A. FUTURE WITHOUT-PROJECT CONDITIONS.

(1) Sea Level Change. The forecast of future without-project conditions in Section 5 of the GRR makes no mention of how sea level rise is expected to change conditions in the Savannah River area. The text should include a brief summary of the most likely conditions anticipated during the period analysis with respect to relative sea level changes and how that could affect significant resources including the fresh water wetlands. Reference should be made to the more detailed analysis and sensitivity information included in the Engineering Appendix, so that it is evident that consideration of the EC 1165-2-211 requirements has been addressed during the project investigations.

District Response: The District has revised Section 5.7 of the GRR to provide information on the amount of sea level rise expected in the without project condition and the potential effects that various amounts of sea level rise could produce.

HQUSACE Assessment (November 2010, revised January 2011): The response partially resolves the concern and is sufficient for the draft report. The District has generally provided the information requested. The paragraph that describes what the sea level may have been in 1733 should the current rate be applied in hindsight needs to be clarified, and the paragraph's point made more explicitly. The sentence that states "The Corps' analyses indicate that tidal freshwater marshes could be reduced by approximately 370 acres if the historic rate of sea level rise continues to 2065 should be clarified or revised. Further text changes were incorporated into the coordination draft GRR to fully address the concern. This comment is resolved.

(2) Berth Locations. The Engineering Appendix states that the existing Garden City Terminal berths 1, 2, 3, 8, and 9 have already been deepened to 48 feet and berths 4-7 will be deepened as part of the project improvements. It also indicates that berths 7 and 8 are upstream of the Kings Island turning basin and vessels must be backed up river to be berthed. Some of the berth locations are generally identified in the engineering figures and aerials, but their limits are not provided and not all berths are identified. As part of the existing and without project future conditions the text should clearly identify where the berth areas are at the terminal so that the reader can better understand the discussions of port operations and plan components. See 2-4.b.(1) of ER 1105-2-100.

District Response: Section 6.2.5 of the Engineering Appendix currently states "GPA has already deepened CB 2-3 and 8-9 to safely dock deeper draft vessels that have come into port using the tidal advantage. CB 4-7 will be deepened at a future time." A sentence has been added to this section stating: "There are no current plans to deepen CB 1."

To clarify the locations of each berth, Table 6.2.5-1 in the Engineering Appendix has been modified to include the channel centerline stationing associated with each berth. Also, plates 01 and 02 of Attachment 1 of the Engineering Appendix have been modified to include the locations for each berth.

HQUSACE Assessment (November 2010): The concern is resolved by the response and changes to the Engineering Appendix.

B. ECONOMICS.

(1) Potential Petroleum Tanker & Bulk Cargo Loading Benefits. Most of the benefits are from transportation cost savings from greater container ship capacity due to channel deepening. The second and third benefit areas are from tidal delay avoidance and maneuvering savings due to meeting areas. However, it is noted in a Georgia Ports Authority press release of September 3, 2010, the Colonial Group brings more than 400 vessels a year into its five berths. "Deepening will definitely reduce the cost of operations for businesses such as ours," Said Bill Baker, the Colonial Groups vice president of operations. "For example, when we charter a vessel to bring in petroleum, the more gas we can load on that vessel, the more economically efficient it is," he said. "But we can't fully load our ships because of depth restrictions." And just as the container fleets are getting bigger petroleum tankers are growing as well. "Larger vessels offer substantial

economies, but we can't take advantage of that until the harbor is deepened," Baker said. This input from a potential local petroleum tanker operator needs to be further examined to see if transportation cost savings are applicable to petroleum tankers from additional loading benefits from a deeper channel. Also, the waterborne commerce statistics show more vessel transits for bulk commodities than for tankers, therefore an investigation of the potential for bulk commodities to benefit from harbor deepening needs to be made. Furthermore, it is not clear if the tanker and bulk vessels were included in the Harbor Sym model inputs discussed on page 112 of the Economic Appendix. Explain the basis for not including the tanker and bulk vessels in the benefit analysis. Reference is made to ER 1105-2-100 paragraph (a) on page 43. "If the plan consists of further improvements to an existing project, statistics on current waterborne commerce will provide the basis for evaluation."

District Response: The tanker and bulk class vessels were included in the HarborSym runs in the form of the General Cargo class. Their purpose was to act as place holders to ensure interaction with both the LNG and Container fleets, however, they are not included in the TCSM deepening analysis. The concerns of the Colonial Group were evaluated to determine if these vessels would benefit from the proposed deepening. Reviewing Waterborne Commerce data for entrances and clearances for Savannah Harbor greater than or equal to 38 feet for vessel other than the container class revealed that over the latest four years of available data (2005-2008) there was an average of just under 22 vessels a year. This average includes a high of 38 in 2006. Therefore, the average for 2005, 2007, and 2008 is just over 16. The average number of outbound vessels over this period with a sailing draft of 38 feet or greater was less than 5. Therefore, while the size of these vessels is anticipated to increase over the study life, insufficient evidence was available to demonstrate significant benefits due to deepening.

HQUSACE Assessment (November 2010): The concern has been resolved, by the historic information on the number of transits of the tanker and bulk vessels.

(2) Design Vessel. The design vessel Susan Maersk was built in 1997. This 8,200 TEU vessel has a beam of 140-feet and an overall length of 1,138-feet and a draft of 46-feet. The vessel dimensions for the planned Panama Canal 2014 include a width of 160-feet; a length of 1,200-feet; and a draft of 50-feet. According to the Wikipedia Encyclopedia as of July 31, 2010, there are 127 container ships with a greater TEU capacity than the Susan Maersk. These larger capacity container ships have either greater width or length or draft than the Susan Maersk. Therefore, the recommended channel as based upon the design vessel may be insufficient to accommodate a substantial portion of the world containership fleet. Note that, the trade routes that utilize the Suez Canal are not as size constrained as the routes using the Panama Canal. Explain in the final report, that the channel dimensions based on the Susan Maersk will be sufficient for the latest Post-Panamax ships built to fit into the Panama Canal as well as the ships that transit the larger Suez Canal. Reference is made to ER 1105-2-100 paragraph (4)(a) on page E-46, "Use estimates of future fleet consistent with domestic and world fleet trends." Also see 3-11.c. and 3-12 of EM 1110-2-1613 which indicate that the design ship is chosen as the maximum or near maximum ship size in the range of ship sizes from the vessel fleet. The design ship should be able to make safe transit while sailing through the proposed navigation channel under the design transit conditions.

District Response: The PPX2 vessel (i.e., Susan Maersk) used in the Economic Analysis is a representative vessel of a class of vessels which are about the largest that are expected to call

ECUS ports in the foreseeable future. The vessels are principally classified by width, with the PPX2 ranging in width from about 141 feet to 146 feet, and TEU capacities up to about 9,500 TEUs, and design drafts of about 40 feet to 48 feet with preponderance. Larger vessels, in excess of this size, exceed 10,000 TEUs and have widths of up to about 160 feet. Based on information from MSI, Drewry's, the carriers and other industry experts, the PDT believes that these are representative of the types of vessels that are anticipated to call USEC ports in the foreseeable future on any regular basis. Vessels in the 10,000 TEU and greater range are more likely to be deployed on trans-pacific, and FE, MED, and EU services. Savannah also has air constraints with the bridge that would further diminish the likelihood of vessels much larger than the selected PPX 2 range to call. In addition, no engineering simulation runs have been made for larger vessels. It is believed by the PDT that the design vessel selected for Savannah is appropriate for the types and sizes of ships anticipated to call in the with project condition. It should be noted, however, that larger vessels may on occasion call with special navigation precautions and arrangements (e.g., riding tide, tug assistance, closing port to others, etc.).

HQUSACE Assessment (November 2010, revised January 2011): The response has partially resolved the concern, by the explanation of the basis for selection of the design vessel and is sufficient for the draft report. However, the load factor analysis for the final report needs to include deeper draft vessels similar in length and width as the design vessel the Susan Maersk. The TCSM does not load PPX2 vessels beyond 47.6-feet. The Charlotte Maersk and three other similar size ships with a design draft of 49.2-feet were built by Maersk in 2002. These vessels have the same length and width as the Susan Maersk. The DWT is slightly more at 110,100 compares to 104,696. However, the tonnage displacement of the four ships built in 2002 is 142,800 which are the same as the Susan Maersk built in 1997.

District Response (March 2011): An updated MSI fleet forecast is expected 14 March. A final response to this OWPR comment will be provided after review and analysis of this new data.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final District response.

District Response/Action Taken (January 2012): A new world fleet forecast is presented in the final report beginning in paragraph 3.4 of the Economic Appendix. Table 29 shows a detailed view of the existing world fleet for containership vessels in the 7,600 to 12,000 TEU class along with size ranges for width and design draft. Of the existing world fleet in the Super-Post-Panamax class, about 15% are less than 145 feet in width and greater than 48 feet in design draft. While about 60% of these size vessels are between 47.5 and 48 feet in design draft. As the text in paragraph 3.4.2.3 explains, future builds in vessels with design drafts greater than 48 feet, are expected to be greater than 145 feet in width, which exceeds the design specifications for the improved Savannah harbor channel. The PDT maintains that the selected PPX2 vessel design is representative of the majority of vessels of this class that will call Savannah in the foreseeable future.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(3) Center Quadrant Maintenance & PPX2 Maneuverability. Reference is made to page 178 of Draft GRR. Projected increases in maintenance dredging volumes and project costs due to

channel deepening are based on full-width maintenance of the channel. Also, the economic analysis assumes maintenance sufficient for vessel speed and maneuverability. Current practice, due to funding limitations, is to maintain only the center two quadrants of the Federal channel. It is not clear if the PPX2 vessels can maintain their speed and maneuverability if the channel is not fully maintained. Also, would the HarborSYM Model inputs be affected? Reference is made to ER 1105-2-100 paragraph (d) (3) on page E-50. The purpose of Corps of Engineers' underkeel design standards is to provide clearance between the ship's bottom and a channel's bottom, which minimizes the risk of grounding by a design vessel under design conditions in the design channel."

District Response: ER 1105-2-100, paragraph (1)(c) page E-42 states that for the without project condition that "Authorized operation and maintenance is assumed to be performed in the harbors and channels over the period of analysis unless clear evidence is available that maintenance of the harbor is unjustified." However, in order to more accurately reflect current practice, wording in the Draft GRR in Section 10.3.6 on page 178 and in the Engineering Appendix on page 236 has been changed to read "Current practice is to conduct maintenance dredging of critical shoals within the navigation channel to the limit of funding and to seek additional funding for the remainder of critical shoals and other shoals growing in the sides of the channel".

HQUSACE Assessment (November 2010): The concern is resolved, by the text changes in the draft GRR and Engineering Appendix.

(4) Environmental Design & Side Slope Instability. Reference is made to page 135 of Draft GRR. The Environmentally sensitive channel design for each of the alternative plans includes maintenance of the existing channel side slopes and extending them downward, thereby narrowing the channel slightly at each alternative depth increment. However the typical channel design would maintain the existing bottom width and extend the side slopes outward. Any side slope instability will make it difficult to maintain channel width needed for PPX1 and PPX2 vessels. Explain if the potential maintenance cost increase has been included in annual costs. Also, clarify if vessel speed and maneuverability will be affected. Also, would the HarborSym Model inputs be affected?

District Response: As designed, during project construction, the new channel toe would be dredged to the existing side slope. The method of cutting to the narrower bottom width does not require undercutting of the existing channel slope. Channel widths were verified for the design vessel by the Ship Simulation Study. In areas where additional channel width was determined to be necessary, the channel was deepened on the existing channel toe or wideners included.

HQUSACE Assessment (November 2010): The concern is resolved. The cutting to the narrower bottom width does not require undercutting of the existing channel slope.

(5) PPX2 Vessels & Transit of Savannah River. Post-Panamax vessels were represented by TEU bands 5,200 to 7,600 (PPX1) and 7,600 to 12,000 (PPX2). The PPX 2 vessels start calling at Savannah in 2015 and exceed the number of PPX1 calls in 2022. The economic Appendix on page 81 shows PPX2 vessels with an overall length of 1,106 feet and a width of 143 feet. It would appear that the smaller size PPX2 vessels would be in a size class able to easily transit the Savannah River. Provide clarification on the availability of smaller PPX2 vessels since this size

plays a significant role in the economic benefits. Provide information on the availability and numbers of smaller PPX2 vessels since this size plays a significant role in the economic benefits.

District Response: The Savannah Harbor study contracted with MSI to develop a world fleet forecast by both TEU class and vessel hull class. The hull classes were defined by design draft and width. A graphical summary by draft class is shown in Figure 24 while the width class is not shown. There are overlaps in hull classifications by depth class and TEU class. The primary differentiation between PPX1 and PPX2 are vessel width, with PPX1 ranging from about 115 to 138 feet and PPX2 ranging from 138 to 160 feet in beam. The smaller size PPX2 vessels as defined by depth, range from 42 to 46 feet in design draft. According to the MSI World Fleet Forecast only 9 of these vessels are currently in existence and no additional orders are on the books. These smaller size PPX2 vessels are not anticipated to be a significant portion of the world fleet. Therefore, the economic analysis focused on PPX2 vessels ranging from 46 to 48 feet in design draft, widths of 139 to 150 feet, and TEU capacities ranging from 7,200 to 9500 TEUs. The selected design vessel evaluated was chosen to represent the preponderance of PPX2 vessels expected to call Savannah and most ECUS ports. While smaller draft size PPX2 vessels may call Savannah in the without project condition, they make up a very small share of the world fleet. A table has been added to Section 4. Transportation Cost Savings Benefit Analysis which shows the forecast Savannah share of the world fleet by vessel TEU class.

HQUSACE Assessment (November 2010, revised January 2011): The concern was resolved by the response information, which included a table showing the Savannah share of the world fleet by vessel TEU class.

(6) TCSM & Freshwater Sinkage. The freshwater sinkage at Savannah varies by size of ship and the range from large to small vessel is about 1.2-feet to 0.5-feet. The Savannah Harbor channel has less saltwater than the water beyond the ocean bar. It is not clear if the Transportation Cost Savings Model (TCSM) has accounted for the freshwater sinkage in the vessel loading of the large containerships and the resulting need for additional channel depth. Explain if the TCSM and HarboSYM Model account for freshwater sinkage.

District Response: Compensation for freshwater sinkage is similar to allowances for vessel squat in that it is allowed for within the context of total underkeel clearance requirements exhibited by pilot practice and rules which have been incorporated as an input to the TCSM. Correspondingly, transit drafts employed for HarborSym are based on actual transit drafts for containerships with input for requirements of underkeel clearance specific to Savannah Harbor also as derived from pilotage rules and practice.

HQUSACE Assessment (November 2010): The concern is resolved. Freshwater sinkage is included in the total underkeel clearance requirements.

(7) Vessel Maneuvering Benefits. Reference is made to page 40 and 54 of Draft GRR. As noted on page 40, “Existing ships are experiencing problems associated with turning capabilities and overall maneuverability in certain reaches of the inner harbor.” However, the information on page 54 appears to contradict the information on page 40. “There are very few operating restrictions, other than vessel draft, for container traffic transiting the Savannah Harbor.” Transportation maneuvering benefits may be applicable for the non-container ship fleet. Later in

the report benefits are documented for widening the channel at the bends for container ships. Clarify if, maneuvering benefits are applicable for other ship types.

District Response: Operating restrictions for container traffic transiting the Savannah Harbor are based on existing channel depth and width. With the exception of two Post-Panamax vessels, it is the usual practice to meet container ships in the straight channel segments. Container vessels can also pass empty liquefied natural gas (LNG) vessels. When a loaded LNG vessel is entering the channel, the channel must be clear within a 1 mile radius of the vessel. Pilots typically require container ships to operate with a minimum of 4 feet of underkeel clearance. Any vessel with a reported sailing draft of more than 38.0 feet is effectively using the tide to gain sufficient underkeel clearance. The tidal range at Savannah is approximately 6.9 feet.

HQUSACE Assessment (November 2010): The concern was resolved, by the response description of operating requirements.

(8) Transportation Cost Savings Sensitivity to 1% Growth Decrease. For GRR sensitivity analysis #8, a 1% decrease in the commodity growth rates results in a 21% decrease in transportation cost savings across the depths from -44-feet to -48-feet. However, for GRR sensitivity analysis #7, a 1% increase in commodity growth rates results in a 5% increase in transportation cost savings. Under these two sensitivity tests, the Economic Appendix shows continued economic feasibility and optimization of depth at the recommended plan depth of 47-feet. Also, as pointed out in the Battelle Panel Comment 4, the overall growth rate is about 5.4% a year, and additional sensitivity tests to see the impact of a 2% and 3% change in the growth rate are needed. Also, an optional sensitivity test with no cargo growth beyond the base year would establish if project benefits and economic feasibility are dependent on cargo growth.

District Response: Additional sensitivity analyses of plus and minus 2% and 3% change to growth rates have been included in the draft report along with a no-growth scenario for the TCSM. These sensitivity analyses can be found in the Economic Appendix, Section 5. Sensitivity Analyses.

HQUSACE Assessment (November 2010): The concern is resolved. Additional sensitivity tests at lower growth rates and the no-growth rate scenario have been included in the draft report.

(9) Tidal Delay Time & Inventory Benefits. The shallow-draft inland navigation improvement proposals consider the hourly costs of equipment such as the tug and barges as well as fuel and crew costs. Also, the benefits from reducing the delay in lock transit time include the inventory time value of the cargo in the barges. The dollar value of bulk cargo in the barges is usually less than \$1,000 a ton. In spite of the fact that, the value of a ton of deep draft cargo such as computers is many times that amount, deep draft does not include the time value of cargo. In this Savannah case the deep-draft navigation benefits do not account for the inventory value of cargo delayed by tides. Yet, the high value cargo is on a just in time inventory schedule to meet urgent direct consumer needs. Computerized inventory systems have greatly reduced the amount of inventory carried to meet customer needs. Therefore, tidal delay benefits are greatly understated in the modern economy of just in time inventory. The time value of high value deep draft cargo needs to be included to give a fair estimate of economic benefits. Note that, ER 1105-2-100 provides a conceptual basis for reduced interest and storage costs benefits in paragraph E-10b on page E-38. "Specific transportation savings may result from the use of larger vessels, more

efficient use of larger vessels, more efficient use of existing vessels, reductions in transit time, lower cargo handling and tug assistance, reduced interest and storage costs such as from an extended navigation season, and the use of water transportation rather than an alternative mode.” It is suggested for the final report that potential economic benefits from reduction in inventory costs be considered in the economic analysis.

District Response: The average delay per vessel calling at Savannah is generally not of long duration (less than ¼ of a day). No methodology has been developed, tested, and approved, to measure cargo inventory benefits attributable to tidal delays. This should be subject of research efforts to develop a suitable methodology external to the Savannah Harbor Expansion study efforts.

HQUSACE Assessment (November 2010): The response has partially resolved the concern, but is sufficient for the draft report. As stated in the response, additional research is needed to develop a suitable methodology to measure cargo inventory benefits attributable to tidal delays. Also, explain how queuing affects delay times due to future traffic increases in the final report.

District Response (January 2012): Should research efforts be funded to develop a suitable methodology to measure cargo inventory benefits, the Savannah study team would be pleased to provide any and all information from this study. However, such research was beyond the scope of the Savannah GRR and was not conducted as part of those efforts. With respect to queuing affects on delay times, the HarborSym analysis includes queuing while awaiting tidal windows at both the entrance channel and the dock.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(10) Tidal Delay. Reference is made to GRR page 55. A vessel loaded to the channel’s maximum operating draft of 42-feet has only a one-hour window before and after each high tide. This narrow window increases the risk that the vessel may miss the opportunity for transit due to LNG vessel operations or cargo related delays. Has the residual interaction with LNG vessels been accounted for in the tide delay benefits after construction of the meeting areas? Also, reference is made to GRR page 132. The tide delay benefits are higher at 45-feet to 46-feet than at the lower depth of 44-feet to 45-feet. Otherwise, the tide delay benefits decrease as the project depth increases.

District Response: The tide delay and the meeting lane model runs were run separately to avoid the possibility of double counting benefits. The tide analysis was conducted using the HarborSym model with the current channel configurations. Once the benefits were determined for tide, the meeting area analysis was conducted using HarborSym again assuming some form of deepening would occur. For example, comparing the anticipated fleet at 46 feet without the meeting area to the with project scenario assuming the meeting areas were in place. Under each deepening scenario run, LNG vessels interacted with the remaining vessel classes. As for the shift in tide delay benefits, while there is not a significant shift in the number of Panamax or Post-Panamax vessels from one depth to another (except for the existing condition – 42 foot), there is a shift in the sailing draft distributions from 44 to 45, and 45 to 46 feet that equates to the differences seen in the estimated benefits. However, from 46 to 48 feet, the sailing draft distribution is similar, which in turn, causes the benefits to decrease as there is a longer tide window in which the deeper drafting vessels can transit.

HQUSACE Assessment (November 2010): The concern is resolved. The response clarified the roles of tidal delay and the meeting lane model.

(11) Basis for Vessel Capacity Utilization. Table 34 on page 65 of the Economic Appendix is very important in understanding the basis for vessel capacity utilization. The ballast values in the Economic Appendix have been updated. For example, these values for the deeper drafts have increased by about 2,500 tons. This table needs to be updated with a specific world trade region scenario and additional explanatory footnotes for the current descriptions in each row. The report needs to reflect the correct data used in actual Transportation Cost Savings Model runs.

District Response: Concur. The referenced table has been revised in the draft report.

HQUSACE Assessment (November 2010, revised January 2011): The concern is partially resolved. The vessel capacity utilization table has been revised in the draft report. The revised table was in the Economic Appendix but not in revised GRR page 85. Table 5-18 Example Load Factor Capacity Analysis needs to be revised like the Economic Appendix. Also, Table 34 in the Economic Appendix shows how vessel capacity is utilized. However, footnote 5 did not include the bunkering or fuel needed for operations. Because of the weight/ space requirements bunkering or fuel should be included as a separate item.

District Response (March 2011): Both reports will be written to ensure consistency. Further, additional text will be added to Footnote 5 in the vessel capacity utilization table.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final report.

District Response/Actions Taken (January 2012): The footnote has been revised to state that Operations includes bunkering. Bunkering (fuel) amounts to about 7900 tonnes.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(12) Susan Maersk TEU Capacity. Reference is made to pages 41, 67 and 82 of Draft GRR. “The design vessel is the Susan Maersk, which is a 6,600 TEU vessel with a beam of 140-feet and an overall length of 1,138-feet. The 6,600 TEU Susan Maersk was built in 1997.” Note, the Economic Appendix on page 51 shows the Susan Maersk at 8,200 TEU capacity. The Draft GRR outdated information should be corrected.

District Response: Concur. The inconsistencies have been corrected in the draft report.

HQUSACE Assessment (November 2010): The concern is resolved. The TEU capacity of the Susan Maersk has been corrected in the draft report.

(13) Interest Rate. Reference is made to page 162 of Draft GRR. The current interest rate for FY 2010 is 4.375%. See Economic Guidance Memorandum, 10-01, Federal Interest Rates for Corps of Engineers Projects for Fiscal Year 2010, dated 26 October 2009. Also, the mitigation plan proposes to fund the lump sum compensation for the striped bass by use of an interest rate

of 4.625% over 50 years to obtain the present worth of the annual funding stream. The interest rate for the most current fiscal year should be used.

District Response: Concur. The lump sum mitigation funding will be corrected for the draft report to apply the FY 2010 discount rate. For the final report, benefits, costs, and compensation values will be adjusted to use the FY 2011 discount rate of 4-1/8%.

HQUSACE Assessment (November 2010, revised January 2011): The response partially resolves the concern and is sufficient for the draft. The lump sum mitigation funding was to be corrected in the draft report by basing calculations on current water resource interest rates. It is noted that the latest revised draft GRR did not correct and apply the FY 2010 discount rate of 4 3/8%. The unrevised GRR used 4 5/8%. It is expected that the final report will use the FY 2011 discount rate of 4 1/8%.

District Response (January 2012): The FEIS uses the FY12 discount rate in its calculation of a lump sum payment to compensate for actions to mitigate for adverse impacts to Striped bass.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(14) Transportation Cost Savings Model (TCSM) and maximum practical capacity (MPC).

Reference Economics Appendix, Page 77, Paragraph 4, “The TCSM [Transportation Cost Savings Model] does not explicitly account for vessel sailing drafts.” This statement is contrary to the TCSM analysis described. The TCSM relies on the MPC calculated in the load factor analysis. At any given channel depth, the MPC unique to a vessel class and route implies a maximum practicable loading draft. Savannah cargo’s share of that MPC is based on historic Panamax vessel data for each trade route. The same share of vessel capacity was applied to the MPC of the forecasted Post-Panamax vessels. The key point here is that the vessel is at its MPC and Savannah cargo is claiming a share of it. If the MPC is the denominator, then it follows that the vessel is loaded to its MPLD. Furthermore as displayed in Table 37, the TCSM relies on estimated unit costs by vessel class, route, and channel depth that were based on the maximum practical capacity. The TCSM is relying on MPC assumptions for costs and vessel loadings, and therefore it follows that vessels would be sailing at their MPLD.

The vessel draft distributions presented in Tables 95 and 96 for PPX1 and PPX2 were developed independently of the TCSM, rather than derived from it, even though the TCSM as applied results in a fleet distribution, albeit all vessels clustered at their MPC at each channel depth. The two tables below represent OWPR calculations of PPX2 and PPX1 vessel calls by draft in the year 2032, derived from information presented in Tables 95-96, as well as Tables 81-85. The highlighted area represents the MPC range for the respective vessels at each channel depth. Note that the constructed distribution suggests that only a fraction of forecast vessels will call at their MPC, yet the TCSM analysis assumes that all vessels realize the efficiencies of MPC cargo capacity and operating costs when calling at Savannah.

2032 PPX2 Vessel Calls by depth computed by OWPR														
TOTAL	Depth	< 37'	38'	39'	40'	41'	42'	43'	44'	45'	46'	47'	48'	49'
891	44'	383	45	45	62	98	125	36	27	18	18	9	27	0
1035	45'	238	31	83	93	155	155	83	62	52	31	21	31	0
1078	46'	140	11	75	97	194	162	119	86	75	54	32	32	0
1078	47'	75	11	54	97	183	162	151	97	108	54	54	32	0
1078	48'	75	11	54	97	183	162	151	97	108	54	54	32	0

Source: Source: Economics Appendix, Page 127, Table 96; Page 117, Tables 81-85 Total PPX2 Vessel Calls

2032 PPX1 Vessel Calls by depth computed by OWPR														
TOTAL	Depth	< 37'	38'	39'	40'	41'	42'	43'	44'	45'	46'	47'	48'	49'
2226	42'	1291	423	67	67	89	289	0	0	0	0	0	0	0
903	44'	397	45	54	54	117	126	36	27	18	18	9	0	0
759	45'	182	23	61	68	121	121	61	46	38	23	15	0	0
716	46'	93	14	50	64	129	115	86	57	50	36	21	0	0
716	47'	93	14	50	64	129	115	86	57	50	36	21	0	0
716	48'	93	14	50	64	129	115	86	57	50	36	21	0	0

Source: Source: Economics Appendix, Page 125, Table 95; Page 117, Tables 81-85 Total PPX2 Vessel Calls

There appears to be a major disconnect between the container fleet draft distribution derived by the TCSM and the draft distribution constructed for the HarborSym analyses. The TCSM overstates benefits attributable to Savannah Harbor deepening given its assumption that all vessels are operating at their MPC over the entire itinerary at all times. While vessels can and will operate at MPC, and certainly there will be occasions that vessels operates in excess of MPC, it is not a sustainable condition, nor is it necessarily a desirable state for carriers. At the point of MPC, carriers will make decisions to add similarly-sized or larger vessels to their rotation. As capacity is added to the fleet, there would be periods of operating at less than capacity cycling back to the point of MPC and fleet adjustments. The TCSM analysis, and resulting transportation cost savings, should be revised to correspond to the vessel loading and operating costs implied by the HarborSym fleet distribution. The revisions to the LFA will be the critical input to this reconciliation between fleet distributions.

