PROJECT MANAGEMENT PLAN

Mobile Harbor, Alabama
General Reevaluation Report

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U. S. Army Corps of Engineers
Mobile District
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PROJECT MANAGEMENT PLAN
LIST OF ACRONYMS

Acronym	Title
A-E	Architect-Engineer
APE	Area of Potential Effect
AR	Army Regulation
ASPA	Alabama State Port Authority
CEFMS	Corps Financial Management System
CPM	Critical Path Method
CWBS	Civil Works Breakdown Structure
EA	Environmental Assessment
EC	Engineering Circular
EI	Engineering Instructions
EIS	Environmental Impact Statement
EM	Engineering Manual
EP	Engineer Pamphlets
EP	Engineering Pamphlet
EPA	United States Environmental Protection Agency
EQ	Environmental Quality
ER	Engineering Regulation
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GE	General Expenditure
H&H	Hydrology and Hydraulic
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HTRW	Hazardous/Toxic/Radiological Waste
ITR	Independent Technical Review
ITRT	Independent Technical Review Team
IWR	Institute for Water Resources
LCPM	Life Cycle Project Management
MCACES	Microcomputer Aided Cost Engineering Systems
NED	National Economic Development
NEPA	National Environmental Policy Act
NRCS	Natural Resource Conservation Service
O&M	Operation and Maintenance
OBS	Organizational Breakdown Structure
OM	Office Memorandum
OMRR&R	Operation, Maintenance, Repair, Replacement, and Rehabilitation
OSE	Other Social Effects
GRR	General Reevaluation Report
PAE	Project Architect/Engineer

PROJECT MANAGEMENT PLAN
LIST OF ACRONYMS
(Continued)

Acronym	Title
PCA	Project Cooperation Agreement
PD-EC	Planning and Environmental Division - Coastal Environment Team
PED	Pre-construction Engineering and Design
PES	Project Executive Summary
PGL	Planning Guidance Letter
PGM	Project Guidance Memorandum
PM	Project Manager
PMP	Project Management Plan
PRB	Project Review Board
PROMIS	Project Management Information System
P&S	Plans and Specifications
PMP	Project Management Plan
QC	Quality Control
RAM	Responsibility Assignment Matrix
RED	Regional Economic Development
ROD	Record of Decision
SAD	South Atlantic Division
SCCR	Schedule and Cost Change Request
SHPO	State Historic Preservation Officer
SMART	Specific, Measurable, Attainable, Risk-informed, Timely
SOF	Statement of Findings
TL	Technical Letter
TRC	Technical Review Conference
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WRDA	Water Resources Development Act

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1. GENERAL REEVALUATION REPORT OVERVIEW

The purpose of the General Reevaluation Report (GRR) is to evaluate proposed navigation improvements to the Mobile Harbor Project, Mobile, Alabama. The Mobile District U.S. Army Corps of Engineers (Corps) and the local sponsor, the Alabama State Port Authority (ASPA), have developed this PMP as a cooperative effort.

This PMP describes the scope, schedule, and budget for accomplishing GRR tasks. This document also includes:

- Detailed work task descriptions;
- The division of responsibilities to be accomplished during the study by the Mobile District and the non-Federal sponsor;
- A detailed project schedule;
- A cost summary table; and,
- A review plan.

The GRR will be developed under an amendment to the Design Agreement currently in-place with the non-Federal sponsor. The amendment will provide for concurrent financing of the GRR process with costs being split 75 percent federal and 25 percent non-federal. Major outputs will be a final GRR and a Supplemental Environmental Impact Statement (SEIS).

1.1. Project Authorization

The navigation channel dredging in Mobile Bay and Mobile River began in 1826 with enactment of the River and Harbor Act of 1826. Over subsequent years, the Federal project at Mobile River and Mobile Bay was expanded to include adjoining channels within the bay. Section 104 of the River and Harbor Act of 1954 (House Document 74, 83rd Congress, First Session, as amended, and previous acts) authorized a 40-foot deep navigation channel. Improvements to the existing Federal project were authorized in Water Resources Development Act of 1986 (PL 99 – 662, Ninety-ninth Congress, Second Session), which was approved 17 November 1986, and amended by Section 302 of the Water Resources Development Act of 1996. This act provided authorization for improvements to the exiting project to include channel dimensions of: a) 57 feet by 700 feet for a distance of 7.4 miles across the Mobile Bar; b) 55 feet by 550 feet for a distance of 27.0 miles in the bay; c) 55 feet by 650 feet for a distance of 4.2 miles in the bay; and d) provision of a 55-foot deep anchorage and turning basin in the vicinity of Little Sand

Island. Figure 1 provides a general layout of the project and the Mobile Harbor Project features are shown on Figure 2.