District Response: The TCSM does not directly use sailing draft distributions, nor does it derive or otherwise predict sailing draft distributions. However, the TCSM, including the number of vessels calls by class by trade route, is used to inform the estimations of sailing draft distributions used in the HarborSym analyses. The TCSM estimates circuit distance transportation costs and savings allocated to SHEP for the without and with project conditions to and from the harbor bar entrance using cost per thousand miles, total trip distances, and Savannah’s share of estimated cargo carried on vessels when arriving and departing Savannah. The HarborSym analysis estimates the vessel costs while vessels are within the limits of the Savannah Harbor. The TCSM does not assume that all vessels on each trade sail in and out of Savannah at their respective MPCs. Sailing drafts vary significantly throughout vessel itineraries, but the cost per thousand miles is the same for the general range of operating drafts; therefore, sailing drafts are not necessary for computation of circuit distance operating costs and

savings. However, sailing drafts are needed for estimating the impacts and costs of tidal delays and passing lanes, therefore they are used in the HarborSym analysis. MPCs and MPDs are used as “proxies” for the fact that sailing drafts on different routes vary from each other based on relative cargo weights, empty containers, and vacant slots. MPC’s are used to make informed judgments as to what channel depth larger vessels would likely be deployed by trade route and how vessel operating drafts and loads are expected to respond to deeper channel depths at Savannah. Sensitivity analyses are made around these estimates and judgments. The Load Factor Analysis (LFA) is used to estimate MPCs, MPDs, and historic cargo carried on vessels to and from Savannah Harbor. The LFA is also used to estimate vessel costs by class per thousand miles, and vessel cost per ton per thousand miles. The LFA is used in three different ways as input to the TCSM as follows:

- Savannah Share of Vessel Capacity. Using 2005 and 2007 vessel call data for Savannah for Panamax and Post-Panamax vessels, the LFA was used to estimate the percent share of Savannah cargo that would be carried on average by Post Panamax vessel calls. The LFA was used to estimate the MPC for each class of vessel for each trade route with the existing channel. The Savannah share of vessel capacity utilization was based on actual Savannah cargo carried, and the estimated total vessel cargo at MPD. In other words, actual Savannah cargo is used as the numerator, and vessel capacity at MPD is used as the denominator. Resultant values for imports for each trade route are shown in table 45 of the economics appendix. The resultant average Savannah cargo carried on PPX 1 and PPX 2 vessel calls for each channel depth is shown for two example trade routes in table 41.
- Vessel Deployment. The LFA estimates of cost per ton per thousand miles for each trade route at various channel depths at MPC for Panamax, and PPX 1 and PPX 2 vessels is used to inform deployment decisions. As the channel is deepened, the relative economic efficiency between the vessels classes can change giving one class an economic advantage over the others. A comparison of unit costs of Panamax and PPX1 and PPX2 vessels derived from the LFA is used to predict at what channel depth these changes occur. The assumption is that when a particular vessel class can attain a sailing draft equal to or exceeding its MPC in the Savannah channel, carriers will deploy the vessels to Savannah. Comparative costs per ton per thousand miles by the relevant route and for each channel depth are shown in table 37. For all trade routes anticipated to be affected by Savannah harbor improvements, the PPX 1 vessels are less costly at MPC than the Panamax vessels and they are already deployed on some trade routes that are not restricted by the Panama Canal. Therefore, PPX 1 vessels are expected to call Savannah in the without project condition. The assumption is not that all vessels of any particular class will sail at their MPC/MPD, but rather will be deployed to Savannah at the channel depth that allows them to attain these sailing drafts cost effectively. This assumption is examined and tested in the sensitivity analysis by the 44 ft, 42, ft, and plus one and minus one foot deployment sensitivities for the PPX 2 class of vessels.
- Savannah Share of Route Costs. The LFA was used to estimate the percent share of each trade routes total circuit distance operating costs attributable to Savannah cargo. This share is calculated similar to the Savannah’s share of vessel capacity, but includes the weight of the containers carried, both laden and empty, and is based on the actual observed operating drafts from the 2005 and 2007 vessel call data. In this calculation, total Savannah cargo plus laden and empty container weight is used in the numerator and

total estimated vessel tonnage (cargo and container weight) carried for all vessels calls in 2005 and 2007 is used as the denominator. Resultant values are shown in table 45.

HQUSACE Assessment (November 2010): The response has partially resolved the concern, but is sufficient for the draft report. The TCSM does not assume that all vessels on each trade sail in and out of Savannah at their respective maximum practical capacity (MPCs). The cost per thousand miles is the same for the general range of operating drafts; therefore, sailing drafts are not used for the computation of circuit distance operating costs and savings. However, sailing drafts are needed for estimating the impacts and costs of tidal delays and passing lanes, therefore they are used in the HarborSym analysis. It is recommended that the District's response be revised for the final report. There is a need to more completely describe how the MPC is used, and how transportation costs were apportioned to Savannah cargo, and implicitly, how the remainder of the cargo is apportioned to the remainder of the voyage cost.

District Response (March 2011): Concur. Paragraph 4.1.3 will be revised to more clearly explain how transportation costs and savings are apportioned to Savannah.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final report.

District Response/Actions Taken (January 2012): MPC is used in the final Economics Appendix primarily as a denominator in an equation in the TCSM to estimate what share of vessel capacities on average are expected to be dedicated to Savannah cargo. (Reference Tables 44, 45, 46 and 47 for PPX vessels.) MPC is used in lieu of design capacity to capture the differences in vessel loadings among the trade routes, and how the vessels are expected to react to different channel depths. Transportation costs were apportioned to Savannah cargo, based not on MPC, but rather on estimates of total historic cargo and box weights on vessels when calling Savannah divided by the historic actual cargo and box weights of Savannah cargo. Paragraph 4.2 of the final Economics Appendix explains how transportation costs were apportioned to Savannah cargo. In addition, the final Economics Appendix has been revised beginning with paragraph 3.4.4. to more completely describe how LFA is used and how MPC is determined and used in the analysis.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report. This also resolves ATR concerns.

C. PLAN FORMULATION.

(1) DMMP , Main Report pgs. 29, 36. The text on page 29 says a DDMP was completed in 1997 with a limited update in 2003. However, page 36 states that the DMMP was updated in 2007. Consistent information needs to be provided throughout the report to avoid confusion. The discussion on page 29 should be updated to indicate that the DMMP was further updated by the June 2010 Dredged Material Management Plan located in the Supplemental Materials for Engineering Appendix disc provided with the report. In addition, the June 2010 Dredged Material Plan is not a complete DMMP. There are some issues regarding the DMMP analysis that need to be clarified in the report. These include:

- Issue (1)A: Has the base plan been identified adequately for the with-project conditions? It is not clear whether the beneficial use of entrance channel material offshore of Tybee Island is the most economical plan in comparison to the ODMDS. The AFB indicated that beneficial use was less economical than use of the ODMDS but the DMMP states that beneficial use can be used when it is shown as economical. The GRR states that near shore placement satisfies the CZM requirements, but it doesn't clearly state that it is the most economical disposal option. However, the Engineering Appendix notes in Section 2.2 that ERDC studies show that about 78% of the erosion problem at Tybee Island is caused by the navigation project. Therefore near shore placement of sand may result in partial mitigation of the erosion problem and lower renourishment costs for the shore protection project. Any cost savings could be considered as NED benefits associated with the beneficial use and may make it more economical than the ODMDS, therefore qualifying as the base plan.

District Response: Section 1.4.6 on page 30 of the Draft GRR was updated to explain the difference between the September 2003 DMMP and the Annual Work Plans that followed. The Base Plan for the with-project condition has adequately been identified on page 37 of this document and is that from the FY 2003 Dredged Material Management Plan (Sep 2003) and reflected in the Annual Work Plans since then. The with and without project Base Plans are exactly the same except that in the with-project "Base Plan" the dredged material capacity taken up by the new work material will be replaced by the project. Beneficial placement of the new work material in the near shore zone will allow Savannah District to complete the overall project in a more timely manner than placing it in the ODMDS. This is primarily due to hopper dredge restrictions on the bar channel. Placement of material into the ODMDS is limited to a hopper dredge while placement of material in the proposed near shore zones can be accomplished by both a pipeline dredge and a hopper dredge allowing work year round rather than being restricted by hopper dredge use windows. This near shore placement also satisfies the CZM requirements. While it has been determined that the navigation project does cause 78% of the erosion problems on Tybee Island it has not determined the monetary NED benefits that could be derived from the beneficial use of the O&M dredged material.

HQUSACE Assessment (November 2010): The concern is resolved. The added language to the first paragraph of Section 1.4.6 provides clarification requested.

- Issue (1)B: The DMMP on the Engineering CD evaluates disposal requirements over the period 2010 to 2060. However, the project implementation is scheduled to be completed in 2016, which would result in a longer period of analysis from about 2016 to 2066. The analysis in Table 11.2-6 of the Engineering Appendix also evaluates the period 2010 to 2060. The GRR needs to clearly indicate that adequate capacity exists throughout the period of analysis and the costs for providing that capacity are cost shared appropriately.

District Response: The DMMP (Annual Work Plan) on the Engineering Supplemental Materials CD does evaluate the disposal requirements over the period 2010 to 2060; however, because the implementation of the project is not scheduled to be completed until 2016, Table 11.2-6 on pages 224 and 225 of the Engineering Appendix has been updated to reflect the 50-year period from 2016 to 2066.

HQUSACE Assessment (November 2010): The concern is partially resolved by the response and text changes, but is sufficient for the draft report. Tables 11.2.1 through 11.2.5 along with Table 11.2.6 provide an overall summary of where disposal material will go for new work and O/M purposes for the with-project condition. Where can similar information be found for the without-project condition? This will be included in the final report.

District Response (January 2012): A new Section 11.1.1 titled “Inner Harbor Current Conditions has been placed in the Engineering appendix with the table below depicting the current Savannah Harbor Federal Navigation 42-foot Project Inner Harbor Annual Maintenance Material Plan 2010 – 2066.

Fiscal Year	Confined Disposal Area							TOTALS		
	2A	12A	13A	13B	14A	14B	J/O	O&M	New Work	O&M & New Work
2010	229,000	4,431,000	BUILD DIKE	782,500	BUILD DIKE	782,500	DRYING	6,225,000		
2011	229,000	DRYING	4,431,000	1,565,000	BUILD DIKE	DRYING	BUILD DIKE	6,225,000		
2012	229,000	DRYING	4,431,000	1,565,000	DRYING	DRYING	BUILD DIKE	6,225,000		
2013	229,000	BUILD DIKE	4,431,000	782,500	DRYING	DRYING	782,500	6,225,000	0	6,225,000
2014	DRYING	4,660,000	DRYING	782,500	DRYING	BUILD DIKE	782,500	6,225,000	0	6,225,000
2015	DRYING	4,660,000	DRYING	782,500	BUILD DIKE	DRYING	782,500	6,225,000	0	6,225,000
2016	DRYING	4,660,000	BUILD DIKE	DRYING	DRYING	DRYING	1,565,000	6,225,000		
2017	FULL	DRYING	4,660,000	DRYING	DRYING	DRYING	1,565,000	6,225,000		
2018		DRYING	4,660,000	DRYING	DRYING	DRYING	1,565,000	6,225,000		
2019		BUILD DIKE	4,660,000	DRYING	782,500	782,500	DRYING	6,225,000		
2020		4,660,000	DRYING	DRYING	782,500	782,500	DRYING	6,225,000		
2021		4,660,000	DRYING	DRYING	782,500	782,500	DRYING	6,225,000		
2022		4,660,000	BUILD DIKE	782,500	DRYING	DRYING	782,500	6,225,000		
2023		DRYING	4,660,000	782,500	DRYING	DRYING	782,500	6,225,000		
2024		DRYING	4,660,000	782,500	DRYING	DRYING	782,500	6,225,000		
2025		BUILD DIKE	4,660,000	DRYING	782,500	782,500	DRYING	6,225,000		
2026		4,660,000	DRYING	DRYING	782,500	782,500	DRYING	6,225,000		
2027		4,660,000	DRYING	DRYING	782,500	782,500	DRYING	6,225,000		
2028		4,660,000	DRYING	782,500	DRYING	DRYING	782,500	6,225,000		
2029		DRYING	4,660,000	782,500	DRYING	DRYING	782,500	6,225,000		
2030		DRYING	4,660,000	782,500	DRYING	DRYING	782,500	6,225,000		
2031		BUILD DIKE	4,660,000	DRYING	782,500	782,500	DRYING	6,225,000		
2032		4,660,000	DRYING	DRYING	782,500	782,500	DRYING	6,225,000		
2033		4,660,000	DRYING	DRYING	782,500	782,500	BUILD DIKE	6,225,000		
2034		4,660,000	BUILD DIKE	782,500	DRYING	DRYING	782,500	6,225,000		
2035		DRYING	4,660,000	782,500	DRYING	DRYING	782,500	6,225,000		

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

- Issue (1)C: It is not evident how non-Federal dredging materials are being considered in the disposal capacity needs and DMMP evaluations.

District Response: There are 481,000 cubic yards of non-Federal dredged material, mainly from the dredging of berths, placed in the DMCA's. There is a list of permits for these actions in the FY 2010 DMMP Annual Work Plan. The costs are based on the cost to replace the capacity lost.

HQUSACE Assessment (November 2010): The concern is partially resolved by the response, but is sufficient for the draft report. Please provide or reference where complete information is provided on where non-Federal material is coming from and which disposal areas each berthing area is disposed in, and how that affects capacity.

District Response (March 2011): The following information will be placed in Section 3.4.1 of the Engineering Appendix. Counted within the 6.2 MCY of Federal dredged material there are 481,000 cubic yards of non-Federal dredged material, mainly from the dredging of berths, placed in the DMCA's. These berthing areas are important to the Navigation Project as they allow vessels to dock outside the channel boundaries while cargo is loaded and unloaded. The areas extend from a dock face out to the navigation channel, and typically extend a short distance beyond each end of a dock. Maintenance of adequate depths at berths is legally required for continued operation of the Savannah Harbor Federal Navigation Project. Typically, each dock owner maintains the depth at their individual berth as needed, using either the dock owner's or a contractor's equipment. The dock owner applies to the Corps for a Department of the Army (DOA) Permit to excavate sediments from the berth, since the Corps regulates dredging under Section 10 of the Rivers and Harbors Act and the related discharge under Section 404 of the Clean Water Act. In accordance with Section 401 of the Clean Water Act, the dock owner obtains water quality certification from the State of Georgia Department of Natural Resources, as required. Currently, 14 dock owners have 18 DOA permits from Savannah District for berth maintenance dredging within Savannah Harbor.

Requirements for Non-Federal Entities to use DMCA's

The following general conditions apply to the Non-Federal use of Savannah Harbor Dredged Material Containment Areas (DMCA) for hydraulically placed material.

- Only Savannah Harbor Terminals will be allowed use of the areas.
- The DMCA may be made available on a case-by-case basis.
- Potential users must provide the District with proof of underlying fee owner permission (Georgia DOT) for the work has been given to the District.
- The Terminal must have a valid permit before the work can begin (see list of permittee's below).
- Sediments are required to be evaluated in accordance with the Inland and Upland Manuals Testing "Tiered" process to the satisfaction of the District.
- The District will specify the location of the head section.
- District work within the area will have priority.

- A plan detailing how water quality standards, particularly for dissolved oxygen, pH and suspended solids standards will be maintained during the work shall be submitted to the District and approved by the District before work can start.
- Tests of DMCA effluent to the standards required by the District and South Carolina Agencies must be performed by the Terminal during the work and the results provided to the District on a weekly basis.
- The District will determine the DMCA's available for the work prior to the commencement of work.
- The Terminal assumes responsibility for any damage to dikes and weirs during the work.
- The Terminal is responsible for controlling weir outfalls during the work.
- The Terminal will pay a fee for lost sediment storage capacity. The fee will be based on the average cost of dike raising. The District will determine such fee to be applied to each cubic yard of dredged material placed within the DMCA and will provide this fee at the time of approval of the use of an area.
- The District will provide a key for access to the DMCA, if required. The gate shall be kept closed and locked during the work. The key shall not be copied or reproduced and shall be returned to the District at the end of the work.
- The Terminal will be responsible for the DMCA, including the quality of effluent from the DMCA until a time specified by the District.
- DMCA Area 2A is not available for non-Federal use.

Table X: Permit Actions

No.	Permittee	Location Station No.	Average Cubic Yards	Sand/Silt %	Disposal Site Used
200112080	Colonial Oil (Plant 1)	83+424	20,551	68/32	12A/13A
200112680	Colonial Oil (Plant 2)	85+594	25,942	68/32	12A/13A
200112670	Colonial Oil (Kaolin)	91+000	52,147	68/32	12A/13A
200112360	Ports Authority G.C.	92+102	130,258	68/32	12A/13A
200112380	Ports Authority O.T.	78+830	66,154	10/90	12A/13A
200115890	Savannah Sugar	104+100	25,814	68/32	12A/13A
200115890	G-P Gypsum	63+600	0	20/80	13B/14A
200112450	NuStar (formally Citgo)	90+000	18,594	68/32	12A/13A
200112750	Southeast Maritime Services	91+872	27,744	68/32	12A/13A
200112760	East Coast Terminal	68+450	19,393	10/90	12A/13A
200113110	S.T. Services (Dock 2)	60+500	4,592	20/80	13B/14A
200111950	Global Ship Systems	84+000	3,542	68/32	12A/13A
200113120	S.T. Services (Dock 2)	62+300	0	20/80	13B/14A
200111960	International Paper	88+500	0	68/32	12A/13A
200112370	G.P.A. Berth 7	109+000	86,352	80/20	1N
200310710	Savannah Steel Terminal	83+000	0		12A/13A
200111820	Conoco Phillips	61+000	0	20/80	13B/14A
	Southern LNG	40+000			13B/14A
TOTAL:			481,083		

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

- Issue (1)D: Discussions in Section 1.4.6 on the DMMP mention area 12B. However, it is not evident how that is used. The text indicates 12A and 13A are paired, but does not discuss 12B which is between them. Section 11.1.2 of the Engineering Appendix does not mention 12B either with respect to the new work dredging.

District Response: Section 1.4.6 on page 30 of the Draft GRR was updated to explain that DMCA 12B was combined with DMCA 13A to form a larger DMCA called DMCA 13A to be paired with DMCA 12A. So at this time, DMCA 12B no longer exists. A statement to this effect has been placed in both areas mentioned above.

HQUSACE Assessment (November 2010): The concern is resolved by the response and text changes incorporated into the report.

- Issue (1)E: This document needs to be revised to comply with ER 1105-2-100 Section E15 pages E-68-83. Table E-14 provides a general outline of the DMMP report.

District Response: The Draft GRR contains all of the information required to produce a Dredged Material Management Plan (DMMP) as defined by ER 1105-2-100 Section E15; however, this information will be combined into a standalone DMMP when the project is completed and the actual project impacts have been observed.

HQUSACE Assessment (November 2010): The response partially resolves the concern, but is sufficient for the draft report. Please provide a complete summary table for without and with project conditions including where material is coming from, where it is disposed, capacity of each disposal area, etc.

District Response (January 2012): The following table has been placed in the Engineering Appendix in Section 11.0 “Dredging and Disposal of New Work Material.

Savannah Harbor Expansion Project With and Without Project Dredging Operations

Stations	Without Project		DMCA Present Capacity (CY)	With 47-ft Project		DMCA Present Capacity (CY)
	O&M Material	DMCA		Total Material (CY)	DMCA	
0+000 to 4+000	76,000	13B	11,900,000	0		
4+000 to 6+375	26,719	13B	11,900,000	248,815	JOI	7,200,000
6+375 to 36+000	605,781	13B	11,900,000	4,663,278	14B	9,100,000
36+000 to 45+000	406,500	13B	11,900,000	1,825,726	14A	6,200,000
51+000 to 57+000	622,800	13A	32,400,000	1,857,054	14A	6,200,000
80+125 to 90+000	318,633	13A	32,400,000	1,369,482	14A	6,200,000
45+000 to 51+000	553,800	13B	11,900,000	1,698,443	14B	9,100,000
57+000 to 67+000	0	13A	32,400,000	161,557	14B	9,100,000
57+000 to 67+000	1,038,000	13A	32,400,000	1,860,000	14A	6,200,000
67+000 to 80+125	641,700	13A	32,400,000	2,528,753	13A	32,400,000
90+000 to 102+000	1,706,067	13A	32,400,000	4,420,043	13A	32,400,000
102+000 to 112+000	229,000	2A	4,400,000	198,041	13A	32,400,000
Total Cubic Yards	6,225,000			20,831,192		

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(2) Screening of Management Measures.

(a) Non-structural Measures, page 100. Additional information should be provided on why “improved traffic management processes” was screened out as a measure. Is the current traffic management system considered “state of the art” or could the port benefit from a comprehensive state of the art integrated traffic and unloading management system? In addition, more information should be provided on why non-structural management measures were screened out, not that they were screened out due to their ineffectiveness. Are non-structural measures such as tug assistance, use of tides, and light loading already being used to the extent practical?

District Response: Section 6.5.1 on page 103 of the Draft GRR was updated to reflect the current traffic management system used by the Pilots serving the Port of Savannah. This system includes ship to ship and ship to dispatch communication via radio/telephone as the ships traverse the harbor. Each Pilot is in contact with the dispatcher and the other shipboard Pilots as they pilot the ships into and out of the harbor. Ships approaching the Port of Savannah are queued based on the factors listed below, and in the order they are listed.

1. Draft restrictions
2. Tide jobs/Labor costs
3. Canal Appointments

The Pilots consider this the best traffic management for the Port of Savannah at this point in time. The Pilots have looked at a system managed by the US Coast Guard called Vessel Traffic

Service (VTS). The purpose of a Vessel Traffic Service (VTS) is to provide active monitoring and navigational advice for vessels in particularly confined and busy waterways. There are two main types of VTS, surveilled and non-surveilled. Surveilled systems consist of one or more land-based sensors (i.e. radar, [AIS](#) and closed circuit television sites), which output their signals to a central location where operators monitor and manage vessel traffic movement. Non-surveilled systems consist of one or more reporting points at which ships are required to report their identity, course, speed, and other data to the monitoring authority. They encompass a wide range of techniques and capabilities aimed at preventing vessel collisions, rammings, and groundings in the harbor, harbor approach and inland waterway phase of navigation. They are also designed to expedite ship movements, increase transportation system efficiency, and improve all-weather operating capability.

In pilot terms, this system is mainly for safety purposes rather than for commercial purposes, is very expensive, and, at this point in time, will not provide a better management system than is currently in place. The pilots continue to investigate system improvements as technology improves and congestion grows.

HQUSACE Assessment (November 2010): The response partially resolves the concern, but is sufficient for the draft report. Please add full discussion presented in response to the final version of the report.

District Response (January 2012): The following updated discussion has been placed in Section 6.5.1 of the GRR:

The traffic management system currently employed by the Savannah Bar Pilots includes ship to ship and ship to dispatch communication via radio/telephone as the ships traverse the harbor. Each Pilot is in contact with the dispatcher and the other shipboard Pilots as they pilot the ships into and out of the harbor. Ships approaching the Port of Savannah are queued based on the following factors listed in order of importance:

1. Draft restrictions
2. Tide jobs/Labor costs
3. Canal Appointments

As each Pilot takes control of a ship he is in contact with the dispatcher and the other shipboard Pilots as they pilot the ships into and out of the harbor. The Pilots believe that this is the best traffic management for the Port of Savannah at this point in time.

The Pilots have looked at a system managed by the US Coast Guard called Vessel Traffic Service (VTS). The purpose of a Vessel Traffic Service (VTS) is to provide active monitoring and navigational advice for vessels in particularly confined and busy waterways such as the Houston Ship Channel and Baltimore Harbor. There are two main types of VTS, surveilled and non-surveilled. Surveilled systems consist of one or more land-based sensors (i.e. radar, [AIS](#) and closed circuit television sites), which output their signals to a central location where operators monitor and manage vessel traffic movement. Non-surveilled systems consist of one or more reporting points at which ships are required to report their identity, course, speed, and other data to the monitoring authority. They encompass a wide range of techniques and capabilities aimed at preventing vessel collisions, ramming, and groundings in the harbor, harbor approach and

inland waterway phase of navigation. They are also designed to expedite ship movements, increase transportation system efficiency, and improve all-weather operating capability.

The Savannah Bar Pilots feel that neither type of VTS would provide a better management system than the system already in place. This does not mean to say the Savannah Bar Pilots are not interested in system improvements. The pilots will continue to investigate system improvements as technology improves and congestion grows.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(b) Dredged Material Management. No measures are discussed relative to dredged material management on page 100. Since the disposal measures are General Navigation Features and the least cost base plan must be identified to qualify as GNF, additional information should be provided regarding all reasonable measures for providing the additional disposal capacity needed for new work construction and incremental maintenance including beneficial uses and site management/dewatering, for instance. As part of the analysis discussion should cover the additional dredging needs of the sponsor for berth improvements associated with the expansion project.

District Response: The least cost “Base Plan” was identified in Section 2.3 on page 37 of the Draft GRR. The additional capacity required for the new work material was calculated in Section 1.1.39 of the “Supplemental Material for Engineering Appendix – September 2010”. It was determined through a sedimentation analysis study that the total amount of O&M dredged material for the harbor would remain the same, but its location within the harbor would change. Additional costs for berth improvements (permit action through the Corps) were paid for by the sponsor, which placed the dredged material in their disposal area.

HQUSACE Assessment (November 2010): The response partially resolves the concern, but is sufficient for the draft report. The District did not fully respond to comment. Section 2.3 on prior studies and reports relates to the base plan for the existing project and therefore does not identify the least cost base plan for accomplishing the modification project. It is understood that the existing DMCAs and ODMDS have a large capacity and that the existing base plan allows for beneficial uses when shown to be economical for particular dredging operations, but the report should indicate what measures were considered in identifying the least cost disposal plan for the modification project including the extended entrance channel construction which was not part of the existing project. Section 2.3 indicates beneficial uses under Section 204 or Section 933 would be permitted based on a local sponsor paying the incremental cost above the base plan. It is not evident where the report indicates that the offshore berm construction is shown to be less costly or of a similar cost to the ODMDS. Provide a full response to identify the measures considered in identifying the base plan for the modification project in the final GRR.

District Response (January 2012): The DMMP for the Expansion Project originally envisioned the placement of new work material in the nearshore areas designated by ERDC. This placement was considered beneficial use of dredged material; therefore, it was cost shared like a normal general navigation feature (GNF). During the official coordination of this plan, clearances were also sought for the placement of O&M dredged materials in the same nearshore sites.

During the public comment period, the Georgia Department of Natural Resources and the City of Tybee Island requested that nearshore placement of new work sediments be deleted from the project. As a result, CESAS revised the sediment placement plan and the final reports include placing the new work sediments in the existing Savannah ODMDS and a DMCA (as the base plan). O&M material would be deposited in the DMCA or a DMCA (as the base plan). If a local entity wants the material placed in other nearshore sites or on the beach, they would have to pay the incremental difference between the desired placement and the base plan.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(3) Offshore Channel Alignments, page 33 Plan Formulation Appendix. Route S-8 (selected route) core borings, contaminants analysis (bioassay) and cultural resources analysis should occur now. Delaying this work into PED will increase the risk that any undiscovered issues surface late in the study process.

District Response: The following statement has been added in Section 11.6 of the draft GRR that states there is a low risk associated with delaying this work until later after the draft report: “Detailed environmental surveys of the proposed channel extension are scheduled to be performed as soon as possible and will be completed and appropriate sections approved by EPA prior to construction. Existing evidence suggests that no environmental issues will be encountered with the selected alignment. There is a low risk that any significant project issues will arise as a result of these confirmatory studies.”

HQUSACE Assessment (November 2010): The concern is resolved by the response and text changes in Section 11.6. The District is strongly encouraged to begin the analysis as soon as PED phase begins with the Division Commander’s Notice.

(4) Meeting Zone Analysis. The GRR presents varying information on the length of the meeting zones which results in confusion for a reader. The action taken as shown above indicates that the two meeting zones modeled by ERDC resulted in meeting areas of 8,000 feet and 4,000 feet. This appears consistent with the text in Section 7.2.1 on meeting area benefits. However, the information in Table 10-1 shows quantities for the two meeting areas as being roughly similar over the range of depths. This doesn’t seem reasonable if Long Island is twice as long as Oglethorpe. Further, Table 11-4 on page 209 of the GRR indicates the Long Island Meeting Lane is located between stations 16+000 and 20+000 (4,000 feet) and the Oglethorpe Meeting Lane is located between stations 55+000 and 58+500 (3,500 feet). The Engineering Appendix indicates on page 81 that the Long Island meeting area has a length of 8,000 and Oglethorpe 4,000 feet with about 1,000-foot transition sections at each end based on January 2009 ERDC simulations. This results in uncertainty as to what is recommended and whether the appropriate costs and benefits have been compared to come to the conclusion that both meeting areas are justified. Clarification is needed to explain any changes that may have occurred during formulation of the meeting zones as they were refined and to confirm the meeting area features which are included in the tentatively recommended and NED plans. A similar explanation would be helpful also to explain how the number of bend wideners has been refined during formulation and final plan design.

District Response: All quantities have been verified. A disproportionate volume of material is to be removed in Oglethorpe Range because of steeper bank of material.

Table 11-4 of the GRR has been revised to show full meeting lane lengths for Long Island and Oglethorpe. Changes that occurred during formulation and how they were refined are detailed in Section 6.3.3 “Meeting Areas” in the Engineering Appendix.

Table 6.3.1-1 in Section 6.3.1 of the Engineering Appendix has been revised to show the Oglethorpe Meeting Lane with transitions at 54+800 to 60+700 (5,900 feet) and Long Island Meeting Lane with transitions at 13+000 to 23+000 (10,000 feet). A table showing bend wideners (Table 6.3.5-1) initially proposed by district and final recommendation provided by ERDC resulting from ship simulation has been added to Section 6.3.5 of the Engineering Appendix Section to further clarify.