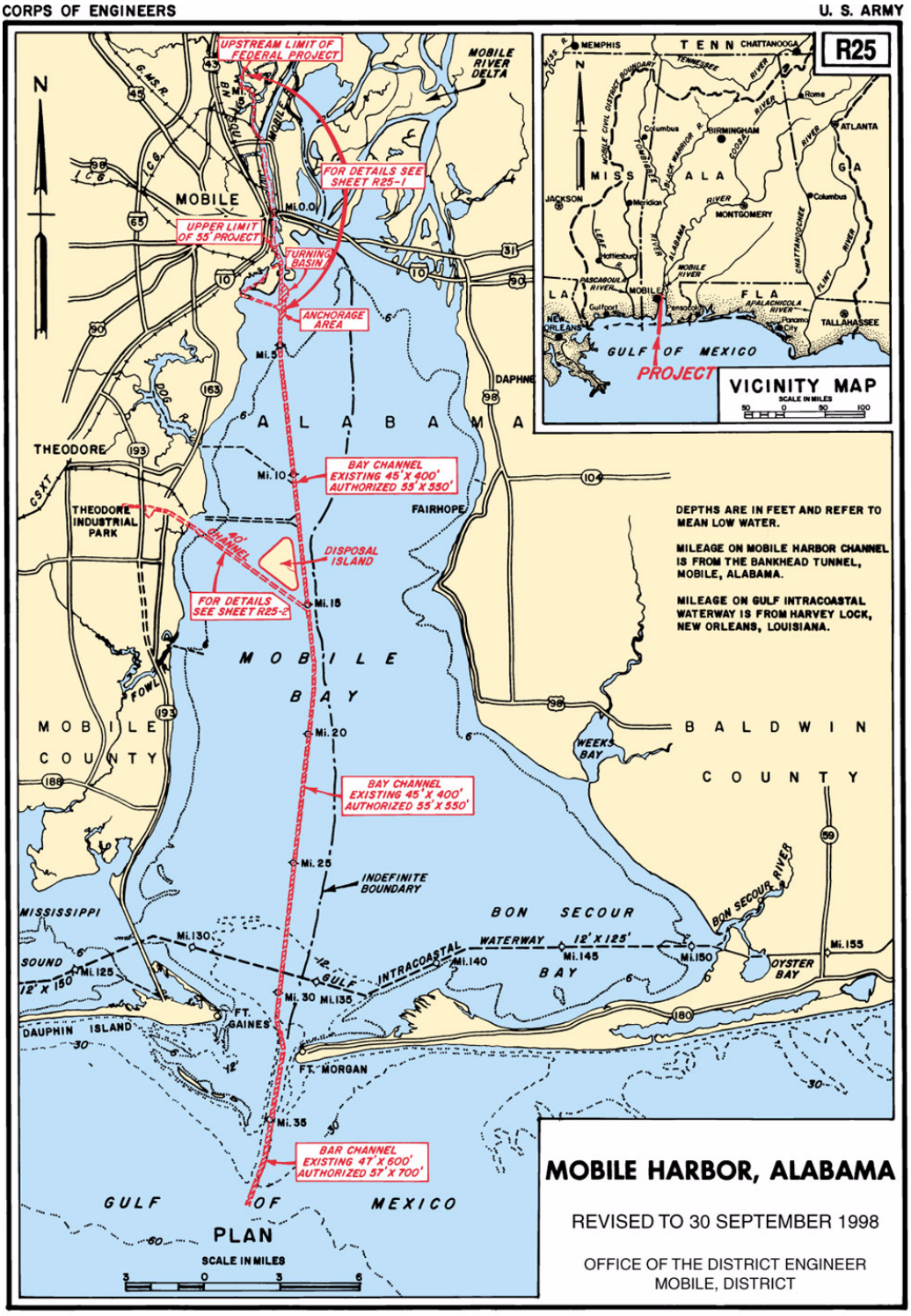

Figure 1: Mobile Harbor Project Map

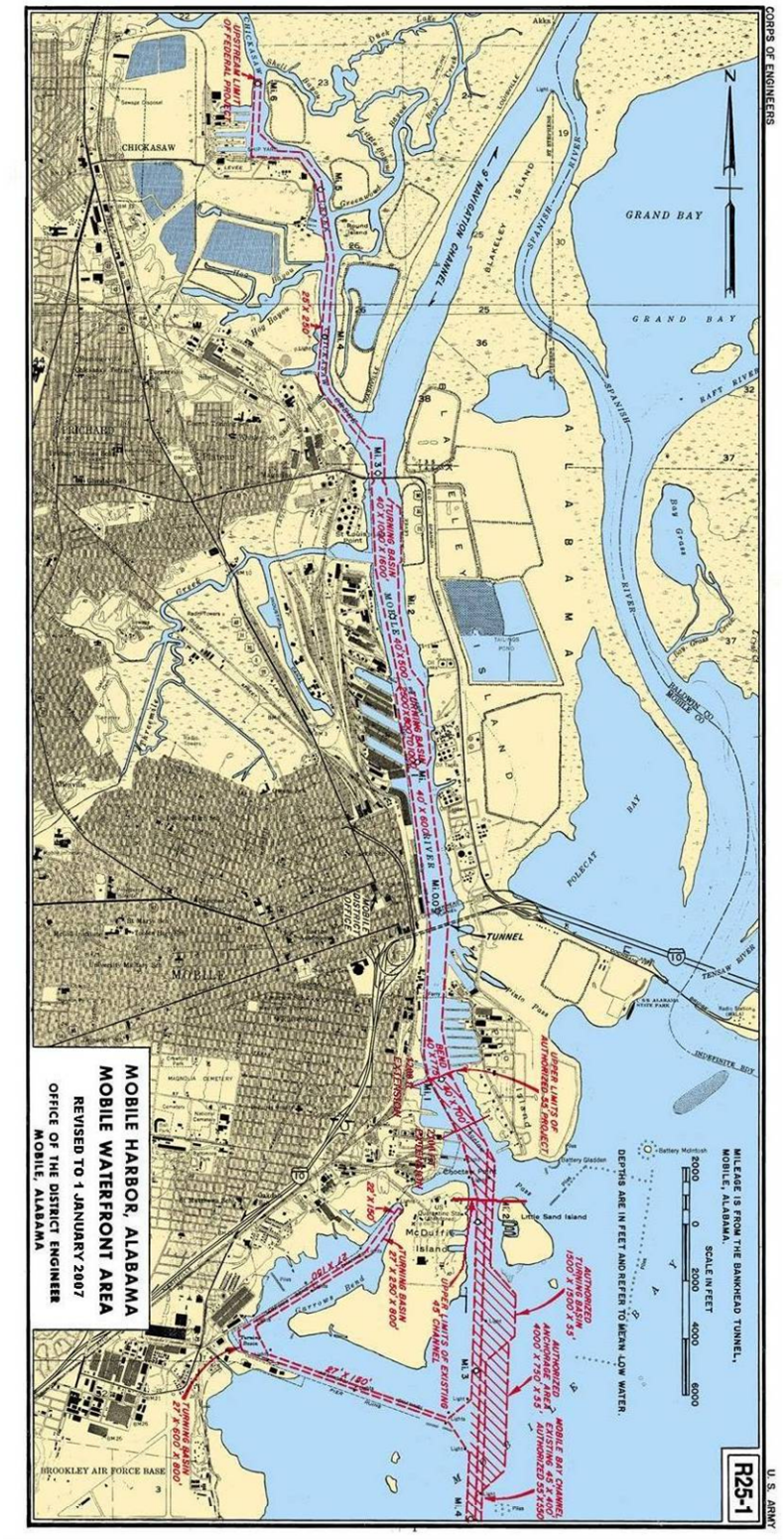

Figure 2: Mobile Harbor Project Features

1.1.1. Study Authorization

FY2015 CROmnibus (PL 113-235): provides the following study authorization: "Sec. 110. The limited reevaluation report initiated in fiscal year 2012 for the Mobile Harbor, Alabama navigation project shall include evaluation of the full depth of the project as authorized under section 201 of Public Law 99-662 (110 Stat. 4090) at the same non-Federal share of the cost as in the design agreement executed on August 14, 2012."

1.2. Study Area Description

Mobile Harbor, Alabama, is located in the southwestern part of the state, at the junction of the Mobile River with the head of Mobile Bay. The port is about 28 nautical miles north of the Bay entrance from the Gulf of Mexico and 170 nautical miles east of New Orleans, Louisiana. The current dimensions of the existing navigation channel are: 47 feet deep by 600 feet wide across Mobile Bar and 45 feet deep by 400 feet wide in the bay and in the Mobile River to a point about 1 mile below the Interstate 10 highway tunnels. The channel then becomes 40 feet deep and proceeds north over the Interstate 10 and U.S. 90 highway tunnels to the Cochrane/Africatown Bridge. The Mobile River, on which the Alabama State Docks facilities are located, is formed some 45 miles north of the city with the joining of the Alabama and Black Warrior/Tombigbee Rivers. The Mobile River also serves as the gateway to international commerce for the Tennessee/Tombigbee Waterway. In the southern region of Mobile Bay, access can be gained to the Gulf Intracoastal Waterway which stretches from St. Marks, Florida, to Brownsville, Texas.

1.3. Application of the Planning Process

This GRR process is expected to consist of four phases on the path to developing a recommended plan for HQ approval: scoping; alternative formulation and analysis, feasibility-level analysis; and, HQ Approval. Along this pathway are five planning milestones leading to the recommended plan:

1. Alternatives Milestone: Vertical Team concurrence on array of alternatives.
2. Tentatively Selected Plan (TSP) Milestone: Vertical Team concurrence on the TSP.
3. Agency Decision Milestone: Agency endorsement of recommended plan.
4.: Division Engineer Transmittal Letter: SAD review and approval of final report to be sent to HQ for approval.
5: GRR Approval: A brief summary of the GRR, signed by the Chief of Engineers, will be prepared to transmit approval to proceed to the design phase.

During the GRR, the PDT will use the six planning steps set forth in the Water Resource Council's Principles and Guidelines to focus the planning effort to select a plan for recommendation to Congress for authorization. The six planning steps are:

1) Specify problems and opportunities;
2) Inventory and forecast conditions;
3) Formulate alternative plans;
4) Evaluate effects of alternative plans;

5) Compare alternative plans; and
6) Select recommended plan.

1.3.1. Scoping

During this phase, the PDT will attempt to narrow the number of alternatives to evaluate to those most likely to satisfy the study objectives. Input will be obtained from the public, the non-Federal Sponsor, the Vertical Team, and resource agencies. Existing data will be utilized as much as possible to limit study costs and schedule. Once the focused array of alternatives and a path forward is developed, the PDT will seek Vertical Team concurrence at the Alternatives Milestone to move forward into the Alternative Formulation and Analysis phase.

1.3.2. Alternative Formulation and Analysis

During this phase, the PDT will collect any necessary data, refine the alternatives, and analyze and evaluate the effectiveness of the alternatives with the intent of identifying a TSP. During this phase the PDT will also develop the draft feasibility report which will include a summary evaluation of the final array of alternatives and the rationale for the TSP selection. A TSP Milestone meeting will be held to obtain Vertical Team concurrence of the TSP. After any needed changes are incorporated, approval will be obtained to release the draft feasibility report for concurrent public and policy review, ATR, and, if required, IEPR.

1.3.3. Feasibility-Level Analysis

During this phase, the PDT will work with the Vertical Team to address outstanding issues (technical, policy, or legal) raised during the concurrent review, via In Progress Reviews (IPR) or other meetings/teleconferences. After the Vertical Team has confirmed that the analyses in the draft report and the recommendations as a result of the concurrent reviews are compliant with policy and that there is a capable non-Federal sponsor ready to support project implementation, the Agency Decision Milestone meeting will be held. After the recommended plan and proposed way forward for feasibility-level design is endorsed by a panel of senior Corps leaders, the PDT will develop the final report and conduct additional design of the recommended plan to reduce risk and uncertainty with more detailed cost data, engineering effectiveness, environmental impacts, and economic benefits. The refined report will be forwarded to the Division office for review and endorsement to Headquarters. The vertical team meeting is the corporate checkpoint to determine if the final GRR and NEPA document, and the proposed Report of the Chief of Engineers, are ready to be released.

1.3.4. HQ Approval

Upon a successful conclusion of the vertical team meeting, the final report will be approved for release. The PDT will assist Headquarters staff with any needed changes to study documents. Once all issues are resolved, the approval memo will be signed.

1.4. Problem Description

The principal navigation problem is that vessels are experiencing delays leaving and arriving at the port facilities and their cargo capacities are limited. This problem is a result of the increasing

number and size of vessels entering and departing the port. In the last five years, the ASPA has added two new facilities at the lower end of the Mobile River (at the upper portion of Mobile Bay) -- the Choctaw Point container terminal and the Pinto Island Terminal. Both facilities have increased the amount of traffic into the port. The existing channel depths and widths limit vessel cargo utilization and also restrict many vessels to one-way traffic and daylight transit. Therefore, determining the feasibility of deepening and widening of the Bar and Bay channels over a combined distance of approximately 37 miles to their fully authorized dimensions through a General Reevaluation Report has been proposed to alleviate harbor delays and improve cargo capacity. The River channel is currently dredged to its current depth so no further investigation is proposed for this area.

1.5 General Reevaluation Report Alternatives

The GRR will evaluate a future "without" project condition of the Bay and Bar channels, which consists of 45-foot deep by 400-foot wide channel in the bay and a 47-foot deep by 600-foot wide channel across the bar. In addition, the GRR will investigate an array of alternative navigation project modifications (i.e. widening and deepening) as shown in Tables 1 and 2 below. The depths and widths will be evaluated incrementally from the existing channel depths and widths (i.e. future "without" project conditions) to the authorized depths and widths for partial channel lengths (i.e. passing lanes). These alternatives were based on ASPA's request.