HQUSACE Assessment (November 2010): The concern is resolved by the response and the text changes incorporated in the GRR and Engineering Appendix.

D. ENVIRONMENTAL.

(1) CE/ICA for Saltmarsh and Dissolved Oxygen Mitigation Measures. The proposed saltmarsh restoration site does not appear to have been evaluated using CE/ICA, as required in paragraph C-3 (e) (2) of ER 1105-2-100. As noted on page 160 of the GRR, approximately 42 acres of dredged material disposal site DNCA 1S would be graded to restore the area to salt marsh. About 27.5 acres of this area would serve as mitigation for the SHEP, and 14.5 acres would be credited as advance mitigation for future O & M actions. The final report should briefly discuss other potential mitigation sites that were considered to fulfill the identified saltmarsh mitigation need, and should also include a cost effectiveness/ incremental cost analysis for this mitigation measure. The description of the Speece Cone dissolved oxygen measure on pages 89-93 is good, and discusses the trade-offs between number of locations, effectiveness, capital costs and operating costs. While the method used to refine the proposed conceptual design appears to be reasonable, the completion of a CE/ICA for this measure would help to confirm that the proposed design is the most cost-effective way to mitigate for induced low oxygen levels. CE/IC analyses for the saltmarsh and Speece Cone measures should be developed for the draft report.

District Response: The District has revised Appendix C (Mitigation Planning) of the EIS to provide the District’s considerations on Cost Effectiveness/Incremental Cost Analysis for these two issues. The discussion on the restoration of brackish marsh is on page 49, and the discussion on the dissolved oxygen systems is on page 42.

HQUSACE Assessment (November 2010): The issue is partially resolved, and the existing information added to Appendix C of the DEIS is adequate for release of the draft report and EIS. With regard to the Speece Cones, Appendix C states that this mitigation measure is a tradeoff between the amount of oxygen required (operating expense), the number of injection locations (capital expense) and the complexity of maintaining numerous systems. HQUSACE requests that the cost information for the various combinations of systems and operating costs be displayed in such a way as to demonstrate that the preferred D.O. mitigation alternative is the most cost effective combination of locations and operating expense. Also, given that given that the output of the various configurations is essentially fixed by the need to fully mitigate the D.O. levels, if it could be shown that the costs of providing each additional increment of dissolved

oxygen was essentially linear using the most efficient system, a CE/ICA may not be necessary for this mitigation measure.

Concerning the wetland mitigation plan, the report states that a previously used sediment placement area (CDF 1S) within Savannah Harbor was identified as having the greatest opportunity for replacing the functions of the lost freshwater wetlands. Appendix C of the EIS states that the USACE evaluated several sites within coastal Georgia, but that the resource agencies preferred a site in the lower Savannah River watershed. If the search for suitable mitigation sites in the lower Savannah River provided only a very limited number of potential restoration sites (or perhaps only one), this section of the EIS should discuss the unavailability of suitable mitigation sites. However, even if only one wetland mitigation site was available, it should still be possible to complete a CE/ICA on the types of activities that would be used to restore the site, such as different excavation methods, different disposal methods or locations, vegetation planting schemes, etc. HQUSACE requests that the CE/ICA be prepared for the final feasibility report and EIS.

District Response (January 2012): Dissolved Oxygen Systems: The discussion in the EIS on this issue has been expanded to include the following:

The hydrodynamic modeling determined the amount of oxygen that would be needed to remove the adverse effects of a deeper channel on dissolved oxygen. The amount of oxygen that would need to be added is the result of both the extent of the impact (which depth alternative) and the location where the oxygen would be added. Modelers initially developed a design that minimized the amount of oxygen that would need to be added. The District and natural resource agencies found that design to be unacceptable because some locations did not have sufficient high ground, road access, or some other factor that rendered the site unusable. The modelers revised the design to use sites that were suitable for development. After coordination with the natural resource agencies, the Corps redesigned the systems with the following protocol: (1) focus the initial site in the locations with the most DO impact, (2) co-locate facilities if possible to serve multiple needs, and (3) locate other facilities needed to address remaining DO impact areas near existing development. That design approach led to the design that was included in the EIS with the bulk of the DO addition occurring in Front River from Hutchinson Island near the International Paper wastewater treatment lagoon, co-locating equipment at that site that would add oxygen to Back River, and locating a final site upriver near Georgia Power's Plant McIntosh to address DO impacts that occur further upstream.

The basic unit of design for the DO systems would be a Speece cone, with its supporting equipment. Two alternatives were evaluated to supply oxygen: (A) one using a liquid oxygen supply tank, and (B) one using on-site generation of oxygen. The costs were very similar on an average annual basis. The District chose to use onsite generation to increase the long term reliability of performance. In recent years the District has experienced difficulties at other project sites with an inability to obtain liquid oxygen in the summer at any price. On-site generation would remove that potential problem.

The District agreed to use an effective capacity of adding 4,000 pounds of oxygen per day for each Speece cone. The costs for each cone (without contingencies) are estimated to be as follows:

Speece cone	\$ 720,000
Oxygen Generator	\$ 240,000
Side Stream Pump	\$ 45,000
Site development	\$1,300,000
Total	\$2,305,000

Some minimal savings may occur from multiple cones being constructed at a given location, but those potential savings were not identified

The Corps clearly considered the cost effectiveness and evaluated incremental costs in its analysis and design of the dissolved oxygen systems. Based on information presented above, the District does not believe it is necessary to develop and display the cost effectiveness of various increments of the amount of oxygen to be added, design alternatives, or construction methods as is included in a typical CE/ICA. The incremental cost per unit of output would be constant until the full mitigation need is reached.

Brackish Marsh Mitigation: The discussion in the EIS on this issue has been expanded to include the following:

After selection of the site to restore, the District followed a rational design process to design the restoration work. The work would consist of grading down a previously-used sediment disposal site to restore the site to marsh vegetation. The rationale and major parameters are summarized below.

- Size of restoration area -- The required size was established by the calculation in the Regulatory SOP – 29 acres.
- Final elevation of site -- The elevation to which the site would be graded down was established by a field survey that identified the height of adjacent marsh -- +7.6 to 7.7 feet mean low water.
- Volume to be removed – The District calculated the volume by comparing a topographic survey of the existing elevations at the site with the desired final elevation – 425,000 cubic yards.

Additional acreages could be restored at the site, up to a maximum size of 45 acres, which is the amount that the USFWS (as landowner) agreed could be restored. Except for a narrow buffer around the marsh, 45-acres is the amount of the site that now functions as an upland. The Corps could restore additional acreage beyond the required 29 acres, but they would not be a project cost. Those costs would be paid using Savannah Harbor Navigation Project O&M funds to create advance mitigation for its future activities that require brackish or saltmarsh mitigation. It would be better from an ecological perspective to perform all the construction/restoration work at the same time instead of performing the work several years apart. Combining the work would also save costs for mobilization/demobilization of equipment.

Since sediment would have to be transported from the site, the manner in which it is transported and the distance it is carried would affect the construction cost. There is no road access to the site, so trucking is not a useable method to remove the sediment. The site has water access and dredges can move large volumes of material at a low unit cost, so the District first considered use

of a small hydraulic cutterhead dredge for this work. Two potential deposition areas were identified – CDFs 2A and 12A. Area 2A is adjacent to the restoration area, but the District determined there was not sufficient capacity remaining to accommodate the roughly 425,000 cubic yards of material. CDF 12A is located further away and has no capacity constraints. A small hydraulic cutterhead dredge is not powerful enough to efficiently pump the sediments the long distance to CDF 12A. A large cutterhead dredge would be required to pump the heavy sands the long distance to CDF 12A. The District then evaluated use of a clamshell and barge to transport the excavated sediment to CDF 12A, and this method was determined to be a viable, efficient construction method. The District based its cost estimate on use of that equipment. Employing a clamshell and barge would eliminate the higher costs of a larger cutterhead dredge pumping the long distance to CDF 12A. The main factor that affects the unit dredging cost with a clamshell and barge is the volume of sediment to be removed. That number was established earlier in the design process, as described above.

The restricted site access, finite volumes, limited construction method alternatives, and placement options were all considered in the design process. As such, the process described above narrowed the scope of a Cost effectiveness/Incremental Cost Analysis and eliminated the need to develop and show cost estimates for various increments of project size, design alternatives, or construction methods. The rational process followed by the design team as described above ensured that the project identified the most cost effective design and construction method to meet the mitigation need.

The Corps clearly considered the cost effectiveness and evaluated incremental costs in its analysis and design of the restoration of brackish marsh at Disposal Area 1S. Based on information presented above, it is not necessary to develop and display the cost effectiveness of various increments of project size, design alternatives, or construction methods as is included in a typical CE/ICA.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(2) *Inconsistent Cost for USFWS Lands in Real Estate Plan.* The real estate plan states on page 5 that the estimated land costs for USFWS refuge lands are \$230,000; page 38 states the estimated values of refuge lands is \$344,350; Table 16-1 on page 42 gives permit costs of \$259,500. It is not clear whether these three figures represent the same parcels of land, or different parcels. Any inconsistencies in the costs of the lands in question should be reconciled. Also, the basis for including these numbers as project costs should be provided, given that they represent lands owned by the Federal government.

District Response: Concur. Inconsistencies in cost have been corrected in the Draft RE Appendix.

HQUSACE Assessment (November 2010): The concern is resolved by the response and text changes incorporated in the Real Estate Appendix.

(3) *Crediting of Costs for USFWS Lands.* It is not clear why crediting would be afforded for lands within the USFWS refuge, as stated in Section 9 of the real estate plan. As noted in ER 405-1-12, Section VII, paragraph 12-38 (c), the non-Federal sponsor should normally not receive credit for the value of LER from Federal agencies if the acquisition of same was at no cost other

than incidental costs. It is noted that the \$344,350 cost shown page 38 specifically excludes administrative costs. HQUSACE requests that the basis for the crediting be provided.

District Response: Partial Concurrence. The Draft Real Estate Plan has been revised to reflect that credit will only be allowed for the easement acquired over USFWS lands. The report originally allowed credit for all USFWS lands obtained by both easement and permit.

HQUSACE Assessment (November 2010): The concern is resolved by the response and text changes incorporated in the final Real Estate Plan. See comment 3.E. above for resolution.

(4) Order of Acquisition for Mitigation Lands. Table 4.3-2 on page 25 of the real estate plan contains a list of properties that would potentially be acquired as compensation for impacted freshwater wetlands on the USFWS refuge. A footnote on this table notes that the Dixie Plywood and DMD Company parcels are the Corps' recommended sites. A similar table is found on page 85 of Appendix C to the GRR, except that there is no footnote designating the Corps' recommended parcels, and page 84 notes that the Corps would pursue acquisition of properties in the order shown on the list. The report should clarify whether the Corps has a preference with regard to acquisition order, and if so, how the order of acquisition was determined. Lastly, it is not clear that a cost effectiveness/ incremental cost analysis was completed concerning the acquisition order as part of the mitigation planning process for this measure, as required in ER 1105-2-100, paragraph C-3 (e) (2).

District Response: The District has revised Appendix C (Mitigation Planning) of the EIS to provide the District's considerations on Cost Effectiveness/Incremental Cost Analysis for the amount and type of lands that would be acquired in a new section titled "Cost Effectiveness/Incremental Cost Analysis" located on page 54.

HQUSACE Assessment (November 2010): The issue is not resolved, but the response is adequate for the draft report. The text on page 54 of Appendix C states that a CE/ICA was performed in the development of the mitigation for conversion of freshwater marsh, but if so, it is not apparent to HQUSACE reviewers where this analysis is displayed. Given that the proposed mitigation measure involves the purchase and preservation of existing lands in proximity to the Savannah NWR, would it be possible to do a comparison of likely costs among the various parcels on the refuge acquisition list? Page 56 of Appendix C implies that some combinations of land transactions would be more efficient than others, given that the focus of acquisition efforts would be on large tracts of land to minimize acquisition costs, and that the Corps would seek to avoid uneconomic remnants. HQUSACE requests additional information about the potential acquisition costs of this mitigation measure, and whether it would be possible to use these costs to conduct a CE/ICA.

Lastly, HQUSACE has determined that the existing information in Appendix C is adequate for release of the draft feasibility report and EIS.

District Response (January 2012): The District evaluated the tax values of the larger privately-owned properties within the list of tracts identified by the USFWS as being desirable and that are located in portions of the estuary that would provide the needed freshwater habitats. Large continuous tracts are more valuable from an ecological standpoint and large tracts do exist in freshwater areas that surround the Refuge. The District's Real Estate Division estimated that

these lands have a value that averages \$5,600 per acre. Acquisition administration costs are estimated to average \$21,100 per tract. The District intends to focus its efforts on obtaining large tracts and believes that the mitigation requirements would be able to be met through acquisition of three properties. Without leaving an uneconomic remnant, the District would acquire only the number of acres needed on the final tract to meet the project’s acreage commitment. The District believes that this acquisition protocol minimizes acquisition costs and would shorten the length of time until the full acreage is acquired. As a result, the District believes that a display showing the costs of obtaining alternate mitigation properties is not necessary. The incremental cost per unit of output would be constant until the full mitigation need is reached.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(5) Performance Measures for Saltmarsh Mitigation at DNCA 1S. The draft GRR does not include performance standards for the saltmarsh restoration at DNCA 1S, as required by the implementation guidance for Section 2036 of WRDA 2007. The performance standards for this mitigation area should be included in the final GRR.

District Response: The following table of performance standards had been included in the DEIS. It has been added to Section 9.10 of the GRR.

Revegetation Rate for Created Marsh	
Time Period	Percent Vegetative Cover
Construction	0
Year 1	15
Year 2	25
Year 3	40
Year 4	60
Year 5	80
Year 6	85
Year 7	90

HQUSACE Assessment (November 2010): The concern is resolved by the response and text changes incorporated in the DEIS and GRR.

(6) Display of Mitigation Costs Inconsistent. The display of mitigation costs appears to be inconsistent between two sections of the GRR. The total cost of mitigation measures is given as \$221 million on page R-213 of the GRR, and are given as \$182 million on page 5 of the real estate plan (Appendix D to GRR). Any inconsistencies should be rectified as needed.

District Response: Table 11-7 “Tentatively Recommended Plan Mitigation Costs” in the GRR is correct. The table on page 5 of the Plan Formulation Appendix has been corrected to reflect these costs.

HQUSACE Assessment (November 2010): The concern is resolved by the response and text changes incorporated in the GRR and Plan Formulation Appendix.

E. COST ENGINEERING

(1) ATR. DrChecks report dated August 2010 shows several cost engineering comments have not been resolved (“comment open”). Several of those comments are flagged as critical issues and could considerably impact the accuracy of the MCACES cost estimates. Confirm all ATR comments have been resolved and closed out.

District Response: All Cost Engineering ATR comments were resolved and closed on 16 September 10. Cost DX ATR Certification was received from Walla Walla District on 11 September 2010. There are currently 13 open comments in DrChecks for economics. The comments are in the process of being elevated.

HQUSACE Assessment (November 2010): The concern is resolved by the response.

(2) IEPR. The report identified several cost engineering comments on the MCACES cost estimate. It is not very clear whether the IEPR comments have been resolved. Confirm all IEPR comments have been resolved.

District Response: A preliminary IEPR of the Costs Estimates and Economic Analysis was conducted due to the significance of this project, the uniqueness of the benefit analysis, and the small differences in incremental net benefits between alternative plans. The primary purpose of the preliminary IEPR was to identify any significant issues that would affect net benefits and plan selection. The same reviewers were used who will later review these aspects of the project during full IEPR, which will be held concurrently with public review of the draft. Eight comments were received during the preliminary IEPR. None of these comments were significant to plan selection. A telephone call was held on 6 October 2010 between the preliminary IEPR reviewers and the PDT. The changes to the report that would likely resolve these comments were identified. Through discussions with the PDT and SAD, it was determined that these changes did not need to be incorporated prior to public review. It was determined that the agreed upon changes would be incorporated along with public comments but prior to the end of IEPR review to allow resolution of these comments during full IEPR and in accordance with the normal IEPR process. There is no reference to the preliminary IEPR or these 8 comments in the draft GRR and EIS.

HQUSACE Assessment (November 2010): The response has partially resolved the concern and is sufficient for the draft report. Further documentation of IEPR is needed to fully address the concern in the final report.

District Response (January 2012): Concur. All IEPR comments have been resolved, including the preliminary ones provided on the cost estimates and economics that were provided prior to public review and full IEPR review. The Final GRR and EIS include any changes necessary as a result of those comments. A separate document has been prepared that contains the final USACE comments to the IEPR comments.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(3) Total Project Cost Summary. It is not very explicit whether the costs for Aids to Navigation are included in the calculation of the total project cost. Please clarify.

District Response: Aids to Navigation have been included in the total project costs. Table 13.1-1 of the Engineering Appendix includes these costs (\$5,025,000), which are the same for each depth alternative. These costs are also shown in Table 10-3 of the GRR.

HQUSACE Assessment (November 2010): The concern is resolved by the response and text changes incorporated into the GRR and Engineering Appendix.

(4) MCACES. The MCACES estimate included in the report is not adequate for review. Provide an MCACES report to sub-feature level as described in paragraph 8, ER 1110-2-1302.

District Response: MCACES-MII estimate has been expanded to the 3rd level and is included in Attachment 2 to the Engineering Appendix.

HQUSACE Assessment (November 2010): The concern is resolved by the response and the changes incorporated into the Engineering Appendix.

(5) Rounding of Costs. Costs stated in the report are not consistently rounded. Costs should be rounded in accordance with Appendix H of ER 1105-2-100. See "Instructions" for specific guidance on rounding.

District Response: Numbers have been rounded to an appropriate level through-out the draft report documents.

HQUSACE Assessment (November 2010): The concern is resolved by the response and text changes incorporated into the draft report.

(6) Incremental Dredging-Related Costs. Table 10-3 on page 175 of the GRR presents the incremental dredging-related costs for the deepening alternatives between 44 and 48 feet. The costs for dredging of berth areas vary significantly over the range of depths in a pattern that does not seem logical. They are shown as increasing from \$4.2M at 42 feet to \$4.4 M at 45 feet, then decrease to \$1.4M at 46 feet, increase to about \$1.9M at 47 feet, and \$2.3M at 48 feet. These costs should be consistently increasing with increasing depth based on the berth depths becoming deeper as project depth increases and would skew the total costs for the alternatives as a basis for comparison. The costs should be reviewed and revised as needed to provide a reasonable estimate of costs for berth dredging at each project depth in order to accurately capture the associated NED costs per ER 1105-2-100, paragraph D-3.f.

District Response: Concur. Costs have been reported incorrectly. Table 10-3 of the GRR has been corrected.

HQUSACE Assessment (November 2010): The concern is resolved by the response and the changes to Table 10-3 of the GRR.

F. SECTION 902 COSTS.

(1) Total Project Cost for Authorization. The text in Section 13.2 discusses the Section 902 cost calculation. Care should be taken in portraying the total project first costs that are to be used for authorization as a basis for setting the revised Section 902 project cost limitation. Beginning in WRDA2007 project costs for Section 902 purposes have not included costs for local service facilities and aids to navigation. To avoid confusion regarding what cost should be cited as the

basis for Section 902, it is suggested that an introductory sentence be included in this paragraph in the following form.

For the purpose of calculating the Section 902 limit, the total estimated first cost of the project is \$_(a) including an estimated Federal share of \$_(b) and an estimated non-Federal share of \$_(c).

- (a) Includes only GNF costs plus LERR value, (and for deep draft harbors) plus the 50% of deep draft utility relocation (DDUR) costs borne by the NFS (ie. (a) = (b) + (c) below).
- (b) Includes only the Government's percentage share of GNF costs.
- (c) Includes only the NFSs initial percentage share of GNF costs (ie. not the extra 10% payment amount) plus LERR value, (and for deep draft harbors) plus the 50% of DDUR costs borne by the NFS.

District Response: Concur. The following language has been added to Section 13.2:

For the purpose of calculating the Section 902 limit, the total estimated first cost of the project is \$223,886,785 (a) including an estimated Federal share of \$141,481,934 (b) and an estimated non-Federal share of \$82,404,851 (c).

- (a) Includes only GNF costs plus LERR value, (and for deep draft harbors) plus the 50% of deep draft utility relocation (DDUR) costs borne by the NFS (ie. (a) = (b) + (c) below).
- (b) Includes only the Government's percentage share of GNF costs.
- (c) Includes only the NFSs initial percentage share of GNF costs (ie. not the extra 10% payment amount) plus LERR value, (and for deep draft harbors) plus the 50% of DDUR costs borne by the NFS.

HQUSACE Assessment (November 2010): **The concern is resolved** by the response and the changes to Section 13.2 of the GRR.

(2) Authorized Project Cost Comparison. The analysis on page R234 compares the costs of the authorized 48-foot project to the costs of the NED Plan identified in the GRR. However, the text in Section 11.5 recommends the Locally Preferred Plan of 48 feet. As such, the comparison should be made between the authorized 48-foot project from WRDA99 and the Locally Preferred Plan of 48 feet being recommended in this GRR. The NED Plan would provide the basis for determining the appropriate cost sharing for the LPP.

District Response: Policy guidance has been provided that the draft report is to be written to both a "tentatively selected -47 feet NED plan complies with Army policy and the Maximum Authorized Plan of -48 feet is supported by the non-Federal sponsor. A final recommended (preferred) plan agreed to by the Secretaries of the Army, Commerce, and Interior, and the Administrator of EPA will be included in the final General Reevaluation Report and the Environmental Impact Statement." During 22 October 2010 discussion of this comment, it was agreed that any modification of this section could be delayed to the final report when a single depth alternative plan was identified. The section will be revised if a plan other than the 47' plan is selected for the final report.

HQUSACE Assessment (November 2010): The response partially resolves the concern, but is sufficient for the draft report. The final report will be revised to reflect the recommendation agreed to by the Secretaries of the Army, Commerce, and Interior and the Administrator of EPA.

District Response (January 2012): The Final GRR & EIS recommends only one plan – the 47-foot depth alternative, which is the NED Plan.

HQUSACE Assessment (April 2012): **The concern is resolved** by the response and text changes incorporated into the final report.

(3) Project Cost Increase Fact Sheet. The project cost increase fact sheet included as item #15 of the submittal is inconsistent with the information shown for the Section 902 cost calculation on page R-234 of the GRR. It appears that the calculation in the GRR which is supported by the Table G-1 through G-3 is correct. However, the indices and full calculation should be shown in the Tables G-1 and G-2 rather than being truncated. Also please check all three tables to assure they are printed correctly. Note that the value for 20% of the authorized cost in the fact sheet (\$73,996,200) includes price level increases whereas it should not as shown in Table G-3 of the GRR calculation (\$46,035,000). The fact sheet should be revised for consistency.

District Response: Concur. Project Cost Increase Issue Paper has been revised to match GRR Section 902 information and tables. Tables G-1 and G-2 have been expanded to show all calculations.

HQUSACE Assessment (November 2010): **The concern is resolved** by the response and changes to the issue paper.

(4) Project Study Issue Checklist. The checklist illustrates in table format that the 2010 recommended cost is \$570,370,428 (item #11 – Changes in Mitigation Plan Fact Sheet). The same document indicates that the Section 902 limit could be \$525,325,000 (item #15 – Project Cost Increase Fact Sheet) if the increased costs associated with design studies and mitigation in accordance with the WRDA99 authorization are determined to be costs required by law. HQUSACE view is that the stipulations in WRDA99 authorization included the requirements for mitigation acceptable to the resource agencies when it set the originally authorized cost. Therefore, they would not qualify as increases in costs due to subsequent legislation and should not increase the 902 limit. The text on page 234 regarding subsequent legislation and a potential increased 902 limit of \$525,325,000 should be deleted.

District Response: If reference to page 234 of the GRR is instead a reference to Item #15, Project Cost Increase Fact Sheet, Concur. Subject language has been deleted.

HQUSACE Assessment (November 2010): **The concern is resolved** by the text deletion noted in the response. Reference should have been to Item #15.

G. POST-AUTHORIZATION CHANGE ANALYSIS. Section 13.2 indicates that there have been no changes in the project scope or purpose and presents some cost information relative to post authorization changes. Table 11.4 compares the dimensions of the tentatively recommended plan to the existing channel dimensions. However, there is no comprehensive discussion of the post authorization changes relative to scope and features as discussed in Appendix G, Section III of ER 1105-2-100. The original project authorization provides significant flexibility based on the

range of depths to be considered, the mitigation requirements to be determined and other features to be designed. The project tentatively recommended in the GRR includes significant increases in mitigation features, meeting zones not included in the original authorization, fewer bend widening, a larger turning area, and an extended channel to connect with deep water in the ocean. HQ believes that such changes are within the Chief's discretionary authority to modify the project. However, the original project authorization provided for deepening upstream to station 130+000. The current GRR and DEIS descriptions vary in describing the upstream end of the project between 130+000 (Section 11.6, Engineering Appendix, Tables 6.3.5-1, 6.3.1-1, for example) and 130+500 (Engineering App. Table 6.3.1-2, Table 11-4 and Section 13.2, for instance). Figures/aerials in the Engineering Appendix appear to show narrowed channel edge lines going beyond station 103+000. Although the additional 500 feet would not be a significant length increase in terms of a percentage of project length, recent coordination with the Office of Counsel and the Executive Office has indicated that navigation projects are subject to hard limits on some dimensions with much less flexibility to change than other project purposes. It was recently determined that a 2,700-foot extension at another project exceeded the Chief's discretionary authority although the percentage increase in project length was relatively low. Clarification is needed on the project's upstream limit relative to that previously authorized to avoid confusion as to whether this project represents a significant scope change. Informal coordination with SAS indicated the upstream limit has not changed since the WRDA99 authorization. Therefore, the text and figures should be modified throughout the GRR, EIS, and appendices to consistently show station 103+000 as the upstream limit of the project.

District Response: Section 13.2 has been revised to include the following language "Based on studies conducted as part of the SHEP GRR and Tier II EIS there have been no changes in project purpose, scope, or location. The project purpose remains navigation improvements to Savannah Harbor. The project scope -- which is defined as the project output -- is unchanged. There have been some minor changes in the design (adding two meeting areas, bend wideners, slightly different mitigation features, extending the entrance channel further to ensure the channel meets deep water, etc.), but those changes are not significant in the overall project and do not alter the type of benefits that would result or type of environmental impacts. Both the tentative NED channel deepening alternative of -47-feet and the Maximum Authorized Channel of -48-feet follow the same alignment and start at the same point in the upper harbor (Station 103+000)." Changes have been made throughout the draft documents to assure that the upstream end of the channel ends at station 103+000 as authorized and not any other station.

HQUSACE Assessment (November 2010): The concern is resolved by the response and the text changes made throughout the GRR.

H. COST SHARING. The cost sharing table included on pages R-243 to R-246 of the GRR includes items in the General Navigation Feature subtotals that are not treated as GNF. HQ suggests that the costs for lands, Easements, Rights of Way, and Relocations for navigation (not mitigation LERR) be shown separately below the GNF as well as a subtotal for the Total Project First Cost per the comment above on costs for Section 902. The costs for berth area deepening and navigation aids are not GNF and should not be included in the subtotal of GNF or total project first cost for cost sharing. These are associated/other project costs which are the responsibility of the local sponsor and the U.S. Coast Guard, respectively. The cost sharing for

these line items is shown appropriately in the table but should be listed as other/associated costs after the project total. See ER 1105-2-100, section E-8.a.(1).

District Response: Concur. Updates will be made to the final documents when a single plan is selected.

HQUSACE Assessment (November 2010): The response partially resolves the concern, but is sufficient for the draft report. The cost sharing table will be revised for the final report.

District Response (March 2011): Concur. The Final GRR & EIS will recommend only one plan and the cost sharing table will be updated to show that plan.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final report.

District Response/Actions Taken (January 2012): Cost sharing of the Selected Plan is discussed in Section 15.2 of the Final GRR.

HQUSACE Assessment (April 2012): **The original concern is resolved** by the presentation of cost sharing for the recommended plan. However, additional comments on cost sharing calculations were made on the final report as noted above in that section.

I. RECOMMENDATIONS. The recommendations section of the draft GRR is set up as a recommendation by the sponsor that the OASA (CW) along with the Administrator EPA, and Secretaries of Commerce and Interior transmit a favorable report to Congress. There is no District Engineer Recommendation, although HQ understands the project is to be built by the Corps using a more traditional process. This creates confusion as to whether the sponsor is intending to construct the project under Section 204 of WRDA86. In addition, the report recommends a tentatively selected plan that is the LPP based on the sponsor's preferred project depth. The text indicates in section 11.4 that a waiver is being prepared and submitted to request approval to recommend the LPP rather than NED plan in the draft GRR. Such a waiver would need to be approved prior to public coordination. To date no waiver has been processed through HQ and ASA. The recommendations will need to be revised to reflect the project being built by the Corps rather than the sponsor and wording should be based on the recent coordination with the vertical team.