Economic evaluations will be performed for all alternatives considered. However, environmental impact assessments and the supporting engineering analyses (i.e. hydrodynamic modeling, water quality modeling, and sediment transport modeling) will be performed for a smaller subset of alternatives (i.e. existing condition, future "without" project condition, and the most economically justifiable plan) to reduce the study cost and schedule. If the environmental impacts associated with the most economically justifiable plan are too significant, additional engineering modeling, and potentially economic evaluations, will be needed to identify an environmentally acceptable plan that is also economically justifiable. The cost for the additional analyses will be accounted for in the study cost contingency; however, there is no contingency in the schedule.

Table 1: GRR Proposed Alternatives for Bay Channel

Channel Deepening (full length)				
Depth (ft)				
47	49	50	52	53
Channel Widening (Passing Lane)				
Width (ft)				
500			550	

Table 2: GRR Proposed Alternatives for Bar Channel

Channel Deepening (full length)				
Depth (ft)				
49	51	52	54	55
Channel Widening (full length)				
Width (ft)				
		650	700	

2. SCOPE OF STUDIES

This section of the PMP provides a detailed scope of studies to be completed to effectively evaluate channel deepening and widening at Mobile Harbor. It is divided into three areas: a presentation of the GRR products; descriptions of tasks required to generate products, analyze alternatives, and determine project feasibility; and reference to applicable statutes, regulations, and guidance.

2.1. Review of General Reevaluation Report Products

Four major products will be produced for this effort as described below:

- General Reevaluation Report with a Supplemental Environmental Impact Statement (SEIS)
- Amendment to the Design Agreement
- Project Management Plan (PMP)
- Other Supporting Plans

2.1.1. General Reevaluation Report

This product includes all study activities leading to approval of the final General Reevaluation Report (GRR) and National Environmental Policy Act (NEPA) document by Headquarters (HQ) USACE. It will describe the problem identification and formulation activities that were conducted during the GRR phase to identify and recommend a plan of improvement. It will also include a required NEPA compliance document that will describe all study activities leading to the assessment of environmental impacts related to the project being investigated. NEPA activities include: preparation of a Supplemental Environmental Impact Statement, including public coordination, review, and notification of findings; environmental compliance documentation; coordination of the study and results with all interested parties; and, initial and policy review by SAD. Assuming the study activities for the General Reevaluation Report start in October 2015 and required funding is available when needed, completion is scheduled in September 2019.

2.1.2. Amendment to Design Agreement

As study plans and costs are finalized, coordination will take place between the Corps and the non-Federal sponsor to amend the Design Agreement that was developed for the previous Limited Reevaluation Report (LRR) for Mobile Harbor. This effort will be executed under an amendment to the existing LRR agreement because of language set for the in the FY2015 CROmnibus (PL 113-235):

"Sec. 110. The limited reevaluation report initiated in fiscal year 2012 for the Mobile Harbor, Alabama navigation project shall include evaluation of the full depth of the project as authorized under section 201 of Public Law 99-662 (110 Stat. 4090) at the same non-Federal share of the cost as in the design agreement executed on August 14, 2012."

The non-Federal sponsor will prepare a letter of intent that acknowledges the requirements of local cooperation and expresses their intent to serve as the non-Federal sponsor for the GRR study. The Mobile District will prepare a draft amendment to the Design Agreement that will be reviewed by SAD. Upon Division approval, the amendment will be finalized for execution between the Corps and the non-Federal sponsor. After execution of the amendment to the Design Agreement, the non-Federal sponsor will provide funds for conducting the GRR study effort.

2.1.3. Project Management Plan (PMP)

The PMP provides a summary of tasks (including cost and schedule) required to conduct and complete the GRR study. Non-federal sponsor and Corps acceptance of the task descriptions, and time and cost estimates addressed in the PMP constitute overall agreement of the PMP, with the understanding that more detail will be provided as necessary for future tasks and milestones as the study progresses. Updates to the PMP will be prepared as needed, but no less frequently than at each milestone in the study. The information contained in the PMP will be used to update appropriate budgetary and other related documents for the GRR study.

2.1.4. Other Supporting Plans

Other supporting plans will be developed, as needed, to address specific items such as local cooperation, real estate acquisition, quality control/review plan, value engineering, environmental and cultural resources, safety and security, and project operation and maintenance.

2.2. Description of Tasks

This PMP provides a list of tasks that the PDT has developed that are expected to be required to complete the GRR. A description of project tasks is included in the following sections and a budget/schedule is attached. At the initiation of the GRR the PMP will be revised and formalized as the PMP based on initial scoping agreed to by the Sponsor and Corps with the understanding that more detail will be provided for future tasks and milestones as the study progresses. Updates to the PMP will be prepared as needed, but no less frequently than around every milestone in the study. The information contained in this PMP will be used to update appropriate budgetary and other related documents for the GRR.

The GRR will rely on an integrated study team that includes:

- The Project Delivery Team (PDT), responsible for the development of the GRR;
- The Vertical Team, with representatives from the District, Division, and Headquarters;
- The Review Team, including technical, policy, and legal reviewers, which provide an independent look at the study decisions and products, following the Review Plan.

2.2.1. Engineering Analysis and Report

An engineering appendix will be prepared for the Mobile Harbor GRR that supports the alternative analysis and the recommended plan. The engineering appendix will be prepared at a level of detail necessary to develop a defensible baseline cost estimate that addresses all pertinent cost factors with adequate contingency factors. The engineering appendix will document the results of all of the engineering investigations conducted during the GRR, including surveying and mapping, coastal analyses and modeling, geotechnical investigations, and cost estimating. The engineering appendix will be prepared by the Mobile District (SAM) Engineering Division (EN).

The scope of work for the engineering appendix to the GRR includes evaluation of channel improvement alternatives for construction of channel deepening and/or widening up to the authorized dimensions. To the extent practicable, efforts will be considered to beneficially use the new work dredged materials for enhancement of the bay resources and/or restoration application. Design of any beneficial use options will, however, be postponed to the Preconstruction Engineering and Design (PED) Phase. All remaining materials not included for beneficial use purposes are expected to be placed offshore in the Mobile Ocean Dredged Material Disposal Site (ODMDS). Descriptions of the required engineering technical analyses to complete the GRR are detailed below and the schedule and costs are detailed in Section 4 of this PMP.

2.2.1.1. Surveys and Mapping, except for Real Estate

Hydrographic surveys are required to determine the configuration of the existing channel, the conditions along and adjacent to the proposed channel, the quantities of material to be dredged for the improvement alternatives and capacity within existing dredged material placement sites.

The most recent bathymetric surveys outside of the Federal Navigation Channels within the bay were completed by National Oceanic and Atmospheric Administration (NOAA) in 2004/2011 in the vicinity of lower bay channel and in 2012 by the USACE, Mobile District in the upper segments of the bay. This data is regional in scale and not appropriate for design of channel alignment and computation of quantities; however, it can be incorporated into model grids. Topographic and bathymetric light detection and ranging (LIDAR) surveys for the southern portion of the project in the vicinity of the entrance channel may also be available and will be incorporated where appropriate.

2.2.1.2. Coastal Analyses and Modeling

The coastal analyses and modeling efforts will be managed and/or conducted by the Mobile District Hydrology and Hydraulics Branch (H&H) with support from the U.S. Army Engineer

Research and Development Center (ERDC). The specific tasks include evaluation of existing conditions, future without project conditions, design of improvement alternatives, field data, and numerous model studies and assessments to determine the influence of the proposed modifications to the Mobile Harbor project and surrounding environment. The model studies and assessments to be completed as part of this effort include the following: hydrodynamic modeling, sediment transport modeling, water quality modeling, sedimentation evaluation, ship wake assessment, and ship simulations. After completion of the abovementioned tasks, the methods, assumptions, and outcomes of each effort will be documented in an engineering appendix. The details of the specific tasks are discussed in more detail below.

2.2.1.2.1. Evaluation of Existing Conditions

This task includes: a) the collection, inventory, and review of such data as historical surveys, maintenance dredging records, historical accident records, and previous Corps reports; b) the determination of existing physical conditions such as tides, currents, waves, winds, etc.; c) the identification of existing navigation channel characteristics and coordination for selection of the design vessel(s); and, d) the review of all pipeline and cable permits supplied from Operations Division which could potentially be impacted by modifications in the project area. This information will be obtained through coordination with the USACE Planning Division, Operations Division, Construction Division, the U.S. Coast Guard, and the non-Federal sponsor.

2.2.1.2.2. Design of Improved Conditions

Based upon the results of the existing conditions analysis, the design of improvements will include the development of preliminary plans for the navigation channel, to include aids to navigation, and assistance with the development of the detailed project cost estimate. All designs will be coordinated with the local pilots, the U.S. Coast Guard, and the non-Federal sponsor. Guidelines for risk and uncertainty inherent in design variables will be incorporated as available. This activity also includes development of the scope(s) of work, management, coordination, and completion/review of the hydrodynamic, sediment transport and water quality modeling, sedimentation evaluation, ship wake assessment, ship simulation, and data collection for navigation improvement alternatives as described below.