District Response: Concur. This reference to the Georgia Department of Transportation is an error. The GRR has been changed to read "The US Army Corps of Engineers tentatively recommends that the Assistant Secretary of the Army (Civil Works), with the Administrator of the US Environmental Protection Agency, the Secretary of Commerce, and the Secretary of the Interior, as required in the construction authorization (WRDA 1999) transmit a favorable recommendation to Congress that..."

HQUSACE Assessment (November 2010): The response partially resolves the concern, but is sufficient for the draft report. The final report will be revised to reflect the final recommendation.

District Response (January 2012): Concur. The final report has been revised to reflect the final recommendation, which can be found in Section 17.

HQUSACE Assessment (April 2012): The final report submitted ahead of the Civil Works Review Board contained no recommendations page signed by the District Engineer. This is important in that it forms the basis for the Division Engineer's endorsement and transmittal as well as the recommendations in the Chief's Report. In addition the standard disclaimer language regarding the changes that might occur during Washington Level review and budgetary and policy considerations in formulating a national civil works program need to be stated in accordance with Exhibit G-7 of ER 1105-2-100. This was provided ahead of the CWRB and **the concern is resolved.**

J. REAL ESTATE- NON-STANDARD ESTATE. It is stated in the REP that a Non-Standard Channel Improvement/Slough Easement was approved for two prior Savannah Harbor projects. HQ does not retain copies of non-standard estate approvals. If a non-standard estate approval is mentioned in the REP then it must include the justification and copies of the other approvals if so stated.

Since each approval is project specific, recommend a new submission be made for this project to HQ. In addition to the standard request requirements, include the previous two approvals and statement that the conditions of those projects are the same as this one. After approval, the REP would state that the non-standard estate was approved on (date) and include a copy of the approval.

District Response: SAS-RE-AP has been unable to locate copies of the previous approvals. However, on May 20, 2010, a request for approval of this estate was forwarded via email to SAD. A follow up email requesting status of the approval was sent on 25 October. Also, paragraph 15 of the Real Estate Plan is requesting approval of this non-standard estate. Once approval is received, the final report will be revised to reflect the approval of the non-standard estate.

HQUSACE Assessment (November 2010): The concern is resolved. HQ determined that the estate could be approved at the District level.

K. EDITORIAL AND MISCELLANEOUS.

(1) Figures, Page R176, R177, R179 and R182 of GRR. It isn't clear why some economic figures are depicted in red highlight on these pages of the GRR. Are they the current estimates that were revised or updated? The highlighting should be removed for the draft GRR when circulated to the public.

District Response: Concur. Red highlighting indicated values that changed per the resolution of ATR cost comments (changes between the 1 Sep and 14 Sep 2010 versions). Red highlighting has been removed.

HQUSACE Assessment (November 2010): The concern is resolved by the text changes noted in the response.

(2) Tentatively Recommended Plan. Since the report recommendations require concurrence by the cooperating agencies and OASA (CW), HQ recommends using the term Locally Preferred Plan when discussing the 48-foot alternative rather than the tentatively recommended plan. The text should be revised accordingly to avoid confusion in reading the GRR and NEPA document.

District Response: Reference in the report to the 47-foot and 48-foot alternatives has been revised to reflect guidance provided by HQUSACE 13 October 2010 which reads “The current Savannah Harbor Expansion project authorization included in Section 101 of the Water Resources Development Act of 1999 authorized a deep draft navigation project up to a depth of -48 feet subject to further evaluation by the agencies and concurrence by the Secretaries of the Army, Commerce and Interior, and the Administrator of EPA. Given the unique authorization of this project, any final recommendation of a preferred plan must meet the requirements of the legislation. Therefore, the draft report will be written to describe all depths evaluated between 42' and 48' (impacts/benefits) as required by the legislation. Within this range of feasible depths, the tentatively selected -47 feet NED plan complies with Army policy and the Maximum Authorized Plan of -48 feet is supported by the non-Federal sponsor. A final recommended (preferred) plan agreed to by the Secretaries of the Army, Commerce, and Interior, and the Administrator of EPA will be included in the final General Reevaluation Report and the Environmental Impact Statement. Adhering to this approach will ensure the draft report will be in compliance with the National Environmental Policy Act found at 40 CFR and other applicable laws and regulations governing public and agency coordination.”

HQUSACE Assessment (November 2010): The response partially resolves the concern, but is sufficient for the draft report. The final report will be revised to reflect the final recommendation agreed to by the agencies.

District Response (January 2012): Concur. The Final GRR & EIS recommend only one plan.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

6. RESOLUTION OF REMAINING ISSUES RAISED AFTER THE AFB.

A. CREDIT FOR NON-FEDERAL POST – AUTHORIZATION GRR COSTS. Section 119 of the Energy and Water Development Appropriations, 2003, Division D of Public Law 108-7, provides for crediting toward the non-Federal share of the project an amount equal to the Federal share of those post-authorization costs borne by the Georgia Ports Authority (GPA), if the Secretary determines that those costs were necessary to ensure compliance with the conditions of project authorization. Since the GPA did conduct studies to support the GRR after project authorization, the CESAS should recommend whether such costs were necessary to implement the project. If they were necessary, then they may be incorporated into total project costs and credit given to the GPA for the Federal share of its expenditures. The credit would thereby substitute for a part of the non-Federal cash contribution. The appropriate legal mechanism for crediting will require additional coordination with the ASA(CW) office.

The studies in question, as well as the amounts recommended for crediting, should be discussed in the cost sharing section of the GRR. The GRR should summarize the content of these studies, and their utility for purposes of project implementation, in support of a recommendation as to the amount to be credited under Section 119, subject to verification and audit. This information should be displayed in the cost sharing table.

District Response: Concur.

Discussion: In accordance with Public Law 99-662 (WRDA 86), Section 204(b) the Corps and Georgia Ports Authority (GPA executed a Memorandum of Agreement (MOA)) in April 2000. This agreement allowed GPA to fund the Corps for technical support in the preparation of the GRR and Tier II EIS, with the GPA taking the lead. Included in the Section 204(b) MOA was a provision that there was no promise for credit or reimbursement of GPA's cost should the project get constructed. In February 2003, with the signing of Public Law 108-7, Omnibus Appropriations Act for Fiscal Year 2003, GPA obtained special legislation that provides for the sharing of costs incurred after Project authorization if the Secretary determines that such costs were necessary to ensure compliance with the conditions of the authorization.

The Savannah District has performed an initial evaluation of the invoices provided by GPA for actual project expenses through June 2010, with estimates for future expenditures through the end of FY2011. That assessment concluded that roughly \$18,580,000 of GPA's expenditures through June 2010 can be creditable as a project cost. An audit of these expenditures is scheduled to be conducted late 2010 or early 2011. In addition, the Corps anticipates expending Federal funds through September 2010 of approximately \$12,480,000 for Federal Oversight and final report preparation.

If approved, credit for the Non-Federal interest's expenses since authorization would be given after execution of the Project Partnership Agreement for construction. The amount of credit would be based on the actual expenditures by the Corps and the Non-Federal interest.

The Georgia Department of Transportation (GDOT) serves as the Non-Federal sponsor for operation and maintenance of the existing Savannah Harbor Navigation Project. The District's written agreements with the Georgia Ports Authority focus on evaluating the Savannah Harbor Expansion Project, for which the District considers GPA to be a Non-Federal Interest. GPA has funded most of the GRR technical studies that were performed since the Expansion Project was authorized in 1999. GDOT works cooperatively with GPA to ensure Georgia's waterborne transportation needs are met. By letter dated 15 November 2007, GDOT informed the District that it intended to serve as the Non-Federal sponsor for construction of the Savannah Harbor Expansion Project. This position was reinforced by a letter dated 18 August 2010, in which GDOT stated their willingness to pay the Non-Federal share of the initial construction costs of the SHEP tentative NED Plan and any incremental construction and operations and maintenance costs attributed to the 48-foot alternative (the Locally Preferred Plan) in accordance with the cost sharing requirements of Public Law 99-662.

Action Required: Discussion of the cost share should be included in the GRR and a discussion of the crediting should be included in the fact paper attached to the Project Study Issue Checklist submitted with the GRR in accordance with Engineering Regulation 1105-2-100, Appendix G, Amendment Number 1, 30 June 2004.

Action Taken: Discussion of the cost share was included in the GRR at section 13.3 and discussion of the crediting was included in a fact paper included as an attachment to the Project Study Issue Checklist submitted with the draft General Re-evaluation Report.

HQUSACE Assessment (October 2010): The concern is partially resolved by the revised information on page 233 of the Draft GRR on the proposed credit for the non-Federal PED costs. Further coordination with the OASA (CW) indicated that the district should develop a good

estimate of costs that could be eligible for crediting to assure that an accurate project cost is determined. The mechanism for providing credit will involve a determination of credit eligibility based on a submission similar to an Integral Determination Report (IDR) during PED that supports the crediting request and shows how the costs meet the criteria of being integral, allowable, reasonable, and allocable. Following a determination of eligibility by ASA (CW) approval of credit would be provided for as part of the PPA and may be delegated by ASA (CW).

District Response: Language has been added to both the Crediting of the Non-Federal Sponsor for In-Kind Services Issue Paper and the GRR stating that “In order for these costs to be considered creditable, the Assistant Secretary of the Army for Civil Works (ASA (CW)) must make a determination of eligibility. Only after this determination could credit be provided and agreed to through a Project Partnership Agreement.” Language has been added to the Non-Federal Sponsor for In-Kind Services Issue Paper that “An audit for validation of these costs is scheduled to be completed during early 2011 and prior to the completion of the final report.”

HQUSACE Assessment (November 2010): The response has resolved the concern. Text has been added to the Issue Paper and GRR noting that ASA (CW) must make a determination of eligibility prior to approval of credit.

B. FUTURE VESSEL CALLS. During discussions at the Economics IRC held in Mobile 9-11 September 2008, it was revealed that future vessel calls grew in direct proportion to and at the same rate as forecast tonnage. This assumption is overly simplistic and not observed at US ports. The ports of LA and Long Beach accommodate 1,000 percent more tonnage than Savannah, but serve only 30 percent more vessels. Applying the current assumption at Savannah to LA/Long Beach would have resulted in 1,000 percent more vessel calls. The methodology for forecasting future vessel calls should be revised to account not only for the growth in tonnage, but also the future fleet’s vessel loading capacities and characteristics (by vessel size, number, and type).

District Response: Concur.

Discussion: A detailed reanalysis of Savannah Harbor trade (containerized commerce) and future vessel fleet has been performed. The forecast future fleet is based upon a detailed analysis of historical and future vessel calls, their loading characteristics, and capacities.

Action Required: Additional analysis was required as summarized above and is described in the GRR Documents.

Action Taken: The commodity forecast and future vessel fleet analysis were revised and incorporated in Economics Appendix Sections 3.3 and 3.4, respectively.

HQUSACE Assessment (October 2010): The concern is resolved. As noted in the revised report Savannah Harbor is on many trade routes with several ports of call rather than direct sailings as the first port of call.

C. EMPTY CONTAINER ASSUMPTION. During discussions at the Economics IRC held in Mobile 9-11 September 2008, it became apparent that empty containers were not adequately accounted for in future vessel loadings. An average weight per TEU by itinerary was estimated, but it accounted only for loaded TEUs. The analysis did not address that a portion (sometimes

significant) of all containers carried on vessels are empty. Additionally, container vessels operate with empty slots. By not accounting for empty containers and empty slots, the analysis is overstating the resultant vessel tonnage loading and transit draft. The revised analysis should account for empty containers and empty slots based on empirical analysis of Savannah's current practices and that of other US ports.

District Response: Concur.

Discussion: A detailed reanalysis of vessel loadings has been performed. It addresses vessel loadings to include loaded containers, empty containers, empty slots and numerous other variables impacting vessel loadings (i.e., ballast, bunkering, etc.)

Action Required: Additional analysis was required as summarized above and is described in the GRR Documents.

Action Taken: The commodity forecast and future vessel fleet analysis were revised and incorporated in Economics Appendix Section 3.4.4 Load Factor Analysis.

HQUSACE Assessment (October 2010): The concern is resolved. The revised Economic Appendix on page 42, Table 25 shows the metric tons per TEU and percent empties for both imports and exports by trade route.

D. AIR DRAFT CONSTRAINTS. During the district's presentation at the AFB which included a visual of the Talmadge Bridge, a concern arose that the bridge could potentially pose a constraint to future vessel traffic, similar to that posed by the Sunshine Skyway Bridge crossing the Tampa Bay Channel. Large container vessels, design vessel-sized and larger, have very high profiles above the water line (upwards of 175'-195'). The revised analysis should confirm that all vessels in the future fleet can be accommodated under the bridge and exclude vessels with air drafts exceeding the allowable clearance of the Talmadge Bridge.

District Response: Concur.

Discussion: Analysis was conducted to define the term air draft, the Talmadge (Savannah River) bridge draft height, restrictions on air draft such as minimum clearance requirements, and the air drafts of the design fleet mix projected to call at Savannah. Analysis also included coordination with the US Coast Guard, the Institute for Water Resources, the Savannah Harbor Pilots and carriers. Findings concluded that the design vessel and the design fleet mix (workhorse 8,200 TEU vessels have an upper height limit of 157 feet sailing at a design draft of 47.6 ft) will not encounter air draft restrictions in Savannah Harbor or by the Talmadge (Savannah River) Bridge (185 feet conservative air draft clearance).

Action Required: Additional analysis was required as summarized above and would be described in the GRR Documents.

Action Taken: The air draft analysis and conclusions were incorporated into the GRR Documents, specifically the Engineering Appendix Section 6.2.4.

HQUSACE Assessment (October 2010): The concern is resolved. The air draft limitations are discussed in Appendix C Engineering Investigations on pages 63 to 66.

7. RESOLUTION OF REMAINING POLICY CONCERNS FROM REVIEW OF THE AFB MATERIALS

A. WITHOUT-PROJECT CONDITIONS

(1). Planning Constraints. Section 7.3 lists the planning constraints for the study. Among them are maintenance of a four-foot under keel clearance for vessel transits, no impacts to the Floridian aquifer, and no impacts to cultural resources. However, subsequent formulation, Section 8.3.1, considers a reduction in underkeel clearance requirements and the text indicates two feet of under-keel clearance is permitted for LNG vessels (Section 12.2.2). The effects on the aquifer are considered to be minimal (Engineering Section 5.3). The recommended plan also includes mitigation for impacts to cultural resources. The planning constraints should be revisited and modified as needed to assure that the stated constraints are not violated by the considerations given in the GRR. See ER 1105-2-100, paragraph 2-3.a. (5).

District Response: Concur

Discussion (26-27 August 2008): This is not an uncommon policy comment, OWPR frequently comments on both planning objectives and constraints (Constraints contained absolute statements – “no changes to pilot practice”, etc., which appear to be inconsistent with information elsewhere in the report, and contradictory – make sure the report is consistent with planning constraints). Better examples of planning constraints that may be more rigid are lack of disposal area, not going higher on disposal areas dikes due to overhead power lines or lower due to underground pipelines.

Action Required: The draft report and EIS will be revised to include “rigid” planning constraints and will designate strategies to “minimize” the impacts where needed. Underkeel references will be reconciled and clarified in the report so that it clear that what underkeel clearance is being applied and why. (There is no universal 4-foot requirement).

Action Taken: Section 7.3 Constraints has been revised as recommended to state that “Savannah Harbor Pilots safety requirements for underkeel clearance” will be maintained (without reference to size of clearance required, as it varies for different vessels). Constraints concerning the aquifer and cultural resources have been revised to state that “significant impacts” will be avoided. The following underkeel clearances were used in the benefits analysis (GRR Section 7.2.2 Tide Delay Reduction Benefits):

Table AAA

Vessel Class	Underkeel Clearance
Handy Size	3.50
Sub Panamax	3.75
Panamax	4.00
Post Panamax Gen 1	4.20
Post Panamax Gen 2	4.30

HQUSACE Assessment (October 2010): The concern is resolved based on the response and text changes incorporated into the GRR.

(2). Consistency of Vessel Calls/Fleet Forecasts. The main report and economics appendix are inconsistent in their displays of forecast vessel calls and future fleet distributions (see Main Report Tables 5-7, 8 and Economics Appendix Tables 3-16, 17). Additionally, the discussion of the without-project condition in the main report elaborates on assumptions not presented in the economics appendix (example Main Report Section 5.6). The expectation is that economic information presented in the main report that supports the recommendation would be supported by the economics appendix; therefore the economics appendix should include similar, if not more detailed information. Prior to release of the draft report for public review the document should be editorially reviewed to ensure consistency and accuracy.

District Response: Concur. The District will make the necessary changes prior to release of the Draft GRR and EIS.

Discussion (26-27 August 2008): In reviewing the main report and economic appendix, there were some inconsistencies between them. The detailed analysis should be presented in detail in the economic appendix, and summary portions of the detailed analysis should appear in the main report. In the plan formulation presentation, the future fleet involves 8,000 TEU vessels, but this sized vessel did not appear in either the economic appendix or the main report. Should it be? Be sure there is a constant consistency between the portions of the report.

As a point of clarification on the presentation, it was disclosed that the 8,000 TEU was used as a part of a reference to the world fleet, and it was not intended to infer that 8,000 TEU fleet will call on the Savannah port.

It became clear at the AFB that the economics comments needed further discussion and elaboration. Holding such discussions before the entire, large audience at the AFB was not considered a good use of the forum's scheduled time, so the economists held a breakout session during the AFB to address the economics comments. This breakout session highlighted that the comments could not be resolved through additional explanation, because of HQ concern that the relevant methodologies or assumptions were not appropriate. Given the complexity of the economics issues, there was a need for lengthier, technical discussions involving the economics vertical team and the Corps' deep-draft navigation expert. A follow-on Economic Issue Resolution Conference was planned and held in the Mobile District on 9-11 September 2008.

Action Required: The District will make the necessary changes prior to release of the Draft GRR and EIS.

Action Taken: The main report and economics appendix have been revised to be consistent in their displays of forecast vessel calls and future fleet distributions (see Main Report Tables 5-12 and 5-14 and Economics Appendix Tables 15 and 18). The discussion of the without-project condition in the main report has been revised to be consistent with the economics appendix. The economic information presented in the main report is supported by information contained in the economics appendix. The draft report has been editorially reviewed to ensure consistency and accuracy.

HQUSACE Assessment (October 2010): The concern is resolved by the action taken to revise the main report and the Economic Appendix.

(3). Vessel Fleet- Distribution Relative to Observed Practices. Reference Economics Appendix, Page 56, “under future without project conditions, the channel depth at Savannah Harbor will be shallower than the depths of those harbors occurring immediately before or after Savannah Harbor on each of the benefiting services’ vessel rotations. Accordingly, channel depths at Savannah Harbor will limit the total amount of cargo that can be carried on the vessel before and after Savannah Harbor as it will be the port that constrains draft.” The resultant “without project” condition vessel fleet distribution for Savannah Harbor is not consistent with observed practices of efficient loading for the existing Panama Canal. According to Table 3-16, the vessel drafts range from <30 to 42 feet, with the concentration centering on 34 feet or less. The vessel fleet is adjusted slightly at 2015 to account for the fleet transition that occurs with the Panama Canal expansion. As a constraining port, vessels arriving at Savannah Harbor should be loaded to maximum practicable drafts, ranging from 38 to 42 feet MLLW. Unless the forecast cargo is light enough to “cube out” the calling vessels, there would be no logic to arrive at Savannah in a Post-Panamax vessel loaded to only 30 feet. The irrationality of the “without project” condition is evidenced by its contrast to the “with-project” condition fleet assumptions. With each foot of deepening, the fleet distribution shifts to the right, essentially loading each vessel one foot deeper. Consequently, a vessel loaded to 33 feet in the without-project condition is essentially evaluated against the same vessel movement loaded to 34 feet in the 43-foot with-project alternative, 35 feet in the 44-foot alternative, 36 feet in the 45-foot, 37 feet in the 46-foot, 38 feet in the 47-foot, and 39 feet in the 48-foot. In each of the “with-project” scenarios, savings are estimated to accrue. However, the vessel would not be constrained by the existing Savannah Harbor project. It, too, could load to 38 feet without a project, so the savings claimed should be zero. Loading to 39 feet without the project would also be possible, but at an additional cost to account for tide delay. Only the 48-foot project alternative would demonstrate a savings over the without-project condition in this example.

District Response: Discuss further at the AFB.

Discussion (26-27 August 2008): As noted in the comment, HQ explained that the benefiting vessels should include only those with operations constrained by the existing channel depth. The analysis presented in the report includes as benefiting shallow draft vessels which can use the existing channel and are unconstrained.

Further Discussion (9-11 September 2008): It appears that some of the data characteristics associated with current without-project operations have been lost based on assumption of a normal distribution, rather than a “whale” shaped distribution that shows more depth constrained operations. The district is looking at 2006 and 2007 data to evaluate more recent information on vessel characteristics and operations. During the Economic IRC, additional analysis was identified as needing to be accomplished in order to more finitely identify the constrained and unconstrained vessel fleets for Savannah Harbor. Additional data will be gathered and analyzed to determine future without and with project condition vessel operations for both the constrained and unconstrained vessels fleet.

Action Required: Additional analysis will be performed and documented in the revised draft report. The future fleet assumptions should be informed by empirical analysis of actual/similar practices and expert judgment.

Action Taken: Fleet assumptions have been totally revised in the economic analysis and are presented in the Economics Appendix.

HQUSACE Assessment (October 2010): The concern is resolved. The revised economic analysis claims benefits only for vessels that would be affected by a deeper channel.

(4) Vessel Fleet- Transition to Post-Panamax Vessels. Reference ER 1105-2-100, Appendix E, paragraph d.4).a, “ provide adequate lead time for anticipated changes in fleet composition for vessels that are currently a small part of the world fleet...it may not be realistic to assume that the optimum size vessel is always available for charter.” The analysis assumes a full transition to Post-Panamax vessels on several itineraries in the year 2015, which coincides with the on-line date of the expanded Panama Canal. Post-Panamax vessel calls are forecast to increase from 319 in 2014 to 3,515 in 2015 (Economics Appendix, Table 3-16). Over the same period, Panamax vessel calls decrease from 3,899 in 2014 to 981 in 2015. Such a dramatic shift is not only unlikely, it may be logistically impossible. The future vessel fleet distribution should be revised to reflect a more reasonable transition to Post-Panamax vessels among the benefiting itineraries.

District Response: Discuss at the AFB.

Discussion (26-27 August 2008): HQ questioned whether the fleet would be chartered or owned. IWR asked whether the fleet transition would be affected by cost recovery for the new Panama Canal construction. It was suggested that a sensitivity analysis might be performed. Other ports that have been deepened could be examined to evaluate what a reasonable fleet transition might be that is not as abrupt as that assumed in the current analysis.

Further Discussion (9-11 September 2008): The future vessel fleet distribution will be re-evaluated as other changes are made in the economic analysis. Additional explanation will be provided on how Savannah Harbor services are expected to transition to larger vessels on the benefiting itineraries. This analysis will also expand discussion and explanation on how tonnage currently moving on smaller unconstrained vessels will transition (over time) to larger vessels in order to improve operational efficiencies.

Action Required: Additional analysis will be performed and documented in the revised draft report. The future fleet assumptions should be informed by empirical analysis of actual/similar practices and expert judgment.

Action Taken: Fleet assumptions have been totally revised in the economic analysis and are presented in the Economics Appendix.

HQUSACE Assessment (October 2010): The concern is not resolved. Reference ER 1105-2-100, Appendix E, paragraph d.4).a, “ provide adequate lead time for anticipated changes in fleet composition for vessels that are currently a small part of the world fleet...it may not be realistic to assume that the optimum size vessel is always available for [deployment].” The Savannah Harbor future fleet was based on a world fleet forecast developed by MSI on the basis of information prevailing in the 2007 timeframe, which reflected a more robust economic outlook than currently exists. As a result of the world-wide economic downturn, a significant number of ships on order were postponed or canceled altogether. The resulting world fleet forecast includes a number of new vessel additions that will not be online prior to the base year and opening of the new, large locks on the Panama Canal. Furthermore the forecast trajectory of PPX vessel fleet additions cannot be realized over the current forecast time horizon given the reduced base and current outlook. The analysis should be revised to reflect the delayed changes to the future fleet. Inasmuch as the future fleet forecast assumes that new vessel additions would trigger a cascading of PPX1 and PPX2 vessels to the East Coast, the order cancellations and postponements will impact the timing and volume of this assumption. Sensitivity scenario 9 may be more reasonable as a baseline condition. It is suggested that this future fleet analysis be considered for the final report rather than the draft report.

Proposed Response: Concur. An updated world fleet and how that new fleet may affect Savannah vessels calls will be included in the final report.

HQUSACE Assessment (November 2010): The response has partially resolved the concern but is sufficient for the draft report. The concern will be addressed further by inclusion of an updated world fleet in the final report.

District Response (March 2011): A revised world fleet forecast and vessel calls forecast for Savannah containerships will be included in the final report.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final report.

District Response/Action Taken (January 2012): A new world fleet forecast is presented in the final Economic Appendix beginning in paragraph 3.4 and reflects conditions through 2010 and the beginning of 2011. In addition, a new vessel calls forecast has been made for Savannah which includes changes to the world fleet outlook since the draft report and an updated commodity forecast.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(5). Advance Maintenance Widener. Reference Page 18 of the Savannah Harbor Expansion Project – Preliminary Draft GRR. The report makes reference to an advanced maintenance feature that is awaiting approval of the USACE South Atlantic Division. Reference Page 185, section 13.8.1, Advance Maintenance, the second paragraph states that the advanced maintenance of a widener at the outer bar channel was assessed and the advance maintenance cannot be justified. There is no advance maintenance feature being reviewed in USACE South

Atlantic Division. Page 18 of the report should be revised accordingly as well as other sections where an advance maintenance widener feature is addressed as part of the without project alternative.

District Response: The district has concluded that the advanced maintenance features on the entrance channel are economically justified. It will add these features to the Expansion Project. CESAS will revise the Draft Report to be consistent on this issue.

Discussion (26-27 August 2008): The report needs to be reviewed carefully. There are discrepancies between sections.

The regional PDT was directed to look at numbers. If it is determined that, based on numbers, the advance maintenance widener (AMW) is operationally justified, based only on the savings to O&M, then it could be considered a part of the Expansion Project. The PDT was directed to ignore any savings to other programs or projects, such as the Tybee Island Shore Protection. If the AMW is justified based solely on savings to the O&M program, then the AMW could be constructed concurrently with the Savannah Harbor Expansion project. That portion of the AMW down to the presently-authorized depth (44 feet below MLLW) would then be constructed with 100% Federal (O&M) funds, with the remainder of the AMW constructed to the new project depth and cost-shared as a component of the General Navigation Feature.

Consistency with the Georgia Coastal Zone Management (CZM) Plan was thoroughly discussed. It was declared that the Corps position that the current Federal project does comply with Georgia CZM now to the maximum extent practicable because any change will add cost to the current Federal Standard. If the additional cost could be covered by funds from a local source, then the current and/or future O&M practice could change as long as the Federal standard is not changed.

The District was asked whether or not it was in compliance now to the maximum extent possible. The question is: "How should the expansion project view the proposed advance maintenance widener?" The Georgia Department of Natural Resources, Coastal Resources Division (GaDNR, CRD) asked about the Corps' official position as it relates to the Corps' compliance to the Georgia CZM plan. The GADNR asked for the Corps' position since the Corps must act adaptively in order to stay in compliance with the new project. It was stated that the compliance laws are in the book and the GaDNR needs to know our position.

The Corps' position is that the current project is in compliance even with the change in the CZM plan. There is a letter being prepared to the South Atlantic Division from the Savannah District that states the Corps' corporate position. Once approved, it will be sent to the GaDNR, Coastal Resources Division.

Further Discussion (Subsequent): The District received guidance from CESAD after the AFB that the economic justification for advance maintenance features is to be based only on the economic effects on the O&M program. Benefits or costs to other projects are not to be included.

Action Required: Verify that the AMW is still justified for the current project based solely on savings to the annual O&M program. If not, it should be removed from the report as a "without project" condition (in the April 2008 IRC, it was agreed that the evaluation of an AMW should include dredging costs, environmental effects, and effects of the nearshore placement on the

Tybee Island Federal Shore Protection Project). The District will perform the post-project O&M analysis based on the outcome of an evaluation of the construction of an AMW for the proposed project to see if there is a difference in the economic justification at the new depth. If there is an additional cost of O&M related to coming into compliance with the Georgia CZM, the default position will be that the sediment will be placed offshore (Federal Standard) unless there is a cost-sharing sponsor willing and able to pay for the difference in dredging costs.

Action Taken: The advanced maintenance widener in question has been removed from the project.

HQUSACE Assessment (October 2010): The concern is resolved by the response and action taken to delete the advance maintenance widener from the report.

B. PLAN FORMULATION.

(1). Disposal Site Formulation. Despite the fact that dredged material quantities vary significantly over the range of alternative project depths (from 17.2 million cubic yards (mcy) to 33.5 mcy in Table 11-3 on page 146), the dike raising costs for each alternative are shown in the later Table 11-3 on page 151 to be a constant value of \$12.5M. It is not clear why dike raising costs would not vary in proportion to disposal quantities. The engineering appendix indicates that the dike raisings are being accomplished to accommodate ongoing O&M as well as construction materials and it would be expected that the project costs would be prorated according to capacity used for the project. This could impact the optimization of the channel depth and needs to be further explained in the report to assure that the appropriate costs for disposal are used in the formulation or they should be revised as needed. See 2-4.k. of ER 1105-2-100.

District Response: Concur. This will be performed prior to release of the Draft Report.

Discussion (26-27 August 2008): The report included \$12.5 million needed for the project as an average cost for dike raisings for all alternatives. Based on the increasing quantity of material to be removed with each alternative, the disposal area capacity requirements would also be expected to increase for each alternative. The costs associated with disposal of cadmium enriched sediments are also shown as being a constant in Table 11-3 for each depth alternative and should be reviewed to determine if costs should vary for alternative depth plans.

Action Required: The dike raising costs should be reviewed and revised to reflect the sediment volumes for each alternative. The report, as well as the engineering and economic sections/appendices, should include the estimated cost for each alternative. Costs for disposal of cadmium enriched sediments should also be reviewed and revised as needed based on the requirements for various depth plans.

Action Taken: Dike raising costs have been revised and increase incrementally with increases in depth (GRR Table 10-3). The costs associated with disposal of cadmium enriched sediments have been reviewed and remain constant because even though the volume of cadmium enriched sediments changes incrementally with depth the handling method and placement operation remains the same across all alternatives.

HQUSACE Assessment (October 2010): The concern is resolved by the response and changes included in Table 10-3.

(2). **NED Plan Designation.** Section 13.2 explains that the tentatively recommended plan has the maximum net benefits of those evaluated and the sponsor has no interest in studying further deepening beyond -48 feet to bracket the NED plan. The text later indicates that the -48 ft. alternative is the NED Plan. Since the plan depth has not been bracketed using a 50-foot depth, the text should indicate that the NED plan is -48 feet. The ASA(CW) should be advised that the NED Plan depth has not been bracketed and the recommendation is being made based on a Categorical Exemption to the NED Plan.

District Response: Do not concur. In guidance from the General Re-evaluation Scoping Meeting in 2002 HQ and ASA(CW) concurred that the project would not consider depths greater than 48 feet. The 48-foot depth maximizes net benefits among the plans that are considered. The District was not previously aware that an exemption was required. The report will be revised to highlight that the net benefits continue to grow with the depths that were considered. Guidance was requested at the AFB on how to correctly phrase the Federally-supported plan.

Discussion (26-27 August 2008): Policy guidance states that the “NED” plan is the alternative that reasonably maximizes net average annual benefits. Even though the WRDA authorization limits the project depth to no deeper than 48-foot, in order for an alternative to be called the “NED Plan” the report analysis should show that the net benefits curve has peaked and started to decrease. This GRR shows that net benefits are still increasing at the maximum depth considered (48 feet) and the optimum depth has not been bracketed. Since the sponsor has no interest in analyzing depths beyond 48 feet, it is not necessary for further studies to be conducted in order to identify the NED. The 48-foot plan should not have been referred to the NED plan, but it is the most economical of the plans analyzed. As such it could be recommended under a categorical exclusion from the ASA(CW) and could be called the tentatively recommended plan or the Federally supported plan.

Action Required: During the subsequent Economic Issue Resolution Conference (IRC) it was concluded that additional analyses are needed to support plan optimization and selection. Once the analyses are revised, if it can be shown that a plan maximizes net benefits it should be identified as the NED plan. If optimization cannot bracket the NED plan, the tentatively recommended plan could also be referred to as the most economical plan analyzed or “Federally supported” plan. Concurrence by HQUSACE in the designation will be confirmed after the economic analysis is completed.

Action Taken: The economic analysis and plan formulation has been revised. The tentative NED plan maximizes net benefits and is bracketed by lower net benefits at 46 feet and 48 feet channel depths (GRR Table 11-1).

HQUSACE Assessment (October 2010): The concern is resolved by the revised analysis discussed in the response and the GRR.

C. ECONOMIC ANALYSIS.

(1) Uncertainty of the Benefits. It is not clear that the report has adequately discussed and displayed the range of uncertainty around the benefits estimate. This should be discussed at the AFB. For example:

(a) Practices. Page 73 - Alternative actions available to the carriers include:

- By-pass Savannah Harbor
- Service Savannah Harbor with smaller vessels
- Modify the port rotation so that Savannah is the “light” spot of the rotation
- Light load
- Use tidal advantage

The report doesn't appear to discuss the sensitivity of the benefits to the greater or lesser use of these strategies than assumed in the without project condition.

District Response: Discuss at the AFB.

Discussion (26-27 August 2008): During the discussion, the District concurred. The report will be revised to clarify this issue. Where required, additional economic analysis will be performed. These revisions will be included in the Final Report.

Further Discussion (9-11 September 2008): During the Economic IRC alternate operating considerations were further explored. Additional investigations and analysis will be performed through use of a series of spreadsheets developed for evaluation of risk and uncertainty through sensitivity analysis of key variables (e.g., ballast, bunkers, light loading, etc.). The spreadsheets will also incorporate tide delay analysis and benefit estimates. Further, investigations will include consideration of alternative operating practices. These analyses and supporting documentation will be provided in the revised report.

Action Required: Based on the additional analysis, revise the draft report and DEIS as needed to reflect the results. The revised analyses will be submitted for review prior to release of the draft report and EIS to the public.

Action Taken: The Economics Appendix and economic analysis has been fully revised. Ten sensitivity analyses have been conducted and are presented in the GRR and the Economics Appendix.

HQUSACE Assessment (October 2010): Resolved. Five specific items were pointed out as alternative actions.

The first item (By-pass Savannah Harbor) was discussed in the Multi Port discussions in the report. **The concern on the By-pass is resolved.**

The second item (Service Savannah Harbor with smaller vessels) was discussed in the Economic Appendix and it was discussed that the larger vessels are more cost effective. **This concern on the use of smaller vessels is resolved.**

The third item (Modify the port rotation so that Savannah is the “light” spot of the rotation) would have to be implemented by the containership lines. The ports of call in the Savannah trade route follow the current optimized business practices of the containership lines. If an unimproved Savannah was a light spot, the shipping lines may incur extra back tracking costs due to more sailing distance in any port rotation changes. The Transportation Cost Savings Model did not include this area of potential benefits. **The concern is resolved for the current Draft GRR.** However, it is noted that reduced costs from rerouting ships may add to benefits of the with project condition.

The fourth item (Light Load) and vessel loading depths are the subjects of concerns on the Draft GRR. **The concern is resolved.**

The fifth item (Use tidal advantage) has been incorporated into the economic analysis. The report pointed out 20% of the vessels use tidal advantage. **The concern is resolved.**

(b) Response to Depth Changes. In the with-project condition the historical sailing draft distributions were maintained in the analysis of alternative plans but were shifted one foot deeper with each project alternative. The report does not appear to discuss the sensitivity of alternative assumptions reflecting greater or lesser responses to project depth increases.

District Response: Discuss at the AFB.

Discussion (26-27 August 2008): During the AFB discussion, SAS concurred. The report will be revised to clarify this issue. Where required, additional economic analyses will be performed. These revisions will be included in the Final Report.

Discussion (9-11 September 2008): It isn’t clear why it is assumed that the vessel fleet would respond to a 1 foot channel depth increase by loading 1 foot deeper. The shape of the distribution may change instead. Additional economic evaluations will be performed to assess the impacts of without and with project conditions on vessel operations (i.e., loading). This analysis will be both developed and coordinated with Corps navigation experts at IWR.

Action Required: The report will be revised to reflect both the analysis and results.

Action Taken: The Economics Appendix and economic analysis has been fully revised. Ten sensitivity analyses have been conducted and are presented in the GRR and the Economics Appendix.

HQUSACE Assessment (October 2010): The report did not discuss the basis for assuming that the vessel fleet would respond to a 1-foot channel depth increase by loading 1-foot deeper. Sensitivity test 5 assumed that the PPX2 vessels would delay taking advantage of the depth available by waiting until an additional foot was available. Sensitivity test 6 anticipated the deepening by loading an extra foot when deepening became available. The essence of the comment was partially captured. Panamax and PPX1 vessels were not included in the sensitivity tests. The question remains what has been the historic loading response by containerships to the availability of incremental channel depth increases. The concern is not resolved.

District Response: The TCSM does not explicitly assume that PPX 1 and PPX 2 vessels will be sailing in the Savannah Harbor at one foot additional depth for each foot of channel deepening.

The TCSM assumes that the percent of Savannah cargo relative to MPC by trade route will be the same as currently observed for Panamax and PPX1 vessels. The sailing draft distributions used in HarborSym, likewise do not assume a foot-for-foot change as shown on the sailing draft distribution tables. Panamax and PPX1 vessels are not included in the cited sensitivity analysis as they call in the without project condition and are not affected by the model sensitivities that are being tested.

HQUSACE Assessment (November 2010): The response has resolved the concern. The Panamax and PPX1 vessels call in the without project condition and are not affected by model sensitivity tests.

(c) Sensitivity Analysis-Canal Expansion. Reference ER 1105-2-100, Appendix E, paragraph e5, “the uncertainty in key variables should be analyzed.” The current analysis includes sensitivity analyses relating to forecast future tonnage. An additional scenario should be evaluated as sensitivity analysis to account for impacts of a delay in the completion of the Panama Canal Expansion. The scenario should consider an on-line date of 2020, versus the current 2015.

District Response: Discuss at the AFB.

Discussion (26-27 August 2008): Data from the Panama Canal Commission indicates that the expanded canal will be operational in 2014. The economic analysis assumes it will be operational in 2015. SAS believes this is a conservative assumption.

Discussion (9-11 September 2008): While all industry information indicates construction of the Panama Canal is on or ahead of schedule, a scenario with an on-line date of 2020 versus 2015 will be evaluated. Results of the analysis will be included in the draft report.

Action Required: Additional analysis will be performed and documented in the revised draft report.

Action Taken: The uncertainty surrounding the opening of the Panama Canal Expansion has been substantially reduced with the official opening date being October 2014. The Economics Appendix includes multiple sensitivity analyses that address the alternative deployment scenarios for Post-Panamax vessels (GRR Section 12.1.2).

HQUSACE Assessment (October 2010): The concern is resolved by the official opening date established by the Panama Canal Commission.

(2) Panama Canal Expansion. Reference ER 1105-2-100, Appendix E, paragraph c.1).e., “a reasonable attempt should be made to reflect advancing technology affecting the transportation industry over the period of analysis. However, the benefits from improved technology should not be credited to the navigation improvement if the technological change would occur with and without the plan.” The Panama Canal expansion is analogous to technical change, in that it will, a) have a real impact on the distribution of vessels calling on Panama Canal itineraries, and, b) occur with or without the proposed Savannah Harbor expansion. Accordingly, savings attributable to replacement of unconstrained Panamax vessels calling at Savannah Harbor with Post-Panamax vessels do not accrue for the Savannah Harbor expansion project. The transition can only occur with a Panama Canal expansion, given that current locks are too small to

accommodate even a light-loaded Post-Panamax vessel. If an assumed transition to Post-Panamax vessels occurs following expansion of the Panama Canal, it is a change attributable to the Panama Canal improvement, not Savannah Harbor.

District Response: To be discussed at the AFB.

Discussion (26-27 August 2008): IWR raised a concern that use of the new improvements to the Panama Canal would likely be affected by the cost recovery charges to users of the new locks. This should be considered in projecting future usage of the improved canal.

Discussion (9-11 September 2008): As a result of the IRC, for itineraries that use and will benefit from improvements in the Panama Canal, additional information will be provided and information broken out on benefits to accrue to the current channel due to improvements at the Panama Canal and benefits that will accrue with additional channel improvements in Savannah.

Action Required: Additional analysis will be performed and documented in the revised draft report. The assumed future use of the Panama Canal and fleet size should be informed by empirical analysis of actual/similar practices and expert judgment.

Action Taken: The Economics Appendix and economic analysis has been fully revised. The transition to and deployment of Post-Panamax vessels is presented in Section 3: Future Conditions – Without and With Project of the Economics Appendix.

HQUSACE Assessment (October 2010): The concern is resolved. The expansion of the Panama Canal by 2014 is the stimulus needed to build larger ships. The deepening at Savannah Harbor is needed to accommodate larger ships using the Panama Canal on a trade route from the Far East to U.S. East Coast ports.

(3) Potential Beneficiaries. The existing Savannah Harbor project provides unconstrained access for all vessels loaded to drafts at or below 38-feet. The tidal range at Savannah Harbor also contributes to access by vessels loaded to 42-feet, albeit at an increased cost. Accordingly, not all vessels and the cargo they carry will benefit from the proposed deepening of the existing Savannah Harbor channel. Potential beneficiaries can be identified through an analysis of the existing fleet. The first step in identifying the beneficiaries of deepening the channel, specifically the vessel types and characteristics, their recorded calls and static drafts (draft at dock). Table 3-16 summarizes the existing and future without project condition vessel fleet distribution by vessel draft. According to the table, 2,903 vessel calls, or 88 percent, were unconstrained by the existing 42-foot channel, operating at drafts less than 38 feet. Constraints elsewhere in the system result in vessel loadings less than 38 feet at Savannah Harbor. Certainly, the existing Panama Canal constrains vessel types and loadings at Savannah Harbor, as do shallower ports of call on existing itineraries. Additionally, Panamax vessels occasionally “cube out” resulting in shallower vessel drafts. Such vessels would not be constrained by the existing project or have the constraint removed by an improved Savannah Harbor project. Accordingly, the economic analysis goes too far in identifying benefiting cargo and vessels. Vessels not constrained by the existing project or constrained vessels not relieved by the proposed deepening project are not to be considered beneficiaries. The analysis should focus on those vessel classes and itineraries that are constrained by the existing project, by light-loading, tides, etc. only. To account for anticipated fleet changes resulting from the Panama Canal expansion, the analysis

should assume the maximum practicable loadings in the without project condition, not an extrapolation of existing distributions.

District Response: Discuss at AFB.

Discussion (26-27 August 2008): HQ reiterated concerns stated in the comment that potential beneficiaries should come from the fleet of vessels whose operations are constrained by the current channel.

Discussion (9-11 September 2008): Vessels don't typically operate at their design drafts- maybe 1 out of 8 or 10, but those would be outliers. There should be a progression evident of benefiting vessels loading deeper, using tides, and then shifting to a larger vessel. The future vessel fleet and sailing draft distribution will be re-evaluated as other changes are made in the economic analysis. Additional explanation will be provided on how Savannah Harbor services are expected to transition to larger vessels on the benefiting itineraries. This analysis will also expand discussion and explanation on how tonnage currently moving on smaller unconstrained vessels will transition (over time) to larger vessels in order to improve operational efficiencies. Additionally, vessel loadings will be re-analyzed to more accurately reflect what is forecast to occur under without- and with-project conditions.

Action Required: Additional analysis will be performed and documented in the revised draft report. The potential benefiting vessels and itineraries should be informed by empirical analysis of actual/similar practices and expert judgment.

Action Taken: The Economics Appendix and economic analysis has been fully revised. The future vessel fleet and sailing draft distribution have been re-evaluated and the transition to larger vessels on the benefiting itineraries is explained in Section 3 of the Economics Appendix. Vessel loading has been re-analyzed as requested and a load factor analysis has been conducted (Economics Appendix Section 3.4.4 Load factor Analysis).

HQUSACE Assessment (October 2010): The concern is resolved. The potential beneficiaries of deepening are claimed only for added Post Panamax vessels and increases in loadings for Panamax and Post Panamax vessels.

(4) Transition to Post-Panamax Vessels. Reference Economics Appendix, Page 51, "through interviews with the various carriers conducted in 2006, it was determined that the list of benefiting services should be expanded to include ECUS EU GULF; ECUS MED; FE ECUS PEN; RTW; and AU ECUS EU PEN." This singular statement is insufficient support for an assumption that all of the listed itineraries will transition completely to Post-Panamax vessel from Panamax and Handymax vessels at year 1 of the Panama Canal expansion. Vessels moving on the itineraries currently are not constrained by Savannah Harbor. Furthermore, any change in the vessel fleet would occur as a result of the Panama Canal expansion, not as a result of the Savannah Harbor expansion. Cost savings accruing to these itineraries for vessels loaded to less than 38 feet are not attributable to the Savannah Harbor expansion project.

District Response: Discuss at AFB.

Discussion (26-27 August 2008): HQ indicated that a more gradual transition to Post-Panamax vessels would be expected. Other ports could be examined to determine a reasonable transition scenario in response to improvements.

Discussion (9-11 September 2008): Discussion in the report will be expanded to provide itinerary specific information on without project and with project fleet projections to include narrative discussion on factors that might drive changes in the fleet composition. Discussion will include identification of which itineraries utilize the Panama Canal and which do not.

Action Required: Additional analysis will be performed and documented in the revised draft report. The future fleet assumptions should be informed by empirical analysis of actual/similar practices and expert judgment.

Action Taken: The Economics Appendix and economic analysis has been fully revised. Section 3.4 Vessel Fleet of the Economics Appendix contains an empirical analysis of fleet deployment and identifies the assumptions used in the fleet forecast.

HQUSACE Assessment (October 2010): The concern is not resolved. A key assumption for the future vessel fleet at Savannah Harbor is that PPX2 vessels will call only with deepening to 44' and beyond, that is no PPX2 vessels, not even one or a lesser proportion, are projected to call in the without project condition. This assumption is objectionable for a number of reasons, the first being that a PPX2 vessel, the Figaro, has recently called at Savannah. Furthermore, the future fleet distribution for PPX2 vessels as displayed in Table 96, forecasts that 43 percent of PPX2 vessels will draft 37' or below when calling at the 44' project; 85 percent will draft 42' or less. The existing Savannah Harbor project could provide unconstrained access for a significant proportion of future forecast PPX2 calls. Furthermore, the deployment assumption presumes that carriers will have a complement of PPX1 and PPX2 vessels in their fleets. It is not unreasonable to assume that some shipping lines may opt to transition from Panamax (PX) to PPX2, given that they have no PPX1 vessels within their fleet. A third reason is that PPX2 vessels, with the economies of scale offered by their significant TEU capacities, are suited for the movement of empty containers, which reduce their channel requirements. The FE-ECUS route is the largest volume itinerary at Savannah. These imported TEUs tend to be lighter weight, while those exported tend to be empty. It is not unrealistic to assume that a PPX2 vessel could move cost-effectively on this string, and others in the without project condition. The analysis should be revised to reflect a more reasonable without project assumption regarding deployment of PPX2 vessels to Savannah.

District Response: The Figaro recently called at Savannah. However, the PDT does not believe that this will be a normal practice. See web site:

<http://seshippingnews.typepad.com/south-east-shipping-news/2010/08/cma-stunt-sends-half-loaded-into-Savannah-for-24-hours.htm>

Engineering investigations indicate that due to current channel configurations, PPX2 vessels are not generally adaptable to Savannah Harbor. Sensitivity analysis #6 already assumes that PPX2 vessels deploy at 42 feet on the FE ECUS route. In addition, a sensitivity analysis has been added to the draft report assuming PPX 2 vessels would be deployed on all trade routes and

would call on Savannah Harbor in the without project condition. Please refer to new sensitivity analysis #13 in document Section 5.4 Other Sensitivities.

HQUSACE Assessment (November 2010, revised January 2011): The response and draft report have partially resolved the concern. A new sensitivity test has been added to the draft report. Provide information on the size differences between the design vessel the Susan Maersk and the FIGARO. The Susan Maersk is 1,138-feet long, 140-feet wide, with a design draft of 47.6-feet and an 8,200 TEU capacity. The Figaro (8,500 TEU), 1,100 feet long, 140-feet wide, and design draft of 49.5-feet was the largest vessel to call on Savannah (August 27, 2010). Since the Figaro is similar in length and width to the design vessel Susan Maersk, explain if air draft or other concerns are the limiting factors for the FIGARO.

District Response (March 2011): PPX2 vessels will be incorporated in to the without project condition for the final report due to recent developments and announcements by carriers.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final report.

District Response/Actions Taken (January 2012): Table 29 of the Economic Appendix shows a detailed view of the existing world fleet for vessels in the 7,600 to 12,000 TEU class along with size ranges for width and design draft. Of the existing world fleet in the Super-Post Panamax class, about 15% are less than 145 feet in width and greater than 48 ft in design draft. While about 60% of these size vessels are between 47.5 and 48 feet in design draft. As the text in paragraph 3.4.2.3. explains, future builds in vessels with design drafts greater than 48 feet, are expected to be greater than 145 feet in width, which exceeds the design specifications for the improved Savannah harbor channel. The PDT maintains that the selected PPX2 vessel design is representative of the majority of vessels of this class that will call Savannah in the foreseeable future. Regarding PPX 2 vessels in the without project condition, considering recent calls of the Figaro and similar size vessels, and recent announcements by carriers to deploy more 8000 TEU range ships to Savannah, the without project condition has been revised to include PPX 2 vessels.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(5) Operating Practices. Reference Economics Appendix Section 4.2.2, starting page 57, includes the assumption that Post-Panamax vessels will be loaded to their maximum design draft of 47.5 feet. The stated design draft of a vessel is related to both its rated deadweight and to the densest cargo the vessel is designed to carry. The vessel's deadweight assumes both a cargo tonnage level based on the vessel's lading capacity by weight and that the vessel contains 100 percent of its fuels, stores, water, and crew capacity, plus any ballast the vessel is expected to carry. Accordingly the design draft refers to the maximum possible draft of the vessel. However, container vessels often sail at less than their design drafts because the average cargo weight carried per TEU slot is low enough that the TEU slots are accounted for – either by cargo-filled containers, empty containers, or no containers – before maximum cargo by weight has been achieved. In this case the vessel has cubed out because its lading capacity by volume is less than its lading capacity by weight. Whether a vessel first cubes out or reaches its cargo carrying capacity by weight depends on both the design of the vessel and conclusions concerning

expected percentage of empty slots, percentage of empty containers carried, and short tons filled per container, which drive the calculation of average weight carried per TEU slot. Accurate information on operating practices is particularly important: without this, reasonable with- and without-project conditions, and economics analysis, is not possible. Entering and departing vessel drafts in economic analyses shall reflect actual practices. Recent investigations by the Institute for Water Resources (IWR) of the design vessel's (Susan Maersk) actual loading practices indicate that the maximum operating draft is approximately 45 to 46 feet. Additionally, IWR Report 91-R-13 prescribes a methodology for calculating actual vessel capacity and resultant maximum vessel draft. The factors presented would indicate a vessel draft of approximately 46 feet. The vessel fleet distribution and port model assumption should be revised to reflect practical operating drafts of all vessel classes, particularly the Post-Panamax vessel.

District Response: Discuss at AFB.

Discussion (26-27 August 2008): The discussion was deferred to the follow up economics meeting.

Discussion (9-11 September 2008): Data on West Coast and East Coast ports will be obtained as a basis for analysis. Model inputs and assumptions will be re-evaluated based on information provided by industry, Institute for Water Resources, historical operations in comparable deep draft ports and historical operations in Savannah. Study economics will be estimated using revised assumptions about vessel loading practices (i.e., TEU weight, percentage of empty slots, percentage of empty containers carried, etc.). Once the new model runs have been completed and evaluated, risk and uncertainty will be addressed through sensitivity analysis of key input variables.

Action Required: Additional analysis will be performed and documented in the revised draft report.

Action Taken: The Economics Appendix and economic analysis has been fully revised. Additional analysis has been conducted on vessel operations and is presented in Section 2.6 Shipping Operations in the Economics Appendix.

HQUSACE Assessment (October 2010): The concern is not resolved. The important output of the load factor analysis is an estimated maximum practical capacity (MPC) unique to vessel class and route, which also derives the vessel's maximum practicable loaded draft (MPLD). The LFA highlights any deviations from the vessel's design draft based on characteristics of the cargo it carries and assumptions for empty containers, empty slots, fuels, ballast, and stores, as well as any constraints imposed by channel depths. The MPC for any given Savannah vessel class and route was estimated with one set of input parameters, and resulted in a unique MPLD and unit cost by channel depth. The LFA does not adequately account for the uncertainties associated with the input assumptions, nor does it result in the likely distribution of MPLD for any given vessel route or class. The load factor analysis should be revised to account for the uncertainties associated with vessel loadings by varying the input parameters and display the MPC and resultant MPLD as a distribution rather than a single point estimate. The economic analysis needs to further explain how a range of sailing drafts at various project depths was determined. It is not completely clear how the practicable maximum vessel capacity was adjusted in the

Transportation Cost Savings Model (TCSM). How does the actual vessel capacity match up with vessel sailing draft in determining benefits? A comparison of the cargo loading of a light drafted ship (Bottom-up) with the Top-down approach of the (TCSM) is needed clarify and verify the Top-down approach.

District Response: There are multiple issues here. The first is to understand maximum practical load or capacity (MPL\MPC) and the contexts under which these can vary with associated immersed draft. As stated on page 11, the load factor analysis (LFA) highlights or portrays the estimation of draft for given assumptions concerning cargo and box weight per loaded handling unit (i.e., TEU), empty units, empty slots, ballast and non-cargo components of DWT such as disposition of bunkering, constants and stores. In regard to uncertainties concerning the LFA the concern is to what degree or extent variance in inputs can be expected. In terms of box weight itself, very little variance can be reasonably expected from the average 2.00 metric tons per TEU with variance estimated at notably less than .1 metric tonnes for the overall average of containers in trade. In terms of cargo weight per TEU this can vary notably by trade but the expected variance for the average weight within a given trade is also relatively small when addressing the hundreds or thousands of containers and other mitigating influences involved. In terms of ballast and disposition of non-cargo components the estimates are generally reasonable regarding total weight aboard the vessel, the maximum respective share of rated DWT (i.e., generally twelve to eleven percent or less for the fleet involved), and arguably should not be varied significantly due to typical allowances for these items and relationships of ballast versus bunkering when approaching or at the summer loadline or maximum practical load. MPC\MPL relationships reasonably portray the thresholds for depth where vessel size class will be employed based on availability of depth, viable loading deployment assumptions, and relationships of transportation costs amongst an available array of vessel classes while greater variability in LFA parameters can be used to estimate reasonable loading relationships at typical or more widely varying transit drafts. In regard to studies for Savannah, the range of probable variance in or around baseline estimations of MPC\MPL will not exclusively address potential variances in transit draft. This is for a variety of reasons which concern the unavailability of data from vessel operators concerning DWT utilization and normal variability in operations regarding transit routing and services extended to other ports along a respective itinerary. Variability in transit draft greater than would be expected around the bounds for MPC\MPL however has been employed in the distribution of drafts for supporting HarborSym Studies.

HQUSACE Assessment (November 2010, revised January 2011): The response and draft report have partially resolved the concern, but is sufficient for the draft report. The relationship of Maximum Practical Capacity (MPC) to Maximum Practicable Loaded Draft (MPLD) is primarily dependent upon cargo weight per TEU by trade route. The final report needs to consider the effect of the changes since 2007 on the weight per TEU on the load factor analysis for the highest tonnage trade routes of Savannah Harbor.

District Response (March 2011): Concur, the final report will include relevant and updated information regarding Savannah cargo weights and empty TEUs from 2008 thru 2010 actual data from GPA. MPC and MPDL are not expected to be revisited for the final report as sailing draft information from 2008-2010 has not be collected and analyzed.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final report.

District Response/Actions Taken (January 2012): The final report incorporates information on actual calls for containerhips for 2008 thru 2010, including full and empty TEUs, tonnage, and cargo weights, imported and exported through Savannah. The analysis now includes average Savannah cargo weights per TEU for the period of 2000 thru 2010. However, MPC and MPLD have not been revised as sailing draft information has not been included in the 2008-2010 analysis.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

(6). Sailing Draft Distribution. Reference Economics Appendix, Page 60, “there are several services transitioning to fleets comprised of a vessel class not historically utilized for those services (i.e. those Panama Canal services shifting from primarily Panamax vessel fleets to Post-Panamax fleets). Accordingly for these services there was not historic record that could be assumed for forecast vessel draft at which the vessel would transit the Savannah Harbor in the future. Therefore, the sailing draft distribution of the Post-Panamax vessels currently calling at Savannah Harbor on non-Panama Canal services was used as a proxy to establish the sailing draft distribution for the Panama Canal service Post-Panamax vessel calls.” The vessel distribution presented includes vessel drafts ranging from less than 30 feet to 42 feet, with more than 70 percent loaded to less than 39 feet. The existing distribution suggests a more significant loading constraint elsewhere on the system. In the without-project condition, following completion of the Panama Canal, Post-Panamax vessels should be loaded to their maximum practicable range of depths for Savannah Harbor, unless a shallower constraint exists elsewhere on the system. If such a constraint does exist without the project, then it will prevail with the proposed deepening project, too. Consequently the movements should not be considered benefiting tonnage.

District Response: Discuss at AFB.

Discussion (26-27 August 2008): The discussion was deferred to the follow up economics meeting.