2.2.1.2.3. Hydrodynamic Study

Current velocities in the channel are needed as input to the ship simulator, sediment transport, and water quality studies detailed below. A numerical hydrodynamic model best provides such currents, so that velocities for both the existing and proposed conditions of the waterway can be determined. An existing geophysical scale modeling system (GSMS), which includes a three-dimensional (3D) hydrodynamic model of Mobile Bay, was developed and successfully applied to the system in a 2012 Multiagency Regional Sediment Management/Beneficial Use study. This modeling system will be the starting point for this study. The hydrodynamic modeling will consist of the following components:

- Wave Modeling. STWAVE will be implemented to simulate locally generated waves in Mobile Bay.

- Tidal elevation/storm surge modeling: The existing ADCIRC Gulf of Mexico model will be used to develop offshore elevation boundary conditions for the Mobile Bay hydrodynamic simulations.

- 3-D Hydrodynamic Modeling. The three-dimensional, baroclinic, multi-block hydrodynamic circulation model CH3D will be utilized to simulate current and elevation within Mobile Bay. CH3D performs hydrodynamic computations on a non-orthogonal curvilinear or boundary-fitted grid. Physical processes impacting circulation and vertical mixing that are modeled will include tides, wind, wave radiation stress gradients, density effects (salinity and temperature), freshwater inflows, turbulence, and the effect of the earth's rotation. The boundary-fitted coordinate feature of the model provides grid resolution enhancement necessary to adequately represent the deep navigation channels and irregular shoreline configurations of the flow system.

Data for hydrodynamic model validations will be obtained from the 2012 study and from data collected for the purposes as described in the field data collection task (see Section 2.2.1.2.9). After model validation is completed, two production simulations will be conducted to support the ship simulation study, in addition to an estimate of four alternatives. One simulation will depict a high river flow condition, and the other a low river flow condition. For both simulations, a spring tide will be imposed in the model, as well as wind, such that each represents the “worst-case” condition under which pilots will navigate the channel. Potential changes in water quality and sediment transport will be evaluated over average conditions (over 12 months) and 2 storm events for the existing and proposed harbor configurations. Simulation will be conducted for the time period of 2010 which contains periods of high (winter), average (spring) and low flow (summer) conditions over 12 months for the existing and proposed harbor configurations to support the water quality analysis. In accordance with ER 1110-2-8162, the preferred alternative will be indentified under a single rate sea level change scenario. A report will be prepared documenting the hydrodynamic study efforts and results.

2.2.1.2.4. Channel Analysis and Design Evaluations

2.2.1.2.4.1. Ship Simulation Study

Ship simulator studies will be required to analyze alternatives and aid in design for channel deepening and widening. A study of the turning basin was conducted by ERDC in 1994 and in 2006. More recently in 2012 ship simulations were used in evaluation of alternatives to widening a segment of the upper bay north of Gillard Island. Channel deepening and widening outside of a 5 mile segment in the upper bay channel has not be evaluated, and one or two new design vessels are anticipated for this GRR.

ERDC will conduct a site visit at the onset of the study to observe navigation conditions and take photographs to develop the visual scenes. Current magnitudes and directions for the ship simulations will be provided from the hydrodynamic study task. Ship simulation testing will be performed for an estimation of 4 alternatives. Evaluations may include possible combinations of deepening, entrance channel realignment, bend easing and widening segments for 2-way traffic. Simulation models will include currents (maximum flood and ebb) for two flow conditions, wind, channel bathymetry, visual scenes, and radar. If the project design ship(s) are not in the ERDC inventory, the design ship(s) will require development. Manufacturing of new ships models would have to be contracted and would require additional funds and time for

development beyond those detailed in this scope. Simulator testing by Mobile Harbor pilots is expected to require four one-week sessions. Reimbursement for Harbor pilots will be by the non-Federal sponsor. A final report will be prepared after completion of the formal simulation program. This report will include simulation results in the form of vessel track plots, pilot evaluations, results, conclusions, and recommendations.

2.2.1.2.4.2. Underkeel Clearance Evaluation

Port designers have historically relied on deterministic approaches with large safety factors for channel design. Risk-based models are now recommended to define a useful lifetime with an acceptable level of risk of accidents or groundings. Prediction of ship underkeel clearance (UKC) for different wave, ship, and channel combinations for the entrance channel segment will be evaluated utilizing the Channel Analysis and Design Evaluation Tool (CADET). The analysis is based on probabilistic risk analysis techniques to evaluate the accessibility of channel reaches for multiple vessel geometries, loading, and wave conditions.

2.2.1.2.5. Estuarine and Dredged Material Placement Transport Modeling

The potential for increased shoaling due to the planned deepening and widening of the existing navigation channel may be significant and needs to be evaluated. Since these modifications are likely to alter the sediment regime in Mobile Bay, estimates of future project maintenance needs are required. The purposes of the numerical sediment transport modeling are to 1) quantify changes in sedimentation due to the navigation channel deepening and widening alternatives, and 2) to assess long term capacity in existing disposal areas. A geophysical scale modeling system (GSMS) was successfully applied to the system in a 2012 Multiagency Regional Sediment Management/Beneficial Use study to look at sediment transport within the bay. Specifically, parallel versions of ADCIRC (2014), STWAVE (CSTORM-MS, Massey et al. 2011), MB-CH3D-West (Chapman et al 1986, Luong and Chapman, 2009) and sediment transport module, SEDZLJ (Hayter et al. 2012 and Gailani et al. 2015) were applied. Efforts for this study will build upon this previous work.

SEDZLJ is an advanced sediment bed module of the GSMB system that represents the dynamic processes of erosion, bedload transport, bed sorting, armoring, consolidation of fine-grain sediment dominated sediment beds, settling of flocculated cohesive sediment, settling of individual noncohesive sediment particles, and deposition. SEDZLJ is dynamically linked to CH3D-MB hydrodynamic model so that simulated changes in bed elevations at active grid cells due to erosion or deposition are utilized by MB-CH3D-West, which computes the transport of suspended material.

Data for model validations will be obtained from the 2012 study and from data collected for the purposes as described in the field data collection task (see Section 2.2.1.2.9). The goal of the calibration/validation task is to demonstrate the model's ability to correctly simulate the suspended sediment load (at locations where data have been measured) and the spatially varying sedimentation rate in the existing navigation channel.

After validation, the tidal and river flow boundary condition time series developed by the MB-CH3D-West, a single block grid CH3D-SEDZLJ, will be run for the chosen scenarios for a period of one year. The flows and suspended sediment loads carried by the Tensaw and Mobile Rivers

as described in the field data collection section will be used to develop a sediment-discharge rating curve for these rivers. These rating curves will be used to specify the suspended sediment boundary conditions for the chosen simulation period. Results from STWAVE modeling (i.e., times series of wave heights, periods and directions) over this same period will be used in SEDZLJ to calculate the current- and wave-induced bed shear stresses.

Estuarine sediment transport modeling and sedimentation evaluations will be performed for the existing condition, future without, and the National Economic Development plan (NED) with a contingency run to bracket potential impacts. The output from these scenario runs will be analyzed to determine changes in the sedimentation rates for the entire channel as well as locations in the channel, in bay open water placement sites, and environmental sensitive sites (e.g., oysters beds, sea grasses).

An analysis will be performed to determine if the existing disposal areas, for example the offshore dredge material disposal site (ODMDS), have the capacity to handle the new work dredge material (generated from channel widening and deepening) as well as the anticipated increase in maintenance dredge material that will result from the deepening and widening of the navigation channel. The capacity of an ODMDS is normally defined by USEPA Region 4 in terms of requiring 1) a minimum water depth over the ODMDS (e.g., 25 ft for the Charleston Harbor ODMDS), and 2) a maximum deposition thickness of 5 cm outside the boundaries of the ODMDS for material that is placed inside the ODMDS which subsequently erodes and is transported outside the ODMDS.

It is anticipated that at least a 10-year simulation will have to be performed for this assessment. This analysis requires the use of MPFATE to simulate the placement of the dredge material and the GSMB sediment transport model to simulate its subsequent erosion, transport, and deposition. The same procedure used for the ODMDS capacity analysis performed for SAJ and SAC will be used to perform the 10-year simulation. This procedure consists of repeating a one-year simulation (using both MPFATE and the STM) 10 times. The simulated changes in morphology at the conclusion of the first year model run will be used to initiate the second year run. This same pattern will be repeated eight more times to give the estimated 10-year changes in morphology at the designated disposal site(s).

2.2.1.2.6. Coastal Nearshore Sediment Transport and Morphology Modeling

This effort will investigate potential changes in sediment transport and morphological response of the surrounding nearshore environment resulting from channel deepening and widening alternatives. A numerical model of coastal processes to evaluate potential restoration alternatives for the State of Alabama is being developed for Dauphin Island by the U.S. Geological Survey (USGS) and the USACE, Mobile District using Deft3D. This work is building off of previous modeling studies in the region including the Mississippi Coastal Improvements Program (MsCIP). Delft3D will be implemented to support evaluation of channel alternatives and potential effects on the surrounding coastal processes based on a comprehensive analysis of nearshore wave transformation, tidal hydrodynamics, and sediment transport. The model will be validated using the data collected as part of the state study. Due to computational requirements the model will not be run over a continuous time period. Instead, a wave climatology will be used to drive the model. Coastal Nearshore Sediment Transport and Morphology assessment will be performed for the existing condition, future without, and NED

with a contingency run to bracket potential impacts. Documentation of the model setup and calibration process will be developed. In each scenario, changes in coastal processes will be identified.