Discussion (9-11 September 2008): Vessels don't typically operate at their design drafts- maybe 1 out of 8 or 10, but those would be outliers. There should be a progression evident of vessels loading deeper, using tides, and then shifting to a larger vessel. The future vessel fleet and sailing draft distribution will be re-evaluated as other changes are made in the economic analysis. Additional explanation will be provided on how Savannah Harbor services are expected to transition to larger vessels on the benefiting itineraries. This analysis will also expand discussion and explanation on how tonnage currently moving on smaller unconstrained vessels will transition (over time) to larger vessels in order to improve operational efficiencies. Spreadsheet applications will use vessel operating costs and costs per ton as indicators for tonnage to transition from smaller to larger vessels as economic efficiencies from channel improvements become available. Further, vessel loadings will be re-analyzed to more accurately reflect what is forecast to occur under without and with project conditions.

Action Required: Additional analysis will be performed and documented in the revised draft report. The future fleet assumptions and sailing draft distributions should be informed through empirical analysis of actual/similar practices and expert judgment.

Action Taken: The Economics Appendix and economic analysis has been fully revised. Vessel loading has been reanalyzed. The vessel loading analysis is included in the Economics Appendix (Section 3.4.4 Load factor Analysis) and an analysis of sailing draft distributions was conducted and included in the Economics Appendix (Section 6.2.3 Sailing Draft Distributions).

HQUSACE Assessment (October 2010): The concern is resolved. The revised GRR on page 44 provides controlling depths at East Coast ports, the Panama Canal, and major foreign trading partner ports. Only Savannah, Charleston, and Miami have planned depths less than 48-feet.

(7) TEU Weight. Reference Economics Appendix, the port model includes an assumption that TEU containers will load to 11.56 representing an average weight of loaded and empty containers, moving inbound and outbound. TEU loadings vary by itinerary and direction. Likewise empties vary along the same lines. The TEU weight is a key assumption in translating forecast tons into vessel calls at the port. Given that more detailed data is available, estimates for TEU weight should be developed by direction and itinerary.

District Response: Discuss at AFB.

Discussion (26-27 August 2008): The discussion was deferred to the follow up economics meeting.

Discussion (9-11 September 2008): There appear to be significant variations when comparing service tons to service TEUs. There is concern as to how tonnage is being translated to TEUs and vessel calls. The TEU assumptions can create too many or too few vessel calls. It appears that there are too many shallow draft vessel calls projected with low tonnage. If these vessels are in ballast then they could add cargo tonnage without any change in operating draft. There should be a trend of adding tonnage per trip before adding vessel calls. TEU weight will be subject to additional analysis. Plans include evaluation by itinerary and movement (i.e., inbound or outbound). Resultant information will be used in the revised benefit calculations. Sources anticipated to be used include but are not limited to IWR products, historical TEU weights in Savannah, and consideration of import and export commodity information generated in the study's commodity forecast.

Action Required: Additional analysis will be performed and documented in the revised draft report. The future TEU loading assumptions should be informed by empirical analysis of actual/similar practices and expert judgment.

Action Taken: The Economics Appendix and economic analysis has been fully revised. An analysis of TEU weights was conducted (Economics Appendix Section 3.3.4 Containerized Trade – TEU Equivalents; Table 24: Container Box Weight by Service).

HQUSACE Assessment (October 2010): The concern is resolved. The revised Economic Appendix on page 42, Table 25 shows the metric tons per TEU and percent empties for both imports and exports by trade route.

(8) Voyage Costs. Reference Economics Appendix, Tables 4-10 through 4-21. The with-project condition vessel fleet distributions assume that the maximum vessel draft will correspond to the evaluated project depth, e.g. 46-foot channel accommodates a vessel drafting up to 46 feet. Given the requirement to maintain 4 feet of underkeel clearance, the assumption follows that vessels will continue to rely on tide with channel improvements. It is not apparent in the information provided on the port model that the cost of tide delay is included each voyage cost estimate or reflected in the average total cost per cargo volume. Voyage cost savings would be overstated if vessel drafts equaling the evaluated project depth are accommodated without tide costs. The analysis should distinguish the tide delay cost portion of the voyage cost estimate.

District Response: Discuss at AFB.

Discussion (26-27 August 2008): The discussion was deferred to the follow up economics meeting.

Discussion (9-11 September 2008): Report language will be modified to distinguish between reductions in vessel operating cost due to channel improvements and due to reductions in tide delay. Spreadsheet calculations will include identification of both benefit categories. The benefits from each source will be displayed and discussed in the revised report.

Action Required: Additional analysis will be performed and documented in the revised draft report. Tide delay reduction benefits should be calculated and presented separately from vessel cost reduction benefits.

Action Taken: The Economics Appendix and economic analysis has been fully revised. The economic analysis includes a separate Transportation Cost Savings model and a separate Tide Delay/Congestion Delay cost Savings model (HarborSym). Tide delay reduction benefits have been calculated and presented separately from vessel cost reduction benefits.

HQUSACE Assessment (October 2010): The concern is resolved.

(9) Tide Delays. Reference Economics Appendix, Section 4.5 Tide Delay Benefits Analysis. Tide delays benefits were estimated outside of the port model deepening evaluation. If the port model does account for tide (see comment 8. above), then a separate tide analysis is double counting benefits. If the port model does not account for the delay costs of tide, then a tide analysis could be used to account for the benefits accruing from tide delay cost reduction. The tide analysis presented in the report, however, is based on a flawed assumption, that being all vessels are delayed similarly waiting for tide. Vessels waiting for an additional 2 feet of channel depth will have a longer wait than those vessels needing only 1 foot additional channel depth. Furthermore, each successive foot of deepening would eliminate tide delay costs for the vessel class loaded to the next channel depth less three feet (e.g. 44-foot channel alternative will eliminate tide delay experienced by vessel draft class 40 feet, which was constrained under the 43-foot alternative). The 48-foot channel alternative would eliminate all tide delay for vessels drafting 44 feet or less. Therefore, tide delay NED benefits would accrue, to some measure, for all channel deepening alternatives, not just the 46 through 48-foot channel depths. The analysis should be revised to account for tide delay reductions at all evaluated channel depths.

District Response: Discuss at AFB.

Discussion (26-27 August 2008): The discussion was deferred to the follow up economics meeting.

Discussion (9-11 September 2008): Report language will be modified to distinguish between reductions in vessel operating cost due to channel improvements and due to reductions in tide delay. Spreadsheet calculations will include identification of both benefit categories. The benefits from each source will be displayed and discussed in the revised report.

Action Required: Additional analysis will be performed and documented in the revised draft report. Tide delay reduction benefits should be calculated for all project depth alternatives and presented separately from vessel cost reduction benefits.

Action Taken: The Economics Appendix and economic analysis has been fully revised. The economic analysis includes a separate Transportation Cost Savings model and a separate Tide Delay/Congestion Delay cost Savings model (HarborSym). Tide delay reduction benefits have been calculated and presented separately from vessel cost reduction benefits.

HQUSACE Assessment (October 2010): The concern is resolved.

(10) Traffic Forecasts. Reference Economics Appendix, Section 3.2.4. The base year for commodity forecasts was revised from 2003 tonnage levels to 2007 tonnage levels. The rationale for the revision was recent growth at Savannah Harbor surpassing forecast tonnage levels. The report attributes recent growth to “GPA’s aggressive pursuit of retailers to build distribution centers in the greater Savannah area.” While recent Savannah Harbor tonnage is higher than forecast, it is not clear how much of the growth may already be accounted for in the forecasts for other Atlantic Coast ports. Does recent tonnage at other Atlantic Coast ports similarly exceed previous forecasts? Is forecast US tonnage significantly less than currently observed? Some portion of the double-digit growth observed at Savannah Harbor is likely a result of transfers of container tonnage forecast at other Atlantic Coast ports to the new distribution centers. If recent tonnages for the U.S. and other Atlantic Coasts ports are in line with previous forecasts, then the revision should focus only on correcting Savannah’s share of future forecast tonnage. Adjusting Savannah’s share of the base traffic would necessitate recalculation of applied growth indices. If the forecasts overall are too conservative, then an adjustment to both the base year and growth indices may be warranted at Savannah Harbor. Rather than relying on one, peak-year tonnage level, the base year for forecasting purposes should reflect an average of recently observed tonnage levels. Three years of detailed commodity tonnage and TEU data is generally the minimum needed to recognize annual variance and anomalies when establishing base year data.

District Response: Discuss at AFB.

Discussion (26-27 August 2008): Consideration had been given to modifying the commodity projections; however that was not pursued based on time and cost constraints.

Discussion (9-11 September 2008): GPA explained that port growth was somewhat a result of a West Coast port closure in 2002 that caused shippers to explore options for reaching East Coast population centers. For trade from Japan and China the Panama Canal route is more efficient, whereas the Suez route is used for other destinations in Southeast Asia. Charleston’s trade is Europe based, whereas Savannah’s is Asia based. Growth is expected to continue although not at the same rate. The commodity forecast will be revised. Modifications to base year tonnage may

include an average of 3 to 5 years versus one year in determining how to take recent growth above forecast commerce into account. Evaluations will include investigation of growth or lack of growth in other south eastern ports during the period 2003 to 2007, some assessment of the impact of activity at other ports on Savannah, and information about shifts in market share for commodity movements that occurred in the 2003 to 2007 timeframe. Sensitivity analysis will be performed on the final forecast in order to test key assumptions.

Action Required: Additional analysis will be performed and documented in the revised draft report.

Action Taken: The Economics Appendix and economic analysis has been fully revised. The commodity forecast includes base year tonnage that includes a weighted average of 3 years to take recent commerce changes into account.

HQUSACE Assessment (October 2010): The concern is not resolved. According to the Georgia Ports Authority (GPA) public address on September 16, 2010, “The 9.7-percent increase in TEU’s in FY 2010 allowed GPA to return to near record levels reached in FY 2008. Based on recent traffic trends, the increase in traffic after 2007 did not occur. Therefore, the commodity projections need to be based on actual traffic in 2009 and 2010. Reference is made to ER 1105-2-100 paragraph (g) on page E-46. “Most projections of waterborne commerce are static estimates of dynamic events; therefore, the projections should be sufficiently current to support report conclusions.”

District Response: The PDT has incorporated actual 2008-2009 total cargo and 2010 GI trade forecasts for the southeast US Atlantic coast in to the commodity forecasts for Savannah as an additional sensitivity analysis for the draft report. For the final report, this revised forecast will form the basis for the new base line forecast, and all sensitivity analyses will be revised accordingly. The draft and final report revisions will not fully incorporate all information such as sailing drafts, tonnage and TEUs, for all vessel calls by trade route from 2008/09 unless requested and agreed to with GPA as this would entail at least 4 months and a complete redo of the economic analysis.

HQUSACE Assessment (November 2010, revised January 2011): The response and draft report have partially resolved the concern. The PDT has incorporated the latest forecasts as sensitivity analysis for the draft report. Also, the final report will have a new baseline forecast.

District Response (March 2011): The commodity forecast has been updated for the final report and is comprised of actual 2005-2010 Savannah Harbor trade and a new Global Insight South Atlantic trade forecast.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final report.

District Response/Actions Taken (January 2012): The updated commodity forecast is included in the final report and the results are presented in Tables 14 to 24 of the Economic Appendix. Additionally, sensitivity analysis of the TCSM results have been included for plus and minus 1 and 3 percent annual change around the new baseline forecast.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

D. ENGINEERING AND COSTS.

(1) Value Engineering. The value engineering report identified cost savings of about \$34,221,000. It is not very clear whether the cost savings are reflected in the MCACES cost estimate. Please clarify.

District Response: The proposed cost savings are somewhat speculative at this point. The District will technically evaluate the proposals. Any that are found to be technically feasible and cost effective will be included in the Final Report.

Discussion (26-27 August): The Draft GRR does not include potential cost savings identified in the Value Engineering (VE) study in the proposed project. During the preparation of the Final Report, the District will examine the VE Study recommendations and include ones that it believes can be implemented and are justified.

Action Required: A thorough evaluation of the Value Engineering recommendations will be performed during the preparation of the Final GRR and EIS. If any cost-savings are technically supported, the GRR and EIS will be revised to include the Value Engineering features that will be recommended for adoption. The Final GRR will include an analysis and discussion on what VE proposals were adopted and why.

Action Taken: Value Engineering of the project was conducted in May 2008, this is contained in Section 14.0 of the Engineering Appendix titled "Value Engineering". Since May 2008 four features were added to the project, which were coordinated with the VE team. No VE proposals were found to be viable alternatives.

HQUSACE Assessment (October 2010): The concern is resolved by the response and the information included with the Engineering Appendix.

(2) Real Estate. A price level date is not identified in the real estate cost summary shown in Tab 13. It is not very clear whether the real estate costs were adjusted to a common price level date. Please clarify.

District Response: Real Estate values are based on a Gross Appraisal completed in June 2008. Will clarify in the RE Appendix and include in the Draft Report.

Discussion (26-27 August): This information will be included in the Draft GRR.

Action Required: Revise the GRR to include the Real Estate costs at the June 2008 price level.

Action Taken: The GRR has been revised to include real estate costs at the October 2009 price level (GRR Section 9.3.1 Construction Cost Narrative).

HQUSACE Assessment (October 2010): The concern is resolved by the text changes included in Section 9.3.3 of the GRR.

(3) Clean Air Act Compliance. Construction of the project may require a longer period due to restriction in operation activities and will have significant cost impacts. Is there a requirement for CAA compliance with this project? Please clarify.

District Response: Concur. It is a requirement. No significant impacts are expected. This will be clarified in the revised Draft Report.

Discussion (26-27 August): Project is not anticipated to have problems with compliance with the Clean Air Act. The project is anticipated to comply with all aspects.

Action Required: Revise the Draft GRR and EIS and clarify the compliance status with the Clean Air Act.

Action Taken: The analysis did not identify any significant adverse impacts to air quality that would result from implementation of the proposed harbor deepening alternatives (GRR Section 8.2.3 Air Quality Impacts). The Air Emission Inventory is included as a separate appendix in the EIS.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text included in Section 8.2.3 of the GRR and the appendix to the EIS.

(4) Passing/Meeting Lanes. Reference Economics Appendix, Section 4.7.2.2. Passing/Meeting Lane Analysis, With Project Conditions. Three alternative "meeting" lane locations were evaluated at Savannah Harbor with each location considering a singular passing lane length. The 3,000-foot passing lane design is approximately 2.5 times the length of the Post-Panamax design vessel. Other Corps project evaluations projects have assumed minimum lengths of 2-3 miles for passing lanes. The Savannah Harbor passing lane appears to be too small to operate effectively, requiring significant coordination between pilots and metering vessel speeds to perform the passing maneuver. The District should verify that the proposed design is within engineering design safety standards and can function as intended.

District Response: Concur. Will verify and include in the Draft Report.

Discussion (26-27 August): A 12,000 foot-long "meeting lane" in the Long Island Channel was included in the ship simulation study conducted by ERDC, but the specific "meeting" lanes recommended in the report were not modeled. The difference between a passing lane at Long Island and the two meeting lanes (Oglethorpe and Long Island) is that the passing lane would allow vessels traveling in the same direction to pass one another. The meeting lanes would serve as places where outgoing ships could meet an incoming ship and with ship-to-ship coordination and planning, go by one another. The meeting lanes are not intended to be used for one ship to overtake another ship. The lengths of these "meeting lanes" were selected based on requirements provided by the Savannah Harbor Pilots. In following up with the Savannah Harbor Master Pilot again after the AFB, the pilot stated that he had reservations over the length of the meeting lanes with respect to safety.

Action Required: The District will define and differentiate between passing, meeting and overtaking. The District will assess replacing the two 3000-foot "meeting lanes" with the 12,000-foot long meeting lane that has been modeled as part of the ship simulation study at ERDC. The PDT will verify the safety aspects of passing the design vessels and the benefits

versus the costs of dredging this "passing" feature in lieu of the "meeting lanes." These revisions will be included in the Draft GRR.

Action Taken: The following text has been added to the GRR Section 6.10.1 Meeting Areas. "Meeting areas provide areas for the design vessels to be able to meet in transit to avoid delays that would otherwise be incurred if a vessel had to either wait in the entrance channel or at a dock until a design vessel had exited the channel. For Savannah Harbor, all "passing" lanes are defined as meeting areas. "Passing" is typically defined as ships overtaking each other. "Passing" in this sense is not practiced in Savannah Harbor; therefore, any subsequent reference to "passing" shall be understood as meeting."

The two meeting areas were modeled by ERDC, which resulted in 8,000- foot and 4,000-foot meeting areas.

HQUSACE Assessment (October 2010): The concern is resolved by the modeling by ERDC.

(5) Incremental Costs. Tables 11-7 and 11-9 show alternative costs including the total annual O&M and average annual equivalent costs, respectively. It is not clear from looking at the information in the tables why the trends in alternative costs are projected to be as shown. For instance, in Table 11-7, the O&M costs for the dissolved oxygen system are shown as \$1,092,480 for the 44 foot and 48 foot plans, but vary from \$756,480 to \$1,008,660 for intermediate depths. Looking at Table 11-9, the incremental AAEQ costs shown in the last column are highest, going from 44 feet and 45 feet with an incremental cost increase of over \$3M, with subsequent values of about \$2.2M (45 through 46 feet), then \$2.9M (46 through 47 feet), and \$1.6M (47 through 48 feet). It is not clear why incremental project costs would vary in this manner as the project depth increases. This raises questions as to whether the appropriate costs are being used in the optimization and may have potential to affect the plan selection. The costs should be reviewed and revised if needed. If the values are correct as shown, further explanation is needed to explain why the trends shown are reasonable and reflect the appropriate NED costs in accordance with Section D-3 of ER 1105-2-100. Note also that cost values should be rounded throughout the report.

District Response: Concur. Will review and revise the Draft Report if needed.

Discussion (26-27 August): The costs for each mitigation plan indicate an unusual trend as they relate to the increasing depth. It would be expected that as the project goes deeper, the mitigation cost should also increase proportionally. This is important in that if the mitigation cost distribution changes, the recommended plan may also change.

Action Required: For certain mitigation elements, such as oxygen injection, the initial costs are a large portion of the overall mitigation costs at any depth alternative that was considered. The District will evaluate the incremental mitigation costs for each alternative and will prepare a discussion on why the incremental mitigation costs are not linear with respect to depth. All cost figures will be rounded.

Action Taken: The District re-evaluated the costs for each mitigation feature. Table 9-4 now shows the costs for the various mitigation features for each channel depth alternative. One item that was identified is that the cost differential for the McCoys Cut Modifications between the 44-foot depth and the other depths results in higher mitigation requirements (and costs) for other

mitigation features – dissolved oxygen and striped bass. Money can be saved by not constructing all the flow rerouting features, but that savings comes at a cost in additional impacts to other resources.

The effectiveness of flow rerouting features is maximized with the 44-foot depth alternative. Additional actions could not be identified to redirect flows to address the additional impacts that would occur with the 44-, 45-, 46-, 47-, and 48-foot depth alternatives.

Other mitigation measures are one-size only, so once a need for them is identified and they are included in the project, additional costs for larger sizes of that measure is not possible. That results in many of the mitigation features not changing in cost as the depth increases.

The District understands that the trend in mitigation costs with this project is not typical, but each mitigation feature and project depth was examined separately. Each item addresses a mitigation need for that particular project depth and the size selected was based on both the amount of mitigation needed and the mitigation performance that could be obtained.

HQUSACE Assessment (October 2010): The concern is resolved. The cost trends in the original comment are unusual but relate to the specific depth DO mitigation given the upstream hydraulic modifications.

(6) Berths. The aerial photographs in the Engineering appendix show the existing and proposed channels in relation to port facilities and docked vessels. From the information shown it appears that berthed vessels are in very close proximity to the channel toe and may even encroach into the Federal channel in some cases (see Plates 1,2, 3, and 5 for example). HQ is concerned that with the shift in vessel fleet to include a greater number of Post-Panamax vessels, there is need for berth widths of about 165 feet to accommodate those larger vessels with clearance from the channel toe, so they do not encroach into the Federal channel and cause safety concerns. It is not clear whether the channel design may need to be adjusted to assure adequate berth widths are available. This has potential to impact project costs and cost sharing, since berth dredging is a non-Federal responsibility. Further information should be presented in the report on existing and proposed berth widths to assure that they are adequate for the forecasted fleet and the basis for project costs and cost sharing is correct. See E-8.a. (3) of ER 1105-2-100.

District Response: Concur. Will review and revise the Draft Report if needed.

Discussion (26-27 August): There are several areas along the edge of the channel, especially the southern toe where it appears that vessels are very near or may encroach into the Federal channel line. There may not be enough room to berth the new Post-Panamax ships along some reaches of the Savannah Harbor. It isn't clear whether this might be related to imprecise plotting or if there may be safety issues. This needs to be verified with the Georgia Ports Authority. Ships using the proposed deeper channel are only expected to dock at GPA berths.

Action Required: The district should review the channel layout to assure that there is adequate berth width to accommodate docked vessels without encroaching into the Federal channel. Based on this research, a determination will be made if any adjustment of the channel alignment is required to receive Post-Panamax ships. The report will be revised as needed.

Action Taken: GPA provided berth width requirements. Channel toe was aligned to accommodate berth width requirements in all alternative plans. Ship simulation modeling confirmed the adequacy of the re-aligned channel. In all alternative plan channel designs, the berths are outside of channel boundaries.

HQUSACE Assessment (October 2010): The concern is partially resolved. The engineering plate Reference Number 03 showing the existing and improved channel on an aerial photo in the vicinity of Marsh Island Turning Basin is still showing the channel alignment designed to go through a berthed tanker at a liquid bulk facility. This appears to be a section where the channel design sharply veers toward the berth and should be modified. The channel design needs to address berths in addition to Garden City to assure it is safe for navigation and adequate space is provided to clear berthed vessels.

District Response: The vessel shown in the aerial on plate 03 in Attachment 1 of the Engineering Appendix is encroaching into the Federal channel. The District met with the Savannah Harbor Pilots Association who indicated that the dock is no longer in operation, therefore vessels no longer dock there and that the problem no longer occurs. To eliminate confusion, Plate 03 of Attachment 1 in the Engineering Appendix has been updated with a different aerial that does not show a vessel docked at the berth. The channel does not actually veer toward the berth but a jog in the channel occurs to provide full dimensions for turning. Dimensions for the turning basin were added to clarify that the jog is a feature of the turning basin, not a design feature of the main navigation channel.

HQUSACE Assessment (November 2010): The concern is resolved by the response and the changes made to the plate in the Engineering Appendix.

(7) Operations and Maintenance. Reference Page 185, section 13.8, Recommended Plan Operations and Maintenance, which addresses current O&M practices and that if fully funded, the O&M costs include the advance maintenance widener, which is explained in section 13.8.1 as not justified. It is not clear what the increased cost in O&M would be resulting from deepening the harbor 6-feet and with the loss of the sediment basin. There appears to be increased costs to meet CZM requirements, but it is not clear if the presumption of dredging the unjustified advance maintenance feature was part of that cost. This section also addresses an additional \$1+M annually for an on-site oxygen system (operational period of 180 days). With mitigation costs around \$160M, is the oxygen system the only additional O&M cost? The increases in O&M for this project needs to be clearly outlined and as noted in section 13.8.1 the advance maintenance of a widener at the outer bar is unjustified and should not be part of the without-project condition.

District Response: The District will clarify the increases in O&M costs in the Draft Report.

Discussion (26-27 August): There was a great deal of discussion regarding the anticipated increase of O&M costs that would be anticipated when a potential Savannah Harbor Expansion would be completed. The District showed slides with information on the items where O&M costs would increase or there would be new funding requirements. These additional funding requirements need to be identified through review by higher authority as others decide whether to fund the project construction.

Action Required: The District will include in the Draft GRR the additional information it had developed that highlights changes in O&M costs that would be expected from the various deepening alternatives, inclusive of O&M costs for mitigation features.

Action Taken: Additional information developed by the District highlighting changes in O&M costs expected from the various deepening alternatives is included in Section 12.0 of the Engineering Appendix to the GRR.

HQUSACE Assessment (October 2010): The concern is resolved by the text changes incorporated into the GRR and Engineering Appendix.

E. ENVIRONMENTAL

(1) Section 404(b)(1) Guidelines Analysis, Appendix H.

(a) Least environmentally damaging practicable alternative, page H-31. Section H.2.80(b) states, with regard to the selected 48-foot alternative, that “there are no less environmentally damaging practicable alternatives to the project that would accomplish the project goals and objectives.” This statement is not supportable, given the project objectives appear to be met by all action alternatives. The project objectives, as stated on page in Section 7.5, page 79 of the GRR, and the similar, although not identical, objectives in Section 2.06, page DEIS 2-3, may be summarized as follows:

- Reduce transportation costs through Savannah Harbor
- Reduce operational constraints caused by insufficient channel dimensions
- Improve system-wide transport of imports and exports

Given that all evaluated channel depths from 44 to 48 feet produce significant net benefits ranging from approximately \$185 million to \$427 million annually, and exhibit robust B/C ratios ranging from 6.4 to 11.4, it appears that all action alternatives are practicable. Given that 44 foot channel depth has the smallest adverse impact on the resources of the Savannah River estuary, this channel depth would appear to be the least environmentally damaging practicable alternative, as defined by the Section 404(b)(1) Guidelines. Given that all action alternatives appear to meet the objectives of the project (even the poorest performer has a B/C ratio of 6.4, and generates \$185 million in annual benefits), the decision that the 48-foot channel is the least environmentally damaging practicable alternative appears to be seriously flawed, as it is not supported by the analysis found in the GRR and DEIS.

District Response: Do not concur. The proposed mitigation is an integral part of each depth alternative. The mitigation plans compensate for the significant adverse impacts of the proposed channel deepening. With inclusion of the mitigation, the alternatives are equivalent in their impacts to the environment. Will revise the Section 404(b)(1) Evaluation in the Draft EIS to address this point.

Discussion (26-27 August): With the explanation that with mitigation features included with each alternative, thus making each alternative environmentally acceptable, thus essentially equal with regard to environmental impacts, the reviewer understood and supported that position.

Action Required: The District will revise the Section 404(b)(1) Evaluation in the Draft EIS to address and clarify this point.

Action Taken: The District will revise the Section 404(b)(1) Evaluation of the EIS to clarify this point.

HQUSACE Assessment (October 2010): The concern is resolved by the response and changes made to the draft EIS.

(b) Approximately 7.2 acres of wetland would be dredged at four locations for the bend wideners proposed for all channel depths. The loss of these wetlands is not addressed in the 404(b)(1) guidelines analysis, Section H.2.59(4), page H-26. The analysis should be revised to include this acreage. Also, it is not clear whether these wetlands are located entirely on Hutchinson Island, or whether some areas are located on Argyle Island as well. Pages 5-57 and 5-87 of the DEIS state that these four locations are on Hutchinson Island, while figures 5-17 and 5-18 of the DEIS appear to show locations on both Hutchinson and Argyle Islands. The DEIS should be revised as needed to clarify the locations of the proposed wetlands impacted by construction of the bend wideners.

District Response: Concur.

Discussion (26-27 August): These 7.2 acres are located on both Argyle Island and Hutchinson Island.

Action Required: The District will revise the Draft GRR and EIS to satisfy the Section 404(b)(1) Guidelines and will identify the location of these impacted areas with a figure in the document.

Action Taken: The District has revised the Draft GRR and EIS to satisfy the Section 404(b)(1) Guidelines regarding the loss of the wetlands as well as the location of these wetlands. The information is included in Section 2.3, paragraph G of the Section 404(b)(1) Evaluation.

HQUSACE Assessment (October 2010): The concern is resolved by the response and the changes made to Section 2.3 of the draft EIS.

(2) No Action Alternative, page 3-4 DEIS. The Jasper County Port project is not discussed in the No Action Alternative (section 3.01.1, page 3-4 DEIS), even though page 5-116 of the DEIS says that the States of Georgia and South Carolina would like to have the new terminal operating in about 20 years. Also, page 4-51 DEIS states that the size and time of construction of the proposed new terminal is unknown. While it is understood that the development of the Jasper terminal is uncertain, the DEIS should be revised to present a consistent picture of the no action alternative/future without-project condition.

District Response: Concur. The DEIS will be revised to present a consistent picture of the no action alternative/future without-project condition.

Discussion (26-27 August): The Draft EIS needs to include a better explanation of the Jasper Ocean Terminal, i.e. the list of the remaining work and issues that must be completed before the Jasper Ocean Terminal can become a reality.

Action Required: The District will revise the Draft GRR and Draft EIS to include additional information regarding the status of a proposed future port within Jasper County, South Carolina (the proposed Jasper Ocean Terminal) and a list of remaining issues that must be resolved before a Jasper Ocean Terminal could be considered part of the Without-Project condition. It needs to be stated and recognized that a potential future port alongside the Savannah River in Jasper County, South Carolina is far from a foregone conclusion. The loss of dredged material disposal areas currently used to maintain the existing navigation channel, and on which a future port in Jasper County would depend, would be a significant hurdle to overcome, and could in fact, prevent the development of a port at that location.

Action Taken: An evaluation of the status of the Jasper Port revealed that the schedule of the Joint Project Office for a new container terminal continues to slip and is now 2+ years behind its original schedule. Since firm plans have not yet been developed for the size or timing of a new terminal and no permits have been obtained or sought for its construction, the District continues to believe that this action is still speculative and should not be considered as part of the without project condition.

Nonetheless, the District conducted several sensitivity analyses to assess the potential impact of a container terminal in Jasper County on the project (Section 12 Uncertainty Considerations). These sensitivity analyses indicate that there are no reasonable Jasper County terminal scenarios that would affect the economic justification of the tentatively recommended plan for Savannah Harbor.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text discussions included in Section 12 of the draft GRR.

(3) Mitigation Plan.

(a) Existing Conditions Used for Baseline of Impact Analysis. (Reference page 5-88 DEIS). The report does not use the most likely condition as the basis of comparison of project impacts, but instead uses existing salinity levels and existing sea level as the basis for the impact analysis, and resulting mitigation need determination. According to ER 1105-2-100, Chapter 2 and Appendix E, it is necessary to develop an inventory (existing conditions) and forecast (future without project conditions) for all planning area resources (physical, demographic, economic, environmental, social, etc.) relevant to the identified problems and opportunities. The future without-project conditions form the basis for which alternative plans are formulated and evaluated, and impacts are assessed; as such clear definition and full documentation of the without-project condition is essential [ER 1105-2-100, paragraph 2-3.b and paragraph E-3.a(2)].

A primary concern of HQUSACE with the forecast of conditions for Savannah Harbor is that the mitigation need is based on conditions that show the most adverse impacts from harbor deepening (page 5-88 DEIS). The choice to not present the most likely future without-project condition as the basis for the impact determination calls into question whether the environmental impacts, and resulting mitigation needs, have been appropriately determined, and not overstated. While a sensitivity analysis using different values for both river flow and sea level rise was conducted, the rationale for choosing the 50% exceedance value for river flow was because it was the condition that showed the greatest adverse affects, and was therefore the least likely to underestimate the adverse impacts of the project. The decision to choose a “worst case scenario”

instead of the likely future without-project condition as the baseline for the mitigation plan does not appear to be consistent with the policies outlined above.

The argument that the existing conditions represent the conditions most likely to be impacted upon the commencement of dredging actions (page C-16) appears to be a reasonable assumption, but is otherwise not discussed in the report.

District Response: Concur. The District will revise the report to state that the existing conditions represent the conditions most likely to be impacted upon the commencement of dredging actions. This information will be included in the Draft Report.

Discussion (26-27 August): This issue has surfaced in other projects. The concern is the anticipated future conditions that are being used in all the analyses. The Draft GRR and EIS used the existing salinities and sea levels as the baseline for the preparation of the impact and mitigation analysis. The Draft GRR needs to explain what the basis is for using current levels for salinity and sea level, rather than what is called the “most likely without-project”, which assumes some sea level rise and increases in salinity over the next 50 years. Any deviation from the standard policy, which uses the “worst case” rather than “most likely without project,” will need ASA(CW) approval through a policy exception. The report indicated that with the uncertainty of the hydrodynamic modeling, choosing current conditions is the “least likely” to underestimate mitigation needs. The most likely without-project conditions were modeled but were not used because using the present conditions was more conservative.

The District agreed that the “most likely future condition” is the correct basis for evaluating impacts. The two scenarios of potential sea level rise that have been evaluated reflect conditions that would occur at the end of a 50-year period. Therefore, the existing sea level best represents conditions that would be expected at the beginning of the project and over its early years. Conditions toward the end of the project’s 50-year would have less effect on average conditions over the period of analysis than the present and near-term conditions. The existing conditions provide a better representation of the “most likely future condition” than any of the scenarios that were evaluated.

Action Required: The Draft GRR and EIS will be revised to clarify that the existing sea level best represents conditions that would be expected at the beginning of the project and over its early years. Therefore, the existing sea level best represents the “most likely future condition.” The District is to prepare a concise, compelling White Paper on this issue to explain the rationale behind the choice of the baseline and identify whether a policy waiver from the ASA (CW) is needed. A policy concurrence statement must be obtained.

Action Taken: 4 April 2009 CESAM-PD White Paper provided to SAD-RIT and coordinated for review in August 2009 for compliance with EC 1165-2-211 dated 1 July 2009.

HQUSACE Assessment (January 2010 following white paper submission and coordination):

a. Methodology. As noted in the comments shown in track changes in the attached Engineering Appendix text (attachment 2) *[omitted from this record]*, the methodology employed for analysis of sea-level rise based on agency coordination does not refer to the existing planning guidance in ER 1105-2-100, E-24.k(1). The 4 April 2009 White Paper states "The interagency team

discussed this issue early in the study process (2003). It reviewed the existing literature on the issue and noted that a wide range of projections existed for future changes in sea level. One of the Cooperating Agencies (EPA) had produced a report on predicting sea-level rise at various locations. The team decided to base its initial discussions on that report, as it reflected the only defined position on the issue by any of the Cooperating Agencies." The district should complete an analysis of the ER 1105-2-100 methodology and revise the Engineering Appendix information to provide the results for comparison to the other two methods presented.

USACE projects must be resilient to expected conditions over the lifecycle. This proposal does not provide adequate information to assess the impacts of the conditions in the later period - i.e., will substantial future investment be required to perform adequately. The current studies do not provide the level of analysis that is needed to evaluate future functionality of the project. It is not possible to tell from the information developed to date how robust the plan formulation is under the various conditions of sea-level rise required by guidance. For example, the analysis does not address whether habitat conversion will occur in the future as sea-level rises which might make the acreage proposed for mitigation more representative of the acres of habitat affected throughout the period of analysis. The analysis to date also does not address the full range of mitigation features which may be impacted by rising sea-level, including dissolved oxygen and salinity effects on water supply intakes. Further information is needed using a risk based analysis with which to assess uncertainties of mitigation performance and how sensitive the project impacts, mitigation requirements, and associated OMRR&R costs may be to the various rates of sea-level rise and how resilient the recommended plan features will be.

The new peer review policy in EC 1165-2-209 (CW Review Policy), asks whether the assumptions made for the hazard analysis are still valid. The guidance in effect at the time the study was accomplished did not require the specific sea-level analysis that is required in the new guidance (EC 1165-2-211). The study must be revisited in accordance with current guidance. The EC requires that the with-project and without-project conditions be assessed for the entire range of possible future rates of sea-level change. The EC supersedes all previous guidance on this subject. The FAQs provided with the EC roll out package indicate that grandfathering is not an option. It is also indicated that the EC is fully applicable to all coastal and estuarine feasibility studies that did not have approved AFB reports on 1 July 2009. (The Savannah AFB package was not approved for public coordination at the 26-27 August 2008 AFB and is currently being revised in response to the AFB comments.)

b. Implications. The two different sea-level rise methods described in the white paper show that the EC 1165-2-211 method resulted an increase of about 0.5 feet for the low and high estimates, and about 0.05 feet in the intermediate estimate, above the sea-level rise estimates in the USEPA method used in the AFB report. While it is clear that the method employed in the EC resulted in a larger estimate of sea-level rise, it is not clear how this greater estimated rise would influence impact determination and mitigation need, as determined by the EFDC hydrodynamic salinity model.

Future changes in sea-level were incorporated into the EFDC hydrodynamic salinity study as a sensitivity analysis, using both 25cm and 50cm increases in sea-level. Would it be possible to characterize how sensitive the EFDC model is to sea-level rise, and whether using estimates derived from EC 1165-2-211 would be likely to result in any significant changes to the future without-project conditions? Without the possibility that a significant change in the FWO

condition would occur, it is not apparent that it is worthwhile to consider whether the EC 1165-2-211 method should be employed at this stage of the planning process, or not.

c. Views of Federal Partners. The decision to use the existing sea level as the basis for the SHEP impact determination was negotiated with the Corps' Federal partners as a way to avoid underestimating project-induced environmental impacts. Have the Federal partners been contacted concerning this effort to reevaluate the sea-level rise predictions? If so, would they be amenable to revisiting the environmental baseline against which adverse impacts and mitigation need are measured, i.e., using the predicted future sea levels as the baseline in place of the current conditions? Until there is a sense of whether the Federal partners would be willing to revisit the effects of sea-level rise, the benefits of expending too much energy on this exercise may be questionable.

d. Policy Waiver. Since the AFB package for Savannah Harbor has not been approved and no grandfathering is permitted under EC 1165-2-211, it does not appear that further analyses of the methodology can be deferred for the SHEP study. Consideration could be given to requesting a policy waiver from the ASA (CW) if the analyses cannot be effectively accomplished at this time or are not agreeable to the agencies. The USEPA sea-level rise methodology employed in the AFB report provides a useful comparison, but is an outdated methodology and does not provide a suitable basis for addressing the requirements of the new EC.

Action Taken: An IRC was held 6 April 2010 to discuss district proposal for compliance with EC 1165-2-211 and clarify HQ guidance. This concluded that the district would provide rationale for use of historic rate (3mm/yr) as the most likely without-project sea level rise scenario. An analysis will be done for the three sea level rise rates over the 50 year project life, evaluating their impact over time on major features of the mitigation plan using an average annual approach. The district will evaluate and describe risk and uncertainties associated with each scenario and provide a write up on as much of these items as possible in the current version of the draft report. In response a May 2010 matrix submission to SAD-RIT on the effects of various levels of sea level rise was coordinated for HQ back check in June 2010.

HQUSACE Assessment (July 2010 Back Check 2)

1. Policy review of the subject material has been completed with limited comment and feedback from the review team on the matrix provided by Savannah District.
2. The evaluation indicates that many factors related to channel operations and maintenance and mitigation have low risk for the low and moderate sea level change scenarios. However, the acreage of impacted wetlands varies considerably with changes in sea level and upstream chlorides are also sensitive. The district should identify in the report the most likely future conditions from among the low, moderate, and high scenarios for sea level change and use that as the basis for determining the mitigation requirements, comparing the with and without project conditions for the range of alternative depths from 43 to 48 feet (MLLW). The report should demonstrate that all proposed mitigation measures are justified. In the case of freshwater wetland impacts justification should be based on the functional habitat value of impacted acreage over the period of analysis as represented by the average annual conditions. This may be established using a mid-point value if that is representative of average annual conditions or by calculating the averages based on intervals throughout the period of analysis. A sensitivity analysis would be

helpful to illustrate to decision makers the differences in mitigation requirements between the most likely conditions and other possible sea level change scenarios.

3. The risk analysis of sea level change impacts should be included in the report as a basis for addressing the robustness of the plan recommendations. The district should add a discussion describing the major uncertainties associated with this analysis such as the uncertainty associated with calculated sea level rise for the three scenarios during the period of analysis; the general level of accuracy and uncertainty inherent in the mitigation modeling; the sensitivity of proposed mitigation to amount of sea level rise; the uncertainty associated with successfully achieving the anticipated habitat, based upon similar efforts; and how these uncertainties relate to the proposed monitoring and adaptive management. Attached is a spreadsheet in which rows 32-37 can be filled out to help in addressing this comment *[omitted from this record]*.

4. If additional mitigation is desired by the sponsor beyond what can be justified as described in comment 2 above, that may be proposed as part of a LPP with non-Federal cost share adjusted appropriately to pay the additional cost. Since this would require OASA (CW) approval, any LPP waiver request should be submitted to the vertical team as soon as possible for coordination.

Action Taken: Section 7.5.2.2.1 of the Engineering details the impacts to freshwater tidal wetlands due to changes in relative sea level. EC 1165-2-211, titled Water Resource Policies and Authorities Incorporating Sea Level Change Considerations in Civil Works Program, dated July 1, 2009 was used for estimating local sea level changes for analysis and incorporation into the project. The District believes that continuation of the rate of sea level rise observed in Savannah over the last 70 years is the most likely future condition for the Savannah area. That historic rate is the low rate used in calculations required in the EC.

HQUSACE Assessment (October 2010): The concern is partially resolved by the response and the discussions included in the Engineering Appendix of the draft GRR. The discussion in Section 7.5.2.2 Pages 143-147, and Section 15 of the Engineering Appendix still contains substantial text carrying forward the EPA sea level rise estimates to provide a historic context of the agency coordination efforts for comparison to the requirements of EC 1165-2-211. This section indicates that the historic projection is the most likely future without project condition relative to sea level rise, and presents the wetland impacts by decade throughout the period of analysis as well as the average annual equivalent wetland impacts. However, it continues to recommend mitigation based on the level of impact expected to occur in the project base year as coordinated with the cooperating agencies rather than using an average annual basis. This approach is not in accordance with Corps policy and would require a policy waiver to allow this method for determining the required mitigation.

District Response: The amount of sea level rise over a period of time in the future at a given location is an unknown. The District believes that the low rate of sea level rise provides the greatest certainty at this site. The Intermediate and High rates required for analysis are rates prescribed in a nationwide EC and are not based on the conditions at the project. The low rate is based on conditions at this site over an extensive period of record.

The District believes that the traditional use of an average annual approach to quantify the amount of wetland impacts should not be applied to this project because it would understate the environmental impacts that would occur if/when a harbor deepening project is implemented.

There is greater certainty in the amount of wetland impacts that would occur immediately after construction than those that may occur 30 and 40 years after the construction. The District has calculated the wetland impacts on an average annual basis. That information can be found in Table 7.5.2.2.1-2 of the Engineering Appendix. Acquisition of lands is estimated to cost \$12.7 million for the 47-foot alternative and \$15.2 million for the 48-foot alternative. Applying an average annual approach to the wetland impacts could reduce those costs by \$1.7 million for the 47-foot alternative and \$2.4 million for the 48-foot alternative. Those costs are <1 percent of the construction costs for those depth alternatives. Use of an average annual approach would not significantly alter the project costs or the plan comparisons.

The project's authorization requires concurrence by three other Federal agencies. Two of those agencies have stated recently that they believe the project should mitigate for all projects impacts that occur from the time of construction, rather than use an average annual approach. The District believes that the project should mitigate for all impacts that are expected to occur in the project base year. If HQUSACE believes that a policy waiver request is warranted to obtain ASA(CW) concurrence for the project to mitigate for impacts that would occur when the project is constructed, rather than the lower amount that would result from using an average annual approach over the entire project life, the District would submit it with the Final Reports.

HQUSACE Assessment (November 2010, revised January 2011): The response has partially resolved the concern. Additional language will be included in the draft report that indicates a policy waiver request would be required with the final report if the wetland mitigation recommendation is based on the regional agency preferred base year impact to freshwater wetlands rather than an average annual value over the period of analysis in accordance with Corps policy. In addition, the average annual wetland impact values shown in Table 7.5.2.2.1-2 should be revised for the various plan depths to reflect a numerical average over the period of analysis instead of being derived through discounting and amortization like economic values. Further, Appendix C Table 15.2 needs to have the uncertainty analysis added - per previous comment 3 during Back Check 2 above and the district response.

District Response (January 2012): Savannah District submitted a policy waiver request to CESAD on 7 Jan 2011 to mitigate for wetland impacts expected to occur at the time of construction, rather than use an average annual approach over the life of the project. ASA(CW) approved that request in a Memorandum dated 28 November 2011. The two tables in the Engineering Appendix have been revised as requested.

HQUSACE Assessment (April 2012): The concern is resolved by the response and text changes incorporated into the final report.

(b) DEIS Discussions. HQUSACE recommends that the costs of the mitigation packages associated with the various channel depth alternatives be included in the DEIS in order to better inform the public. Also, it would be very helpful to have a single table in the DEIS that summarized the various mitigation components for every channel depth, and also included a total cost for each mitigation plan.

District Response: Concur. This table will be included in the Draft Report.

Discussion (26-27 August): None.

Action Required: A table showing the scope and cost of each of the mitigation plans for each alternative will included in the Draft GRR and EIS.

Action Taken: Table 10-4 in the GRR lists the mitigation actions and their costs for each depth alternative.

HQUSACE Assessment (October 2010): The concern is resolved by the response and the text revisions to Table 10-4 of the draft GRR.

(c) Mitigation Requirement for Refuge Lands. (Reference page 5-63 DEIS; page C-52; page 132 GRR) The DEIS states “To recognize the higher value of lands within a National Wildlife Refuge, the Corps multiplied the replacement ratio of 6.9:1 that was previously determined for excavated saltmarsh by 150 percent”, but provides no justification for this determination. It is Corps policy to assess the value of lost resources using a habitat based methodology, and as such, the 150% increase in mitigation acreage for the lands in question appears to be arbitrary, and not in compliance with policy (ER 1105-2-100, C-3 (d) 5). This decision is especially puzzling given that the Regulatory SOP was used to assess the acreage in question. The reference to boosting the mitigation ratio for Refuge lands should be removed if it cannot be justified in accordance with Corps policy.

District Response: Concur with comments. Will either provide more explanation and include in the Draft Report or revert to the SOP derived replacement ratio and revise the Draft Report accordingly.

Discussion (26-27 August): HQ questioned whether the 150 percent factor was included because the lands were within the National Wildlife Refuge. The District responded yes. The factor was based on the environmental values provided by the lands. The USFWS stated that the public use aspects of the lands mean they are more environmentally valuable than similar nearby lands that are privately owned.

Action Required: The District will re-evaluate the mitigation plan and modify the Draft EIS accordingly and provide the rationale for the plan chosen. Advance coordination of the results will be provided to HQ prior to integrating into the draft report.

Action Taken: This section has been deleted from the reports.

HQUSACE Assessment (October 2010): The concern is resolved by the response and deletions to the text.

(d) Reduced Mitigation Value for Easement Lands. (Reference page C-52; page 133 GRR.) The proposed 50% reduction in the mitigation value for lands subject to a conservation easement is not substantiated. No information concerning the details of the easement in question is presented, and it has not been demonstrated whether the easement affords any effective protection, or not. Conversely, if the easement is written in such a way as to afford strong protection in perpetuity, acquiring the land may offer no mitigation value whatsoever, because the risk of the land use being changed is minimal. The evaluation of the easements should also take into consideration the ability of the non-federal sponsor, as a unit of State government, to take lands covered by easements. Lastly, the 50% reduction in mitigation value appears to be an

arbitrary figure, and the rationale behind how this percentage was determined should be explained and justified.

District Response: Concur. The District will delete this section from the Draft Report as later coordination with the natural resource agencies revealed that use of conservation easements will not be acceptable.

Discussion (26-27 August): This issue is not explained very well in the report and a lot of the facts get lost in details. The District needs to explain the proposal and references. If the proposal cannot be fully justified, then all references to the proposal needs to be deleted from report.

Action Required: The District will delete this section from the Draft EIS as later coordination with the natural resource agencies revealed that use of conservation easements will not be acceptable.

Action Taken: The District deleted this section from the EIS.

HQUSACE Assessment (October 2010): The concern is resolved by the response and deletions to the text.

(e) Mitigation Cost for 47-foot Plan. Table 13-1, page 175 GRR provides both average annual benefits and the benefit to cost ratio for a 47-foot channel. It is assumed that all associated mitigation costs were calculated into the average annual benefits, and benefit to cost ratio. However it is not clear from the DEIS or Appendix C how the mitigation costs for the 47 foot channel was determined, given that neither of these two documents appear to evaluate impacts associated with a 5-foot deepening alternative (i.e., a 47-foot channel).

District Response: Concur.

Discussion (26-27 August): It is not apparent in the mitigation section, Appendix C, how the mitigation determination for a 47-foot channel was made. The report must demonstrate how the costs were developed for all plans. A table of mitigation options will help.

Action Required: The District will clarify and explain what went into the 47-foot mitigation plan and include a table covering all alternatives, in the Draft GRR and EIS.

Action Taken: The District performed additional evaluations so that the 47-foot alternative was evaluated at the same level as the other alternatives. Table 10-4 in the GRR lists the mitigation actions and their costs for each depth alternative.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text changes noted above.

(f) Additional 50 acres of Wetland Mitigation. Section 4.A, page 7 of the risk and uncertainty analysis (Appendix Q) discusses the uncertainty surrounding the hydrodynamic model to predict salinity values, and states that the model was found to generally over-predict salinity changes at low salinity levels. Section 4.B, page 8, estimates that the chance of the model over-predicting at low salinity levels is approximately 80%. Given the propensity of the model to over-estimate impacts at low salinity levels, the decision to add an additional 50 acres of mitigation to the total

does not appear to be justified, notwithstanding the stated +/- 2% error associated with translating the modeled salinity gradients to a map of the estuary. Also, it should be recognized that the 50% exceedance flow regime chosen to represent the baseline for impact determination was itself a conservative estimate, in that it was selected because it resulted in the highest adverse impacts of any of the modeled flows. The choice of the 50% exceedance flow would appear to have already provided a considerable safety factor concerning project impacts. Therefore, adding an additional 50 acres to the mitigation requirements where there is strong evidence that the hydrodynamic modeled over-predicts impacts is not supportable. HQUSACE requests further justification for this proposed measure.

District Response: Concur. The District will include additional justification or this proposed measure will be removed from the Draft Report.

Discussion (26-27 August): Since the accuracy of the salinity projections was +/-2%, an additional 50 acres of impacted lands was included to cover the uncertainty of the salt marsh impact analysis. This was included to better assure that the impact analysis would not underestimate the impacts of salinity on the freshwater marsh. There must be adequate justification for this uncertainty, and relating to the +/-2% error. Discussions then were pursued regarding the risk and uncertainty of any of the recommended features.

Action Required: The District will include additional justification for the inclusion of an additional 50 acres as mitigation lands, or else remove the item from the Draft GRR and EIS. In addition, the Risk and Uncertainty assessment within the DEIS (Appendix Q) will be expanded to address the potential uncertainty of the project's mitigation features.

Action Taken: The District deleted this section from the EIS.

HQUSACE Assessment (October 2010): The concern is resolved by the response and deletions to the text.

(4) Shortnose Sturgeon Mitigation Efforts. HQUSACE believes that the mitigation plan for the shortnose sturgeon should not be discussed in the report and EIS until policy issues concerning the WRDA 2000 authorization in Section 348(1) for the New Savannah Bluff Lock and Dam (NSBL&D) have been resolved. This action is necessary because any inability to carry out the proposed fish passage at the site due to unforeseen difficulties with the authorization language (an unresolved issue at this point) could create a public perception that the Corps is not willing to implement this mitigation measure.

District Response: Do not concur. CESAS intends to obtain resolution of any policy concerns about this proposal as part of the AFB process.

Discussion (26-27 August): The policy issue is the assumption that once a project or project feature has been authorized, that it eventually will be built. Therefore, currently policy dictates that you cannot promise a mitigation feature for the Savannah Harbor Expansion Project that is already authorized for another project, namely, the rehabilitation of the NSBL&D. One option would be for the rehabilitation of the NSBL&D to be de-authorized in another WRDA. Another option would be to obtain a policy deviation from the ASA (CW) to approve the construction of a fish passage at the NSBL&D as a mitigation feature for the Savannah Harbor Expansion Project. A basis for such a deviation would be that it is highly unlikely that, almost 8 years after

authorization, Congress is going to appropriate \$22 million for the rehabilitation of the lock and dam. A “white paper” on this topic will be needed to outline the issue and to obtain a policy waiver from the ASA (CW). The paper should be provided to HQ before the Draft GRR and EIS can be made available to the public.

Discussion (25 September 2008) and Subsequent Research: Further discussions occurred between HQ team and district team. The participants questioned whether this was indeed a policy deviation, given that the fish ladder is an appropriate mitigation component of the Harbor expansion, and would be consistent with the rehabilitation of the NSBL&D, should it ever be funded.

Subsequent to the meeting, HQ counsel obtained the language amending Section 348(1)(2) to include the fish passage, contained in Section 113 of Division B of H.R. 5666 (Appendix D), the Consolidated Appropriations Act, 2001, P.L. 106-554. Section 113 changes Section 348(1)(2) to add the words “and construct appropriate fish passage devices at the Dam” to the sentence directing the Secretary to repair and rehabilitate the Dam. This language requiring “appropriate” fish passage measures reflects the intent of Congress to protect the fish species in question, and would not appear to be confined to the NSBL&D. This intention is fulfilled just as well if the fish passage is constructed as an appropriate measure to the Harbor expansion.

Action Required: The District should proceed with the analysis of the fish bypass channel as a mitigation component of the Harbor expansion, and include it in the GRR if warranted.

Action Taken: The District has analyzed the fish bypass channel as a mitigation component of the Harbor Expansion Project and included that analysis in the GRR.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text included in the GRR.

(5) Adaptive Management and Monitoring Plan (AM&M) One of the components of the adaptive management and monitoring plan is the evaluation of the accuracy of the hydrodynamic and water quality models that were used to quantify project-induced impacts. The goal of the evaluation is to improve the predictive abilities of these models. The evaluation of the models would take place for three years during construction at a total cost of \$360,000, and for two years post-construction at a total cost of \$200,000. HQUSACE questions whether this evaluation is a valid component of the AM&M plan, given that the stated purpose of the work is to improve the models, and not to help evaluate the performance of the various mitigation measures (The extensive monitoring of water quality and salinity, fish populations and movements, and wetland habitats will be used to judge the performance of the mitigation measures). Given that improvement of the models has no apparent link to assessing the performance of the project, additional justification for including such an evaluation in the AM&M plan is requested.

District Response: Concur.

Discussion (26-27 August): A purpose of post-construction monitoring is not to help calibrate the models but to allow the models to work better in support of adaptive management. The models would be used to evaluate the performance of the mitigation measures, so maximizing the accuracy of the model is important to later decisions on the potential need to implement adaptive management features. There were questions about adding funds for the possible future

modification to project mitigation features in the total project cost estimate. However, it became clear that WRDA Section 2036 actually calls for contingency funding to be a part of the project estimate in order to implement Adaptive Management. An additional 10% of the initial cost of each mitigation features was set aside in a Monitoring and Adaptive Management account that totals almost \$30 million to fund any needed modification of the mitigation features.

Action Required: The District will revise the Draft GRR and EIS to explain that the model calibration would be reviewed when the additional data is obtained from the monitoring period.

Action Taken: Section 8.B of Appendix D of the EIS now explains that the additional data would be used to assess the accuracy and reliability of the models and identify whether those functions could be improved by recalibration. If recalibration is warranted, the District would perform it using the new data.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text changes noted above.

F. COST SHARING. See Table 15-1 on Pages 194 - 196. Reference is made to guidance in PGL 62 and CE CW-P/CECC-G memorandum dated 19 September 2006, subject: Cost Sharing for Lands Associated with Fish and Wildlife Mitigation.

(1) Mobilization and Demobilization. Page 194 indicates that the mobilization and demobilization costs are included in the 21 to 45-foot increment. This is incorrect and inconsistent with PGL 62 which indicates that General Navigation Facilities (GNF) costs of non-depth related features such as mobilization and demobilization will be assigned to the depth zones in the same proportion that dredging costs are assigned to each zone.

District Response: Concur.

Discussion (26-27 August): None.

Action Required: The District will revise the cost sharing table and include in the Draft GRR and EIS.

Action Taken: The District has revised the cost sharing tables in the Draft GRR.

HQUSACE Assessment (October 2010): The concern is resolved by the incorporation of on mobilization and demobilization on page 242 of the Draft GRR.

(2) PED, S&A, Mitigation. (Reference Table 15-1) Preconstruction Engineering and & Design and Supervision and Administration for GNF and Mitigation Features are shown as cost shared 75-25. This is incorrect. These costs must be allocated to the two cost sharing depth zones in the same way other costs are allocated and shared accordingly.

District Response: Concur.

Discussion (26-27 August): None.

Action Required: The District will revise the MCACES with the proper cost sharing and will include the new numbers in the Draft GRR and EIS.

Action Required: The cost sharing (Section 13.1 of the draft GRR) for PED, S&A, and Mitigation has been changed to reflect the two cost sharing depth zones rather than the original 75-25 Federal/non-Federal split.

Action Taken: The District has revised the reports to include the proper cost sharing.

HQUSACE Assessment (October 2010): The PED and S&A cost sharing was resolved by a footnote on page 247, which pointed out no variance by depth. The mitigation costs that do vary by depth were shown separately and the mitigation that did not vary by depth was also shown separately. **The concern is resolved.**

(3) Mitigation. (Reference Table 15-1) The mitigation costs assigned to the increment greater than 45 feet seem very small in comparison to the total mitigation costs. This requires an explanation.

District Response: Concur.

Discussion (26-27 August): The District developed the mitigation costs separately for each depth. Even though most of the impacts change as one goes deeper, most of the mitigation costs result from the structural changes to reroute flows in the upper end of the harbor, along with the construction of the sill across the mouth of the sediment basin and the removal of the tide gate upper pier structure. Most of the remaining mitigation costs across the depths are related to the additional Speece Cones that would be needed to be installed and operated for various depths. The other major mitigation component that would vary with depth would be land acquisition costs to mitigate for impacts to freshwater marshes. As the impacts get larger with deeper depths, the amount of property that would have to be acquired and preserved would also increase.

Action Required: The District will provide further explanation of what environmental impacts would occur from each increment of depth and how the mitigation costs would vary for each increment of depth. The District will include this additional information in the Draft GRR and EIS.