2.2.1.2.7. Water Quality Modeling

This effort will investigate changes in water quality and flushing resulting from channel deepening and widening alternatives. A 3-D water quality model, CEQUAL-ICM (ICM) will be applied with the parallel versions of ADCIRC (2014), STWAVE (CSTORM-MS, Massey et al. 2011), MB-CH3D-West (Chapman et al 1986, Luong and Chapman, 2009). Three dimensional modeling is required due to the existing deep draft channels and vertical thermal, salinity, and water quality structure in the Bay. CE-QUAL-ICM is one of the world's leading water quality and eutrophication models and has been proven successful in several studies in the region including: Gulfport Federal Navigation Project, MsCIP, and Bayou Casotte. In addition, the model is currently being utilized for assessment of potential water quality changes associated with various restoration alternatives for Dauphin Island for the State of Alabama. Efforts for this study will build upon these previous and ongoing works in the system.

CE-QUAL ICM, is a finite volume eutrophication model, which incorporates 36 state variables including multiple forms of algae, carbon, nitrogen, phosphorus, silica, dissolved oxygen, SAV, and higher trophic level organisms. ICM incorporates a predictive submodel of benthic processes including sediment oxygen demand and sediment-water nutrient flux. Required hydrodynamic information consisting of flows, diffusivities, along with cell dimensions and volumes will be obtained from MB-CH3D-West output.

Data for water quality model calibration and validations will be obtained from existing state and local data collection efforts and from data collected for the purposes as described in the field data collection task. Water quality testing will be performed for the existing condition, future without and TSP with a contingency run to bracket potential impacts. Simulation will be conducted for the time period of 2010 which contains periods of high (winter), average (spring) and low flow (summer) conditions over 12 months for the existing and proposed harbor configurations to support the water quality assessment. Results of water quality modeling will be used to assess changes in water quality within the bay as well potential fisheries impacts from channel deepening and widening.

Documentation of the model setup calibration and validation process will be developed. In scenarios, changes in coastal water quality conditions including temperature, dissolved oxygen and salinity will be identified. Attention will be paid to known ecologically sensitive areas and time periods for selected sensitive species such as SAVs and oysters to identify temporal and spatial water quality changes.

2.2.1.2.8. Ship Wake Study

As vessels travel through water they produce transverse and divergent waves from the bow and stern. These waves are often visible from the shore and raise public concerns of sediment movement and habitat disruption at nearby shorelines. In order to compare estimated existing vessel generated waves with future vessel generated waves Automatic Identification System (AIS) data for 1 year will be requested from the United States Coastal Guard for Mobile Harbor. Vessel transits will be analyzed to determine the existing vessel conditions. AIS data includes

vessel dimensions, speed, and transit heading, amongst other information. The AIS data will be used to estimate waves generated by vessels and to estimate future vessel waves for comparison utilizing analytical/empirical formulas to compare ship forces in the without project and with-project (deepened and widened) channels.

2.2.1.2.9. Field Data Collection

Data are needed to support the development of waves, currents, and river sediment input loads to the bay for use in the ship simulation and/or sedimentation studies. As previously discussed, attempts will be made to use existing data for validation of the models. In the event these data are deemed to be inadequate, this task will produce the required data.

Waves cause a shear at the seabed that can readily mobilize sediment and make it available for transport. A directional wave gauge that is based in part on measurement of the current will be deployed for a one-month period in the bay to obtain the wave and current characteristics in the area. These data will also provide validation for the numerical wave model.

Flow and river Total Suspended Solids (TSS) data will reduce the uncertainty in both the hydrodynamic and sediment transport models. Three bottom-mounted ADCPs will be installed in the primary rivers flowing into the bay for one month. Periodic (once per hour) TSS measurements over the water depth at two stations (one in each river) over a neap, mean, and spring tide during high river flows will also be collected for this effort.

2.2.1.2.10. Coastal Analyses and Modeling Documentation

A draft engineering appendix will be prepared that fully documents all methods, assumptions, and results of the coastal modeling assessments and design computations. Design drawings will also be prepared, as required, to display the recommended plan.

2.2.1.3. Geotechnical Studies and Investigations

Geotechnical, Environmental, & HTRW Branch will conduct a project-wide analysis based on geologic and soils information obtained through explorations and selected laboratory testing. This activity will include determination of existing subsurface data, design and implementation of subsurface investigation plans, subsurface data acquisition, testing and documentation, analyses, quantity computations, and appendix write-up.

2.2.1.3.1. Review of Existing Subsurface Data, Design, and Implement Boring Plan

A regional map of the Mobile Harbor project channel area will be prepared that summarizes the location and depth of the existing data. Significant information such as the soil type and depth will be noted. This review will determine where additional subsurface information will be required. After a thorough review of the available subsurface data, additional investigation plans will be prepared. Based on a cursory review of existing data, some additional subsurface information (approximately 15 borings) will need to be collected as part of the GRR effort to supplement/fill gaps in the data collected under previous efforts.

2.2.1.3.2. Subsurface Data Acquisition and Testing

An interim subsurface investigation will be performed as part of the GRR effort to fill gaps in existing data which will reduce uncertainty in the existing conditions and the likelihood of a future major schedule/budget impact. However, additional subsurface exploration and testing will still need to be performed during PED to complete the design. At that time, hydro-acoustic geophysical surveys will be conducted and the results will be used to target locations for additional marine soil borings. Once the locations are identified, Standard Penetration Testing (SPT) will be conducted and continuous soil samples will be collected. Soil samples will be classified in accordance with the Unified Soil Classification System (e.g., SM, ML). Samples will be stored in tightly sealed plastic jars and representative soil samples, both disturbed and undisturbed, will be selected for testing. Soil samples will be tested for grain size distribution, moisture content, unit weight, specific gravity, and liquid and plastic limits. Tri-axial tests will be performed on selected fine-grained (silt and clay) soil samples to determine shear strength and cohesion. The information developed in this activity will be used to perform engineering analyses (e.g., slope stability analyses, estimate dredge production rates, etc.) and to determine the characteristics and identification of the subsurface material.

2.2.1.3.3. New Work Quantities

New work dredging quantities will be computed for each channel improvement alternative identified based on surveys obtained in Task 2.2.1.1. Refined dredging quantities will be calculated for the recommended plan pending the results of any ship simulation studies. The refined dredging quantities will require cross sections of all channel reaches to be improved. The ultimate capacities of current placement areas and potential new sites will be determined.

2.2.1.3.4. Subsurface Documentation, Analyses, and Appendix Write-up

Stratigraphic profiles and cross sections will be prepared to illustrate lateral and vertical changes in materials. Results of laboratory tests on soils and drafted boring logs will be appended to the report. The locations of borings drilled and available hydroacoustic survey lines will be shown on plan sheets. Recommendations will be made as to the most suitable means of dredging based on the characteristics of the materials found to be present within the recommended plan's template for excavation. The stability of the side slopes adjacent to existing structures will need to be analyzed if the widening of the channel decreases the distance from the existing structure to channel. Slope stability analyses will be performed using the program Slope/W (version 2012) to establish stable side slope configurations for earth slopes in the recommended plan. A geotechnical appendix will be prepared and included in the engineering appendix which documents and illustrates the geological and geotechnical aspects of the project. The appendix will include a discussion of geology, soil parameters, channel slope stability, recommendations, and conclusions.

2.2.1.4. Cost Engineering

2.2.1.4.1. Project Cost Estimates

Comparative construction cost estimates will be prepared for all proposed alternatives that are evaluated economically. These alternatives consist of combinations of project segments, configurations, channel depths, and widths. The cost estimate for each viable alternative will include appropriate comments describing the method of construction, assumptions used in developing the estimate, and the technical or design data available. All alternatives will be reviewed through the Civil Works Cost Engineering Mandatory Center of Expertise (MCX).

Once a NED and Locally Preferred (LP) (in the event one is identified) plan are determined by the economic analysis, a more detailed construction estimate will be developed within the latest approved software, Micro Computer Aided Cost Estimating System (MCACES) and USACE Cost Engineering Dredge Estimating Program (CEDEP) taking into consideration construction contract size, phasing within each contract, and the sequencing of contracts. New work quantities as a result of any ship simulation studies, soil characterizations as a result of additional soil borings, and environmental constraints as a result of water quality and sedimentation studies will be accounted for in the refined construction estimates. The Cost MCX will review and provide a cost certification of the project cost estimate during the Cost ATR.

2.2.1.4.2. Operation and Maintenance (OMRR&R) Cost Estimates

The OMRR&R estimates will be prepared in support of the all of the alternatives using historical data and hydraulic/coastal engineering best judgment of shoaling rates. Once the NED plan (determined by economics) and the LP plan (if one is identified by the sponsor) are identified, the hydraulics/coastal engineering team will provide the shoaling rates from the Sediment Transport Modeling results (see Sections 2.2.1.2.5 and 2.2.1.2.6) to more accurately determine OMRR&R costs. The refined estimates for the NED and LP plans will be provided to the economics team in efforts to verifying a positive benefit to cost ratio.

2.2.1.4.3. Risk Analysis

The risk analysis is the formal process used to project the cost and schedule contingency for project execution success. HQUSACE mandates the use of Crystal Ball for projects over $40 million. The risk analysis will be accomplished as a joint analysis with the other PDT members that have specific knowledge and expertise on all possible project risks for all features, internal and external. Management will focus efforts in the identified areas for potential risk mitigation, resulting in cost and schedule savings. A value engineering study will be conducted concurrently with the risk analysis in efforts of saving money and time.

2.2.1.4.4. Total Project Cost Summary

The Total Project Cost Summary (TPCS) will be developed for the LP (if identified) and NED plans. It includes all Federal and non-Federal costs. The Federal portion will be provided by the senior planner and captured in the summary sheet.

The TPCS will be broken down by the civil works work breakdown structure (CWWBS) features with respective estimates and schedules for escalation purposes. It will include the lands, damages and relocations; MCACES construction costs; cultural resources (if applicable) as a result of any surveys, contingencies resulting from the risk analysis; planning, engineering and design costs including monitoring and construction management costs. Real Estate Division will provide the estimate for the relocations, lands and damages. Planning Division will provide the environment mitigation and monitoring requirements as well as cultural resource costs. The project manager will provide the preconstruction engineering and design budget and construction management budget with input from operations/construction, engineering, planning, and real estate.

2.2.1.4.5. Value Engineering

During a period of potential opportunity of the feasibility phase, the value engineering officer or, if necessary, a certified value specialist will conduct a value engineering study concurrent with the risk analysis. A presentation and written report will be prepared for the final decision. Coordination between various disciplines of Engineering Division, Planning Division, Operations Division, and Project Management will be required.

2.2.1.4.6. Cost Documentation and Appendix Write-up

The cost engineering portion within the engineering appendix of the feasibility report will contain the MCACES cost estimate report at a higher feature level, TPCS, Risk Analysis report, project and construction schedules, review comments, and narrative with details of the development of relevant documents.

2.2.1.5. References

References that will be used during the completion of work tasks include the following:

EM 1110-1-1003	NAVSTAR Global Positioning System Surveying
EM 1110-1-1005	Topographic Surveying
EM 1110-1-1802	Geophysical Exploration for Engineering and Environmental Investigations
EM 1110-1-1904	Settlement Analysis
EM 1110-1-1905	Bearing Capacity of Soils
EM 1110-1-1906	Soil Sampling
EM 1110-2-1003	Hydrographic Surveying
EM 1110-2-1607	Tidal Hydraulics
EM 1110-2-1613	Hydraulic Design of Deep Draft Navigation Projects
EM 1110-2-5025	Dredging and Dredged Material Disposal
EP 715-1-4	Architect-Engineer Contracts
ER 715-1-7	Architect-Engineer Contracting
ER 1105-2-100	Guidance for Conducting Civil Works Planning Studies
ER 1110-1-12	Quality Management
ER 1110-1-8156	Policies, Guidance, and Requirements for Geospatial Data and Systems
ER 1110-2-401	Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual for Projects and Separable Elements Managed by Project Sponsors
ER 1110-2-1150	Engineering and Design for Civil Works Projects
ER 1110-2-1403	Studies by Coastal, Hydraulic, and Hydrologic Facilities and Others

ER 1110-2-1404	Hydraulic Design of Deep Draft Navigation Projects
ER 1110-2-8153	Technical Project Sedimentation Investigations
ER 1130-2-520	Navigation and Dredging Operations and Maintenance Policies
ER 1100-2-8162	Incorporating Sea Level Change in Civil Works Programs
ETL 1100-2-1	Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation

2.2.2. Socioeconomic Analysis/Report

The purpose of socioeconomic studies is to assist in identifying water resources related problems, identifying the social and demographic characteristics of the affected populations, and quantifying the benefits and costs of proposed solutions. The broad purpose of cost benefit analysis is to aid social decision-making. More specifically, the purpose is to facilitate the efficient allocation of society's scarce resources. Study documentation will include quantification and description of the impacts of alternative plans on the National Economic Development (NED) Account. The results of socioeconomic studies will be presented in an appendix to the feasibility report, a summary of which will be included in the main body of the feasibility report and NEPA document. The tasks outlined in Sections 2.2.2.1 through 2.2.2.10 are all necessary elements of a cost benefit analysis of the various alternatives arising from the plan formulation process. Evaluations will be conducted in compliance with the requirements of ER 1105-2-100, revised. The tasks outlined in Sections 2.2.2.1 through 2.2.2.10 will also require regular coordination with the local sponsor.

2.2.2.1. Economic Analysis/Report

The economic analysis will result in a determination of: a) what goods carried into and out of the economic study area will be subject to an ocean voyage; b) what modes of transportation will carry those goods before and after its ocean voyage; c) what type of vessel will carry these goods during their ocean voyage; d) what quantities will be carried per unit of time; and, e) the cost to transport those goods by ocean carrier. This information will be evaluated for the existing/future "without" project condition as well as each of the "with" project alternatives being evaluated. In the Bay channel, project depths of 45-55 feet will be evaluated with channel widths of 400, 500, and 550 feet. On the Bar channel, project depths of 47-57 feet will be evaluated with channel widths of 600, 650 and 700 feet. Thorough analysis of potential harbor/channel improvement options will be conducted during the GRR alternatives screening process.

Economic analysis will be accomplished by collecting, analyzing, and integrating data from a variety of sources - including the Alabama State Port Authority (ASPA), Mobile Bar Pilots Association (MBPA), Institute for Water Resources (IWR), Waterborne Commerce Statistics Center (WCSC), Global Insights and Maritime Strategy International. The economic analysis will be completed through the efforts of the National Deep Draft Navigation Planning Center of Expertise utilizing information provided by the non-Federal sponsor and/or contract services.

2.2.2.1.1. Economic Study Area

This task will result in a determination of the economic study area that is tributary to the proposed harbor and channel improvement project. The economic study area is seldom limited

to the immediate port area. The inland trade region (hinterland) served by the port consists of a number of cargo hinterlands defined by the inland origins or destinations of specific commodities. Collectively, the cargo hinterlands of actual and potential commerce of the project port define the economic study area.

2.2.2.1.2. Types and Volumes of Commodity Flow

An analysis of existing as well as potential commodity flows into and out of the study area will be conducted. This analysis will result in a determination of the following:

- Origins and destinations of import, export, and coastwise commodity shipments;
- Commodity trade routes;
- The transportation mode or modes by which commodities are carried to or from the port;
- The sizes and types of ocean vessels used for ocean transportation; and
- A description of the economic study area in terms of:

    - Commodities, current and prospective;
    - Existing port development, including port infrastructure;
    - Local municipalities
    - The local economy; and,
    - Competing ports.

Data sources will include Waterborne Commerce of the United States, Global Insight, Maritime Strategies International, and interviews with harbor and facility representatives as well as any other relevant publications or knowledgeable industry personnel.

2.2.2.1.3. Project Waterborne Commerce

Commerce projections reflecting the potential use of the waterway over a 50 year period of analysis will be developed. The volume of harbor commerce will be projected on a commodity by commodity and trade route by trade route basis. Commerce projections will be based upon, but not limited to, any or a combination of the following methods: relating the traffic base to an index over time (e.g., general indices on an industry basis constructed from industry projections), independent hinterland and resource availability studies supplemented by interviews of relevant shippers, carriers, port officials, commodity consultants and experts; and/or statistical analysis of historical flow patterns. Current guidance for risk and uncertainty/sensitivity analysis will be consulted and incorporated into projections of waterborne commerce.

2.2.2.1.4. Vessel Fleet Composition and Cost

1. Vessel Fleet Composition - Historical, present and future vessel/fleet size and composition will be established, comparison of which will result in determination of anticipated fleet changes over the period of analysis. Fleet composition will be considered according to trade route, type of commodity, volume of traffic, capacity utilization and any port or canal restrictions. Data will be obtained from various sources, including but not limited to the U.S. Department of Transportation (Maritime Administration), trade journals, trade associations, shipbuilding companies, vessel operating companies, port records, pilot records, and interviews with port/facility

representatives. Current guidance for risk and uncertainty/sensitivity analysis will be consulted and incorporated into projections of fleet composition.

2. Vessel Operating Costs - Commerce transportation costs will be determined using vessel operating costs published in the current Deep Draft Vessel Operating Cost Guidance Memorandum provided by the Corps of Engineers, Institute of Water Resources.

3. Load Factor – Load factor analysis needs to be developed for Mobile Harbor to determine vessel calls by alternative depth. The weight of cargo can vary by trade route, whereas vessel operators can also carry a number of empty containers or sail with vacant slots. A vessel load factor analysis helps to capture valid relationships and parameters for estimating the disposition of cargo and non-cargo components of vessel loading which in turn helps to better estimate the amount of cargo on a ship at a given time. Cargo components of a load factor analysis include carried tonnages, the container that stores the cargo as well as empty containers. Some of the non-cargo components that are considered include allowances for ballast, bunkerage, vacant slots and any other load factor significant to reasonably estimating full immersion and draft.