HQUSACE Assessment (October 2010): The additional information in the Draft GRR and EIS has **resolved the concern.**

(4) Mitigation Lands. (Reference Table 15-1) In accordance with the attached memo, lands and damages for mitigation are shared in the same way GNF is shared (allocated to depth zones and shared accordingly). These costs are not credited against the 10 percent repayment requirement.

District Response: Concur.

Discussion (26-27 August): There has been a recent policy clarification with regard to the treatment of lands, easements and rights of way required for mitigation features. Instead of treating mitigation lands as a traditional part of the Lands, Easements, Rights of Way and Relocations, property that is required for mitigation of GNF is now cost shared the same as GNF and not creditable against the additional 10% cash over 30 years. This should be reflected in the cost sharing tables.

Action Required: The District will revise the cost sharing tables and include them in the Draft GRR and EIS.

Action Taken: The cost sharing tables (Section 13.1 of the Draft GRR) have been revised and the costs for Mitigation Lands have been cost shared the same way as the GNFs and not credited against the 10 percent payment requirement.

HQUSACE Assessment (October 2010): The revised cost sharing table on page 244 of the Draft GRR has **resolved the concern.**

(5) Aids to Navigation. Aids to navigation are a Federal cost and not cost-shared.

District Response: Concur.

Discussion (26-27 August): None.

Action Required: The District will revise the cost sharing tables and include them in the Draft GRR and EIS.

Action Taken: The cost sharing tables (Section 13.1 of the Draft GRR) have been revised and the costs for Aids to Navigation have been placed in the “Federal Cost” column.

HQUSACE Assessment (October 2010): The revised cost sharing table on page 244 of the Draft GRR has **resolved the concern.**

(6) O&M Cost Sharing. As provided in the explanatory notes, the non-Federal sponsor must pay 50 percent of the incremental O&M costs over a 45-foot project. Table 11-7, on page 154, shows there is in excess of \$300,000 annually of such costs. The 50 percent cost sharing requirement for incremental O&M should be discussed in the cost sharing section.

District Response: Concur. The District will revise and include this discussion in the Draft Report.

Discussion (26-27 August): None.

Action Required: The District will revise the cost sharing tables and include them in the Draft GRR and EIS.

Action Taken: Cost Sharing for O&M has been updated in the GRR and in Section 12.0 of the Engineering Appendix.

HQUSACE Assessment (October 2010): The revised cost sharing information on page 248 of the Draft GRR has **resolved the concern.**

(7) Repayment. The ten percent cost sharing of GNF should be shown as a debit of Federal costs and added to non-Federal costs for the purpose of displaying total Federal and non-Federal costs. The 10 percent share includes mitigation costs which are part of GNF for cost sharing purposes.

District Response: Concur.

Discussion (26-27 August): The maximum of 10 percent cash can be less, after the value of the LERR's are accounted for. This needs to be reflected as a debit to Federal Share and a credit to the Non-Federal Share in the cost sharing tables.

Action Required: The District will revise the cost sharing tables and include them in the Draft GRR and EIS.

Action Taken: The Cost Sharing tables in Section 13.1 of the Draft GRR have been updated to reflect this concern.

HQUSACE Assessment (October 2010): The revised cost sharing table on page 246 of the Draft GRR has **resolved the concern**.

(8) Explanatory Note. The explanatory note "For providing depths to 20 feet below Mean Low Water (MLW), the non-Federal sponsor pays 10 % of GNF." has no relevance and should be deleted. Reference the guidance in PGL 62 there are only two cost sharing zones for this project. No GNF would be shared at 90-10.

District Response: Concur.

Discussion (26-27 August): This should be removed from the draft revised report.

Action Required: The District will revise the Draft GRR and EIS to remove the reference.

Action Taken: The District revised the reports to remove that reference.

HQUSACE Assessment (October 2010): The revision to the draft report has **resolved the concern**.

(9) Credit. The credit for non-Federal share of feasibility costs per Section 203 of WRDA and as presented in the explanatory note should be estimated and the credit displayed on the Cost Sharing Table.

District Response: Concur.

Discussion (26-27 August): A proportionate share of the "sunk costs" for the preparation of the Section 203 Feasibility Study and Tier I EIS should be displayed as a credit on the non-federal share, subject to auditing, etc. But should be shown for clarification on the Cost sharing table

Action Required: The District will revise the Cost-Share table and include the information in the revised Draft GRR and EIS.

Action Taken: The explanatory note "For providing depths to 20 feet below Mean Low Water (MLW), the non-Federal sponsor pays 10 % of GNF has been deleted. A portion of the "sunk costs" has been included as a credit for the non-Federal share in the Draft GRR.

HQUSACE Assessment (October 2010): The revised information on page 233 of the Draft GRR has **resolved the concern** on the credit for the non-Federal share of feasibility costs.

G. ITR, MODEL CERTIFICATION. Documentation of previous independent technical reviews (ITR) was not included in the submitted materials. The report submittal should include technical

review comments and responses, as well as ITR and legal team certification. Additionally, there was no status of certification of the economic models. ER 1105-2-100, Appendix H, Exhibit H-4 lists the required review submittals. The missing materials must be submitted to HQ prior to finalization of the project guidance memorandum.

District Response: Concur.

Discussion (26-27 August): The only model where certification is an issue is the HarborSym model used for the passing/meeting lane analysis but that should not be a problem as it has been presented on a more advanced level, even more advanced than Savannah. The economic model that was developed by GEC, that is the basis for the economic analysis, is in the review process for certification. The District needs to develop a matrix of all of the models that were used and the status of the model's certification. This matrix will also be a stand-alone document to be used as a reference. The External Peer Review schedule also needs to be presented.

Action Required: The District will prepare a table for the model certification status both as a stand-alone document and will be included in the Draft GRR and EIS. In addition, the ITR documentation (sign-off sheet) will be presented as another stand-alone document with the final reports.

Action Taken: Model certification and ATR documentation have been prepared and are included in the Draft GRR.

HQUSACE Assessment (October 2010): The concern is not resolved. The draft report does not include documentation to demonstrate that the economic models used in this analysis, specifically HarborSym and the Transportation Cost Savings Model (TCSM) have been certified or approved for use. EC 1105-2-412, and its predecessor EC 1105-2-407, specify that use of certified models in for all planning activities is mandatory, and apply to models currently in use, new models, and models under development. Furthermore, use of a certified model does not preclude a technical review of the model inputs and outputs by an agency technical review team member. The PDT should provide documentation that indicates the model certification status, as well as the findings of the model technical reviews. This is a critical concern given the recommendation is based on outputs of HarborSym and the TCSM.

District Response: The status of the certification of the HarborSym model and "approval for use" Savannah Harbor Expansion Project designation is outlined below.

A contract was issued 29 Sep 2010 for HarborSym certification. The end product will be a report of findings of review and resolution, the PCX will have to make the recommendation for certification based on the findings and resolution from that contract which should be completed NLT 27 Jan 2011. The PCX will prepare a memorandum for the PCX Director to send to Headquarters recommending certification. Certification is necessary prior to release of the final report for public notification, currently scheduled Apr 2011.

The report of findings TCSM "Approval for Use" is expected to be completed on November 12, 2010 and transmitted to the DDNPCX. The PCX will then recommend certification based on the findings and resolution and prepare a memorandum for the PCX Director for forwarding to Headquarters recommending certification. There is not a standard processing time for model

reviews. Since these two models are complex in their design and/or application, there is a longer lead time required and scheduled to obtain certification and approval for use.

HQUSACE Assessment (November 2010): The response has partially resolved the concern, but is sufficient for the draft report. The model certification and ATR documentation should be submitted with the final report.

District Response (March 2011): The status of the certification of the Harbor Sym model, ATR certification and the Transportation Cost Saving Model – (TCSM) “approval for use” is outlined below.

A contract was issued 29 September for HarborSym certification by the Institute for Water Resources, (IWR) who is the proponent for this model. The end product will be a report of findings of review and resolution. The report is scheduled for completion and delivery to IWR on March 7, who will work on resolving any comment and/or suggestions. IWR will provide the certification package to the Deep Draft Navigation Planning Center of Expertise (DDNPCX) on 15 March 2011. The Center will forward the endorsed certification package to HQ on 16 March. HQ certification is expected 13 April 2011.

The ATR of the HarborSym model as applicable to Savannah Harbor Expansion Project (SHEP) is being evaluated by Jacksonville District. Comments are in DrChecks and the first round of back checks has been completed. The ATR is expected to be completed on March 7, 2011. The DDNPCX will complete the certification of the ATR package by March 11, 2011 and forward to HQ.

The Transportation Cost Savings Model was “approved for use” for the Savannah Harbor Expansion Project on 3 March 2011. HQ will soon send out a formal announcement. The HQ certification of ‘approval for use” for TCSM, the HarborSym ATR for SHEP documents and HarborSym certification will be submitted with the final report.

HQUSACE Assessment (March 2011): The response has not resolved the concern. This comment remains open until review of final report.

District Response/Actions Taken (January 2012):

The Transportation Cost Savings Model was “approved for use” for the Savannah Harbor Expansion Project on 3 March 2011. HarborSym Widening Model was certified for Corps wide use on 10 June 2011. This certification of the HarborSym model rendered the HarborSym ‘approval for use’ documentation unnecessary since now the model is certified for Corps-wide use.

The ATR is complete and the documentation is included with the final reports.

The HQ certification of ‘approval for use” for TCSM, the HarborSym ATR certification of the inputs and outputs of the HarborSym application to SHEP and HarborSym Model certification will be submitted with the final report.

HQUSACE Assessment (April 2012): The concern is resolved by the response.

H. REAL ESTATE.

(1) **Acreege.** Table 4.3-1 notes that the total proposed land acquisition for mitigation is 2,230 acres. However, the real estate summary notes that 3,138 acres will be acquired in fee and easement for mitigation. Acreage information should be presented consistently.

District Response: Concur.

Discussion (26-27 August): None.

Action Required: The Real Estate summary will be revised to clarify that the 3,198 acres includes lands necessary for harbor widening and mitigation features. This will also be included in the main Draft GRR and EIS.

Action Taken: Section 4.3 of the RE Appendix is the discussion of mitigation lands only and Table 4.3-1 reflects same. No changes to the appendix necessary.

HQUSACE Assessment (October 2010): The concern is resolved by the response.

(2) **Fee Property.** Table 4.3-2 shows that the USFWS acquisition plan includes 1,555.8 acres. The real estate summary details that 3,134 acres will be acquired in fee. The REP should clearly denote the remaining owners of fee property.

District Response: Concur.

Discussion (26-27 August): None.

Action Required: The 1,555.8 acres shown as Ranking #17 on Table 4.3-2 is not recommended for acquisition. This will be clarified in the Draft GRR and EIS.

Action Taken: Table 4.3-2 of the RE Appendix has been revised.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text change to Table 4.3-2.

(3) **USFWS lands.** There is a difference of 600+ acres between the 2,230 acres required for mitigation and the 1556 acres that will be acquired for the USFWS. Will the remaining 600+ acres be part of the Savannah Refuge?

District Response: Concur.

Discussion (26-27 August): None.

Action Required: The 1,555.8 acres shown as Ranking #17 on Table 4.3-2 is not recommended for acquisition. This will be clarified in the Draft GRR and EIS.

Action Taken: The property shown on Table 4.3-2 as Ranking #17 consisting of 1556 acres is not being recommended for acquisition. This table was provided to SAS by USFWS as a wish list of sites for us to consider. Line 7 of the table has been revised to reflect this.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text change to Table 4.3-2.

(4) Non Standard Easement. HQUSACE RE/Counsel will review the non-standard channel improvement/slough easement.

District Response: Concur.

Discussion (26-27 August): None.

Action Required: Prior to the initiation of acquisition of real estate, HQ will review and approve any non-standard channel improvement/sloughing easement language.

Action Taken: Section 4 of the original report requested approval of non-standard real estate. No change necessary.

HQUSACE Assessment (October 2010): The concern is resolved by the response.

(5) Land Tract Owners. Table 16-1 of the Real Estate Plan shows that a total of 18 tracts will be acquired. The Real Estate Summary notes that there are 13 owners. What is the correct total number of tracts? Also, the cost listed in table 16-1 and the RE summary should be consistent.

District Response: Concur.

Discussion (26-27 August): The correct number of Tracts to be acquired is 18. These tracts are owned by 13 separate owners. The cost shown on the REP Summary includes the administrative fees associated with acquisition. The Administrative fees are listed as a separate line item in Table 16-1 of the REP.

Action Required: The draft REP and the Draft GRR and EIS will be clarified.

Action Taken: Table 16-1 has been revised to show the correct number of owners.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text change to Table 16-1.

(6) Easements. The REP states that a perpetual access easement consisting of six acres will be acquired from a private owner; and 1.5 acres will be needed from Georgia Port Authority. The REP states that the plan would require acquisition of easement interest over three tracts. Are these two of the three tracts? What is the third?

District Response: The six-acre perpetual access easement will be acquired from one owner for access to the proposed fish bypass channel located at the NSBL&D. The 1.5 acres needed from the GPA is associated with the dissolved oxygen system to be constructed on sponsor-owned lands. The three tracts referenced are to be acquired for the channel widenings using the non-standard channel improvement/slough easement.

Discussion (26-27 August): None.

Action Required: This will be clarified and included in the Draft GRR and EIS.

Action Taken: Section 4.6 of the RE Appendix states that a 6-acre access easement will be acquired for the fish bypass channel. Section 4.5, lines 40-43 has been revised to clarify that the access road to this site is included in the acreage. Two of the three wideners are privately owned and easements will be acquired over these lands. The third widener is owned by the USFWS and will be acquired by permit.

HQUSACE Assessment (October 2010): The concern is resolved by the response and text change to Section 4.5.

I. POLICY ISSUES. (REFERENCE TAB 8)

(1). Section 8.1. Clarify what is to be included in the final GRR concerning costs and benefits.

(a) This section states “Should the costs be re-calculated using October 2008 prices (including fuel)?”

HQ Response: Although ER 1110-2-1302 requires cost estimates be updated every two years it is prudent that the cost estimate reflects the latest prices for labor, material, and equipment (including fuel). Also, based on the project schedule shown in Tab 10, the cost estimate could be more than two years old by the time the Chief’s report is prepared and submitted to ASA.

(b) Section 8.1 also states, “Should the benefits be re-estimated using October 2008 vessel costs?”

HQ Response: Benefits should be estimated using the most recent vessel costs available from IWR.

HQ Comments

1) Second paragraph, states, “(t)he final report is scheduled to be submitted in April 2008.” This section is referencing the GRR. The preliminary final report that was submitted was dated “July 2008” it is not possible to have completed the final three month prior to the 90% Preliminary Draft. Request revision to this section.

2) Third paragraph clearly states that Savannah District will be updating cost and benefits using October 2008 price levels. Make sure that when the Corps requests authorization (as indicated in previous comment) that the same figures are used. This is just a general comment, if it is determined that something else is going to be used, then make sure that this section is changed accordingly.

Action Taken a/b: The date was in error and has been removed. Savannah District will update the costs and benefits to the latest price levels.

HQUSACE Assessment: The concern is resolved by the revised analysis in the GRR.

(2). Section 8.2. CSS Georgia

(a) Question #1. Assuming that the base mitigation plan (O&M responsibility) is neither implemented or funded at the time the Savannah Harbor Expansion Project is constructed, should funds to implement that base mitigation be included in the amount requested to construct the Savannah Harbor Expansion Project?

HQ Response: There is concern over the mitigation cost associated with the CSS Georgia. It appears that the remains of the CSS Georgia would be impacted by the deepening project for any of the depths (4 April, 2008, CESAM-PD-E Issue Paper in Read Ahead Material at the back of Section 6) and if the base mitigation plan is not implemented prior to the base year, the work should be included in the project cost.

If funds are not provided to do the mitigation work prior to the project implementation, it should not be assumed to be part of the without-project condition. The without-project should reflect the conditions anticipated at the time of construction.

District Response: Concur. Since this is an existing Federal requirement, CESAS will include it as a 100% Federal cost and exclude from the BCR. Will revise and include in the Draft Report.

Discussion (26-27 August 2008): The question has arisen, what has changed with respect to the CSS GEORGIA that requires this to be an O&M cost? The Expansion project, along with the O&M program funded studies which show that the 1983 maintenance dredging severely impacted the wreck. These detailed studies, show that something needs to be done by the Corps to be in compliance with existing commitments.

Action Required: Please see Action Required in response to Question #3 below,

Action Taken: CSS Georgia will be investigated and mitigated as part of the project. The 1% Federal cost has been included in the cost-sharing section as well as the cost sharing on the amount > 1%. Costs for the CSS Georgia have been included in the project BCR.

SAD Comment: Reference the Savannah Harbor deepening Feasibility Report (Section 203) and Tier I EIS 1998. Page 33 of 133 of this report addresses the CSS Georgia and page 128 of 133 addresses the associated cost of the CSS Georgia mitigation and the cost shared responsibilities for both Federal and Non-Federal Costs. This is the document that was transmitted to Congress in support of this project in 1999. What has changed since 1999?

District Response: Detailed studies were initiated in 2003 and completed in 2006. Those studies indicate substantial damage to the wreck and the need to mitigate now, independent of a harbor deepening project.

Discussion (26-27 August 2008): Discussions of the CSS Georgia occurred regarding its current condition and findings from the various detailed studies initiated in 2003 and completed in 2006.

Action Required: The District will revise the Draft GRR and EIS to include an explanation of the additional information that has been obtained since the 1998 Feasibility Report.

Action Taken: This information is in Section 4.9.1 of the Draft GRR and on page F-16 of Appendix F of the EIS.

HQUSACE Assessment: The concern is resolved by the response and the text changes noted above.

(b) Question #2. Savannah District has determined that mitigation of the CSS Georgia is needed for compliance of the existing project with the National Historic Preservation Act and should be performed at full Federal expense (being an O&M responsibility). Should the cost of that base mitigation effort be assumed to be a Without-Project condition and subtracted from the total cost of the Savannah Harbor Expansion Project before calculating the project BCR and net benefits?

HQ Response: If funds are not provided to do the mitigation work prior to the project implementation, it should not be assumed to be part of the without-project condition. The without-project should reflect the conditions anticipated at the time of construction.

Discussion: None

Action Required: The report should reflect the most likely without project conditions anticipated at the time of construction.

Action Taken: This information is in Section 4.9.1 of the Draft GRR and on page F-16 of Appendix F of the EIS.

HQUSACE Assessment: The issue is resolved by the response and text changes noted above.

(c) Question #3. Assuming the answer to Question #1 is yes, is it appropriate (from a fiscal law perspective) to use CG dollars to implement an action that the Federal Government previously determined was an O&M responsibility? If CG dollars are used must they be supplemented by a non-Federal cost sharing partner?

HQ Response: Please see Action Required below.

Discussions (26-27 August 2008): There were some concerns regarding the proper use of Construction General funds to pay for what is essentially an O&M requirement. Proposed 100% federal funds to be used, providing fiscal law allows for it. HQ will confirm this with their Office of Counsel.

Discussions (25 September 2008): Follow up discussions were held between HQ team and district team. HQ indicated that it appeared either an O&M or CG funding approach could be used, but only one appropriation type should be chosen and used, not both. If it is not anticipated that O&M funds will be forthcoming to accomplish the work, use of CG funding should be planned for. Federal funding would be used to accomplish this work up to 1% of project costs, however costs above 1% would be cost shared in accordance with Article XVIII, "Historic Preservation", in the navigation model PPA. HQ could find no guidance that excluded these costs from the BCR calculation. If 100% CG funding is preferred by the sponsor, they would have to seek legislation that directs special cost sharing.

Action Required: The CSS Georgia will be investigated and mitigated using 100% Construction General Funds under the authority of the Archeological and Historic Preservation Act of 1974 (Public Law 93-291) which provides the authority for the Corps to make expenditures at Federal costs for cultural resources data recovery up to 1 percent of the amount appropriated for the project. Costs above 1% would be cost shared in accordance with Article XVIII, "Historic Preservation", in the navigation model PPA. The estimated cost for the CSS Georgia would be counted toward the BCR. The District will revise the Draft GRR and EIS accordingly.

Action Taken: The report has been revised to show recovery of the CSS Georgia to be a 100% Federal Construction General cost.

HQUSACE Assessment: The issue is resolved by the changes to the text noted above.

(3) Section 8.3. Fish Passage. Appropriateness of implementing as mitigation for this project a component of another Congressionally-authorized project (Fish Passage Devices at NSBL&D).

HQ Response: The approach suggested by the district appears reasonable.

HQ Comment: The *fourth paragraph* discusses the Section 216 study, and how the District proposed removing the dam. It is HQ understanding that the Section 216 study was never approved by this headquarters. Fact is, it was returned back to the District. Why would the report mention a study that was never approved? Is there further rationale that HQ is missing here?

Discussion (25 September 2008) and Subsequent Research: Further discussions occurred between HQ team and district team. The participants questioned whether this was indeed a policy deviation, given that the fish ladder is an appropriate mitigation component of the Harbor expansion, and would be consistent with the rehabilitation of the NSBL&D, should it ever be funded.

Subsequent to the meeting, HQ counsel obtained the language amending Section 348(1)(2) to include the fish passage, contained in Section 113 of Division B of H.R. 5666 (Appendix D), the Consolidated Appropriations Act, 2001, P.L. 106-554. Section 113 changes Section 348(1)(2) to add the words “and construct appropriate fish passage devices at the Dam” to the sentence directing the Secretary to repair and rehabilitate the Dam. This language requiring “appropriate” fish passage measures reflects the intent of Congress to protect the fish species in question, and would not appear to be confined to the NSBL&D. This intention is fulfilled just as well if the fish passage is constructed as an appropriate measure to the Harbor expansion.

Action Required: The District should proceed with the analysis of the fish bypass channel as a mitigation component of the Harbor expansion, and include it in the GRR if warranted.

Action Taken: The fish bypass channel has been analyzed as a mitigation component of the Harbor Expansion Project and this information is in Section 11.5.2 of the draft GRR.

HQUSACE Assessment: The issue is resolved by the analysis described in Section 11.5.2.

(4). Section 8.4. Lateral Advance Maintenance Widener. Whether to include the previously authorized, but unfunded, Lateral Advance Maintenance Widener in the New Work quantity calculations for the entrance channel.

(a) Question #1 Assuming the advance maintenance widener authorized for the existing Navigation Project (O&M responsibility) is neither implemented or funded at the time the SH Expansion Project is constructed, should funds to implement that feature be included in the amount requested to construct the SH Expansion Project?

HQ Response: If the advance maintenance widener has not been implemented or funded at the time of construction, it is not part of the existing project under the without project condition. The

additional work could be recommended, if justified, as part of the expansion project as additional dredging if required for efficient maintenance.

(b) Question #2 Since construction of the advance maintenance widener would normally be performed at full Federal expense (being an O&M responsibility), should the cost of that work be assumed to be a Without Project condition and subtracted from the total cost of the SH Expansion Project before calculating the project BCR and net benefits?

HQ Response: No. Incremental project costs are based on improvements beyond the existing project including O&M practices for over depth including advance maintenance. See Appendix G of ER 1165-2-131

(c) Question #3 Assuming the answer to Question #1 is “Yes”, is it appropriate (from a fiscal law perspective) to use CG dollars to implement an action that the Federal Government previously determined was an O&M responsibility? If CG dollars are used, must they be supplemented by a non-Federal cost sharing partner?

HQ Response: The previous determination is not relevant if it hasn't been implemented and become part of the normal operations historically. Additional dredging for efficient O&M that is recommended and undertaken as part of a new project would be cost shared with the Federal sponsor.

HQ Comment: The *third paragraph, third sentence* indicates that as of July 2008, the District has not submitted a report that demonstrates justification of the feature, however, the district expects to submit that report this summer. What is the status of that justification? Has it been forwarded to the Division, and what was the outcome?

Action Taken #1/2/3: After further consultation with CESAD, the District concluded that the lateral advance maintenance widener was not feasible and has removed it from the Savannah Harbor Expansion Project.

HQUSACE Assessment: The issue is resolved by the analysis described in Section 11.5.2.

(5) Section 8.5. Sediment Control Works (Freshwater Control System, USFWS Wildlife Refuge) Clarify which appropriations are responsible for remediation of damaged water control structures and canals within the Savannah National Wildlife Refuge (Refuge) that must be addressed prior to construction of the Expansion Project.

a. Question #1 Assuming that the rehabilitation needed for the previously authorized mitigation (O&M responsibility) is neither implemented or funded at the time the SH Expansion Project is constructed, should funds to implement that mitigation be included in the amount requested to construct the SH Expansion Project?

HQ Response: If the rehabilitation is not implemented prior to the base year, the work should be included in the project cost.

District Response: Concur. Since O&M funds are quite limited, CESAS may not receive funds to rehabilitate this previous mitigation feature prior to the Base Year. Since continued operation of this feature is warranted independent of any harbor deepening and would otherwise be

implemented using 100% Federal funds, CESAS will include it in the project as a 100% Federal cost and exclude from the BCR. Will revise and include in the Draft Report.

Discussion (26-27 August 2008): This is the same type of situation as the CSS Georgia. If it is not implemented under O&M, then it is not to be considered in the without-project conditions.

Discussion (25 September 2008): Further discussions occurred between HQ team and district counsel and team. The feature needs a major rehab at this point. It was built by the Corps as mitigation for the earlier deepening and turned over to USFWS, however no formal agreement could be found that documented USFWS agreed to operate the mitigation facilities. At this point USFWS has insufficient funds to perform rehab and it is needed so the mitigation features continue to work. The district indicated that O&M funds are included in FY09. It was suggested that SAS prepare an MOA to do this work as a one-time rehab and coordinate it with ASA. The agreement should detail the USFWS responsibilities and formalize the agreement to perform OMRR&R on the features in the future. That would decouple the work from the expansion project.

1. CESAS will submit a Letter Report to CESAD prior to release of the Draft Report. This letter report will make a determination on whether the freshwater diversion canals and water control structures are still needed for mitigation for the existing Navigation Project. That determination will or will not support the appropriateness of the use of O&M funds toward the repair and rehabilitation of the Freshwater Diversion Canals and Water Control Structures.
2. The District will assess whether it is likely that this mitigation – if required – would be implemented prior to the Base Year with O&M funds.

In the alternative, the CESAS may consider including these measures in the project as a 100% Federal cost, but only if the Letter Report determines that the freshwater diversion canals and water control structures are needed for mitigation for the Harbor expansion project. If justified as part of the Harbor expansion, these features would be cost shared with the sponsor in accordance with the model PPA provisions. The Government would use CG funds for its share.

Action Taken: A letter report was sent to HQUSACE on 27 May 2009 which determined that the repair of the Freshwater Control System was needed for mitigation of the existing project and that it was appropriate to use O&M funds for this work. The work was started in FY 2010 and will be completed in FY 2012.

HQUSACE Assessment: The issue is resolved by the response.

(b) Question #2 If the Corps determines that rehabilitation of the Freshwater Control System is appropriate and should be performed at full Federal expense (being an O&M responsibility), should the cost of that mitigation effort be assumed to be a Without Project condition and subtracted from the total cost of the SH Expansion Project before calculating the BCR and net benefits?

HQ Response: If funds are not provided to do the rehabilitation work prior to the project implementation, it should not be assumed to be part of the without-project condition. The

without-project should reflect the conditions anticipated at the time of construction. The costs would not be subtracted out before calculating the BCR and net benefits.

(c) **Question #3** Assuming the answer to Question #1 is “Yes”, is it appropriate (from a fiscal law perspective) to use CG dollars to implement an action that the Federal Government previously determined was an O&M responsibility? If CG dollars are used must they be supplemented by a non-Federal cost sharing partner?

HQ Response: Please see response to Question #1.

HQ Comment: *Second page, first paragraph*, the District indicates that it will be reviewing the present salinity conditions and that this investigation will be completed at the end of 2008. Is that effort on schedule?

SAD Comment: If the responsibility for repair, rehab and maintenance of the sediment control works structure is a Corps of Engineers responsibility, clarify under what authority has FWS been performing these duties.

Action Taken: Since the rehabilitation work is underway using O&M funds and the District expects to complete it in FY 2012, the work is assumed to be part of the Without Project condition.

HQUSACE Assessment: **The issue is resolved** by the response.

(6) **Section 8.6. Payment of pre-construction monitoring.**

The Savannah District requests approval to allow the non-federal interest to fund pre-construction monitoring, which would begin in April 2009.

HQ Response: It appears reasonable to have the non-federal interest fund the pre-construction monitoring under the MOU.

HQ Comments:

a. *Second paragraph*, mentions that a ROD is scheduled to be signed in July 2009 (a year from now), however, monitoring would begin in April 2009. Can monitoring be started “before” the ROD is signed?

b. *Sixth paragraph*, the Issue Paper indicates that the District is requesting approval to allow the non-Federal interest to commence monitoring in April 2009. Is the District waiting for headquarters approval?

Action Taken: No action needed in the GRR/EIS. The District may use Non-Federal funds to initiate the pre-construction monitoring.

HQUSACE Assessment: **The issue is resolved** by the response.