2.2.2.1.5. Current Cost of Commodity Movement

The full origin-to-destination to include the water based leg transportation costs for commodity movement will be estimated for the without and with project conditions. Estimated costs will include necessary handling, transfer, and storage, as well as any other accessory charges. Without project condition transportation costs will be based upon costs and conditions prevailing at the time of the study. With project condition transportation costs will reflect any efficiency expected as a result of the alternatives evaluated (e.g., larger vessels, increased loads, reduction in time delays, etc.). Vessel movements will be simulated using the HarborSym model. HarborSym is a Monte Carlo (risk-based) waterway simulation model. It is used to assess the economic impacts of navigation improvements to the waterway being studied. By comparing different improvement scenarios (alternatives) with a baseline alternative (without project condition), the reduction in operating cost can be determined, and alternative navigation improvement plans can be assessed in a risk-based economic framework.

2.2.2.1.6. Current Cost of Alternative Movement

The economic concept of substitution applies to production as well as to consumption. The essence of this task is to identify and evaluate substitutes for this channel deepening/widening project. Such options may include alternative harbors, lightening/topping-off operations, traffic management, or use of other modes of transportation. This study task will be accomplished by drawing on knowledge of what is technically and practically possible in the field of ocean transportation. Information will be obtained through a search of appropriate literature and interviews with harbor users.

2.2.2.1.7. Future Cost of Commodity Movements

This task will result in an estimate of the relevant shipping costs during the period of analysis and future changes in fleet composition, port delays, and port capacity under without project conditions and for each harbor improvement alternative being evaluated.

2.2.2.1.8. Use of Harbor and Channel With and Without a Project

The purpose of this task is to estimate harbor use over time, both without and with the project. Applicable data obtained for the establishment of existing conditions will be used as the foundation for this analysis. Data requirements include determination of the use of the harbor in terms of fleet composition, commodity flows, and transportation costs for without and with project conditions. Commodity transportation costs for each project alternative, for a 50 year period of analysis , will be compared. Current guidance for risk and uncertainty and/or sensitivity analysis will be consulted and incorporated into analysis of this study task.

2.2.2.1.9. National Economic Development Benefits

The primary source of NED benefits of a given deep draft navigation project is the difference between total transportation costs with the project and total transportation costs without the project. The average annual cost of the investments that must be made in order to realize project benefits is subtracted from the average annual NED benefits in order to determine the given navigation project's net annual benefits. The NED plan is the project alternative with the highest net annual benefits. The benefit-to-cost ratio is computed by dividing annualized benefits by annualized costs for each alternative.

As appropriate, NED benefits will be measured for any or a combination of the following benefit categories:

2.2.2.1.9.1. Cost Reduction Benefits

Cost reduction benefits will be calculated for vessel operations that meet any of the following:

- Same commodity, origin-destination, and harbor. Transportation benefits will be calculated as the difference between current and future transportation costs for the movement by the existing project (without project condition) and the cost with the proposed improvement (with project condition);
- Same origin-destination, different harbor. This cost reduction benefit category captures commerce that shifts to the harbor from other harbors due to the proposed improvements. Benefits are realized from the reduction in current and future transportation costs due to the alternatives analyzed;
- Same commodity and origin-destination, different mode. Transportation benefits are measured as the reduction in current and future costs to the producer or shipper that result from commerce shifting from alternative modes of transportation to vessel due to the proposed harbor improvements.

2.2.2.1.9.2. Shift of Origin Benefits

This benefit category will be calculated for commodities that have a change in their origin because of the proposed plan, but no change in destination. Benefits are measured as the reduction in total cost of transporting quantities with versus without the plan.

2.2.2.1.9.3. Shift of Destination Benefits

Shift of destination benefits will be measured for commerce that is transported to a new destination due the proposed harbor improvements. NED benefits will be established as the difference in net revenues to producers with and without the project alternative.

2.2.2.1.9.4. Induced Movement Benefits

This benefit category will be estimated for operations where a commodity or additional quantities of a commodity are produced and consumed as a result of lower transportation costs resulting from harbor improvements.

2.2.2.1.9.5. Safety Benefits

This benefit category will be estimated if there are reductions in vessel accidents realized due to the proposed harbor improvements.

2.2.2.1.10. Economic Costs

Average annual equivalent construction costs, including interest during construction and operation and maintenance costs will be calculated. The project first cost and period of construction will be obtained from Mobile District's Cost Estimating Section. The discount rate used for this analysis will be the discount rate established annually for the formulation and evaluation of plans for water and related land resources.

2.2.2.2. Social Studies Report

Existing social, economic and demographic conditions of Mobile and Baldwin Counties, Alabama and the specific project area (to the extent possible) will be documented for the GRR. The without and with project conditions will be defined and documented.

Social impacts will be evaluated on the region, community, and groups within the zone of influence of the project. Impacts to be considered under the other social effects (OSE) account will include the following: income distribution; employment distribution; population distribution and composition; the fiscal condition of the state and local governments; the quality of community life; life, health, and safety factors; displacement; and long-term productivity. Impacts to minorities and low-income groups will also be evaluated and incorporated into the environmental justice analysis in the NEPA document.

2.2.2.3. All Other Socioeconomic Tasks

This task includes IEPR response and coordination and other SMART Planning Milestone efforts.

2.2.2.4. References.

References that will be used during the completion of work tasks include the following:

ER 1105-2-100, Planning Guidance Notebook
Economic Guidance Memorandum 11-04, Deep Draft Vessel Operating Costs (or later version)
IWR Report 10-R-4, NED Procedures Manual for Deep Draft Navigation

2.2.3. Real Estate Plan

2.2.3.1. Real Estate Planning.

During the GRR study, Real Estate Division (RE) will review selected alternatives to determine real estate requirements and appropriate real property interests. RE personnel will prepare all real estate reports and cost estimates for the GRR. A Real Estate Plan (REP) will be prepared as an appendix to the GRR. The REP outlines the minimum real estate requirements for the proposed project, in accordance with ER 405-1-12, Chapter 12-16.c, dated 1 May 1998 and revised 8 March 2003. The REP contains a description of the area; the acreage and proposed estates, including non-standard estates, and reasons therefore; a discussion of any land owned by the Federal Government, the non-Federal sponsor or any public entity; an estimate of the Public Law 91-646 relocations; the Baseline Cost Estimate for Real Estate; a discussion of the non-Federal sponsor's ability to acquire Lands, Easements, Rights-of-Way, Relocations and Disposal area (LERRD); a discussion of mineral activity, if any, and the attitude of the landowner; a detailed schedule of land acquisition; a preliminary assessment of the facilities/utilities to be relocated; and any other relevant real estate information appropriate for the project. The appropriate interest to be acquired in properties identified in the proposed alternatives will be defined. RE will identify benefits available to displaced residents under Public Law 91-646. Acreage needs for land mitigation (survey, description and appraisal) for affected wetlands will be established as required.

2.2.3.2. Preliminary Real Estate Acquisition Maps.

RE will prepare an initial set of maps and drawings that delineate the real estate acquisition lines based on technical design drawings developed the Engineering PDT members during study phase. Maps and drawings will reflect the minimum real estate required for project purposes.

2.2.3.3. Physical Takings Analysis.

A written legal opinion will be prepared as to whether flooding will be induced by the construction, operation or maintenance of the proposed project. If induced flooding is expected, a determination will be made as to whether it will rise to the level of a taking of an interest in real property for which just compensation must be paid to the owner of the real property. The opinion will describe the analysis of relevant information regarding the depth, frequency, duration, velocity and extent of induced flooding, as well as relevant State and Federal law, and will present a conclusion on the physical taking issue.

2.2.3.4. Preliminary Attorney's Opinion of Compensability.

A preliminary legal opinion will be prepared on whether provision of a substitute facility is required under the Fifth Amendment as compensation for a facility/utility being acquired for the project. The opinion makes findings on whether the owner has a compensable interest, whether the owner has the legal duty to continue to maintain and operate the facility/utility, and whether Federal law requires the provision of a substitute facility/utility rather than a mere payment of the market value for the property acquired. The preliminary legal opinion differs from the final legal opinion only in its acceptance as fact of the owner's statement of interest in the subject property, without a search of property records.

2.2.3.5. Gross Appraisal.

Mobile District, Real Estate Division is required to prepare a gross appraisal during the study or when agreed, the NFS may provide the gross appraisal for the cost shared project. The appraisal will include a total estimated value for fee and easement estates, including improvements, minerals, and severance damages. It will also include any additional details or refinement beyond the initial reconnaissance of the location and description of the area; the special features (i.e., timber, minerals, water rights, etc.); environmental concerns including potential hazardous, toxic, and radioactive waste (HTRW) or lack thereof; existing encumbrances; the highest and best use(s) involved; and the assumptions and limiting conditions. In conjunction with the preparation of the gross appraisal, RE will prepare an assessment of the depreciated replacement costs of those structures within the purview of the project, if applicable.

The gross appraisal will be of sufficient detail to provide an accurate cost estimate, which will be sufficient for authorization. Additional brief or full gross appraisals may be required in accordance with EC405-1-04-21, depending on the appraisal issues and potential project cost thresholds (i.e. Brief Gross Appraisal - under $5 million and less than 30% of project cost / Full Gross Appraisal – over $5 million).

2.2.3.6. Rights-of-Entry.

RE and/or the non-Federal sponsor will obtain any rights-of-entry access needed for surveys or other preliminary work during the GRR study.

2.2.3.7. Relocations of Facilities and Utilities.

RE personnel will determine if alternatives for the project require the relocation of any existing facilities or utilities. A staff appraiser will determine the fair market value of any additional lands needed for the relocations. SAM Office of Counsel and RE Division will coordinate with the non-Federal sponsor to fulfill all legal obligations.

2.2.3.8. Participate In Meetings and Public Workshops.

RE personnel will attend (as needed) progress review meetings and all other pertinent public/private meetings. RE Division will provide all necessary real estate data for workshops, feasibility, and internal review.

2.2.3.9. Preliminary Draft Real Estate Plan.

A preliminary draft Real Estate Plan (REP) will be prepared after the aforementioned real estate planning activities have been completed to an acceptable level. The REP will be fully coordinated and accomplished with the PDT. Supervisory and OC review will be accomplished and the preliminary draft report will be revised to incorporate appropriate comments. The preliminary draft real estate report will be incorporated as an appendix into the preliminary draft GRR and distributed for the final technical review. Responses to technical review comments will be prepared and any necessary changes will be incorporated into the draft real estate report.

2.2.3.10. Draft Real Estate Plan.

The draft REP will be prepared after the draft technical review has been completed. The report will discuss and display all data, findings, procedures and assumptions used in the analysis. Changes to comply with appropriate comments from the draft technical review will be incorporated into the draft REP. Supervisory review will be accomplished and the draft real estate report will be revised to incorporate appropriate comments. The draft REP will be incorporated into the draft GRR.

2.2.3.10.1. Final Real Estate Plan.

The final REP will be prepared and will be incorporated as an appendix into the final GRR. The report will discuss and display all data, findings, procedures and assumptions used in the analysis. Supervisory and OC review will be accomplished and the final report will be revised to incorporate appropriate comments.

2.2.3.10.2. Other Real Estate Analyses/Documents.

The results of all real estate analysis will be organized into an REP and subsequent RE appendix to be incorporated into the overall report. Subsequent RE appendix revisions will most likely be required during the alternative formulation analysis phase for District Quality Control (DQC) reviews and Agency Technical Reviews (ATR). In addition, a risk analysis (including checklist) will be compiled by the realty specialist to be included in the overall project risk register.

2.2.4. Environmental Studies Documents

Preparation of the Post Authorizations Change Report (GRR) will ensure that the environmental

study process is used in determining the selected plan and that the process is documented by the production of appropriate National Environmental Policy Act (NEPA) documentation as required in accordance with the President's Council of Environmental Quality (CEQ) Rules and Regulations as defined and amended in 40 Code of Federal Regulations (CFR) Parts 1500-1508, Corps' Principals and Guidelines as defined in Engineering Regulation (ER) 1105-2-100 and ER 1105 -1-200, and other applicable Federal and State environmental laws. Principle applicable laws include but not limited to the Endangered Species Act (ESA), the Clean Water Act (CWA), the Clean Air Act (CAA), the U.S. Fish and Wildlife Coordination Act, Marine Protection Research and Sanctuaries Act (MPRSA), Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), National Historic Preservation Act (NHPA) and the Coastal Zone Management Act (CZMA). Several key outputs to be furnished by the environmental studies are:

- Establishment of without project environmental conditions.
- Assessment of direct, with-project impacts for the alternatives.
- Assessment of indirect and cumulative project impacts.
- Utilization of existing hydrodynamic and water quality models and monitoring programs to determine project impacts on salinity, dissolved oxygen, nutrients, transport of contaminants, and marine life.
- Determination of mitigation planning requirements and associated habitat evaluation procedures.
- Preparation of a Supplemental Environmental Impact Statement (SEIS) and associated Record of Decision (ROD) including all pertinent public and agency coordination.
- Perform all investigations for compliance with all hazardous, toxic and radioactive (HTRW) waste requirements.
- Provide management, documentation and appropriate data collection to document all cultural resources.
- Coordinate placement of dredged material to insure consistency and availability of dredged material disposal sites and beneficial use opportunities.

The effort for the Mobile Harbor GRR involves the evaluation of the impacts resulting from deepening and widening the Mobile Harbor Federal navigation project and associated dredged material disposal alternatives. The proposed modification of the of the Mobile Harbor navigation project includes deepening and widening 35 miles of navigation channel. A number of plans will be evaluated considering alternative channel depths and widths as well as dredged material disposal options. The Planning Division Environmental and Resources Branch (PD-E) is responsible for developing environmental and cultural data, assessing environmentally related project impacts, conducting mitigation analysis and preparation of plans, and obtaining all related Water Quality Certifications (WQC) and environmental compliances. In addition, the PD-E is responsible for evaluation of the suitability of “new work” dredged material for the disposal alternatives. Finally, representatives from U.S. Fish and Wildlife Service (USFWS), National

Marine Fisheries Service (NMFS), Environmental Protection Agency (EPA), Alabama Department of Environmental Management (ADEM), Alabama Department of Conservation and Natural Resources (ADCNR), and Alabama State Port Authority (ASPA) and others will be requested to actively participate in identifying and evaluating potential project environmental impacts as well as disposal alternatives and beneficial uses of the new work material. The environmental work for this account will be conducted under the leadership of the Environment & Resources Branch. The Coastal Environment Team will have the overall environmental management and execution responsibility.

To accomplish the study's goal, environmental work for the Mobile Harbor GRR studies will be conducted in three general areas. These are analyses of impacts associated with non-Federal improvements which may be required to achieve economic benefits, analyses of impacts associated with navigation improvements, and analyses required for beneficial use of dredged material and mitigation planning. Environmental activities will be phased to accommodate the GRR schedule.

2.2.4.1. PMP Assumptions:

1. Sediment studies will be undertaken to characterize sediments for suitability for various disposal options. These areas will be sampled and analyzed to determine compliance with the Clean Water Act (upland, within bay, and beneficial uses) and the Marine Protection, Research and Sanctuaries Act (ocean disposal).

2. Assessment of impacts will be accomplished through the SEIS process. The SEIS process will determine what issues should be evaluated, include a full public review, and include a full public disclosure of all impacts associated with each of the alternatives.

3. The product of the GRR will be a recommendation towards whether or not to proceed with project construction and all required environmental compliance certifications (i.e. State WQC, Coastal Zone Consistency (CZC), Ocean Dredged Material Disposal Site (ODMDS) concurrence, and all appropriate ESA coordination.

4. Evaluation of dredged material disposal will be performed to assess ODMDS and other disposal capacity, prepare appropriate input to the NEPA documentation, including environmentally acceptable alternatives for beneficial use of dredged material and environmental restoration consistent with regional sediment management practices.

5. Marine-related infrastructure improvements will occur with and without the project. However, growth with the project will exceed growth without the project.

6. Provide a preliminary benefit and cost analysis, using available information, for the Vertical Team at the Planning Charette to illustrate the potential magnitude of the costs and benefits for the current array of alternatives.

2.2.4.2. Agency Scoping Meeting (Charrette)

Scoping meetings with the Federal and state support agencies will be held at the beginning of

the GRR to develop the issues of concern to be considered during the environmental impact analysis process. Minutes of these meetings will be prepared and used to guide the environmental studies process. This report is in addition to the public transcript of the public scoping meeting that is included below.

2.2.4.3. Supplemental Environmental Impact Statement (SEIS) and Record of Decision (ROD)

To meet NEPA requirements, a SEIS will be prepared. In completion of this task, the USEPA, NMFS, USFWS, ADEM, ADCNR, ASPA, and other appropriate Federal and state agencies will be asked to be cooperating agencies in the NEPA process. Below are the required sub-tasks to formulate an SEIS this is compliant with NEPA. Some activities associated with this task will begin upon receiving funds to initiate the study.

2.2.4.4. Scoping

As required by the NEPA guidelines, a public scoping process will be organized and conducted once funding has been received to begin the GRR study. The scoping process will allow public input into the development of issues and alternatives to be considered during the NEPA analysis. Minutes compiled from the Scoping process will be publically available and used as guidance for the NEPA analyses. Tasks involved include development of a public mailing list, issuance of notice of scoping meeting, holding the public scoping meeting, and preparation of a public transcript of the scoping meeting.

2.2.4.5. Without Project Assessment

To address possible impacts from the various navigation alternatives, a comparison of future-without project conditions to with project conditions is required by NEPA. This task will include the compilation of all existing information associated to establish existing environmental baseline conditions with the impacts of the utilization of the existing project, including ocean disposal options and beneficial use of dredged material.

2.2.4.6. With Project Assessment

During the GRR Phase, a comparison of the existing conditions without the project to with project conditions will be conducted. This task includes the development of impacts associated with each of the alternatives being considered in detail on all resources of concern. These impacts will then be compared to those associated with the utilization of the existing project to determine the incremental impacts (positive or negative) associated with the alternatives. The determination of any mitigation requirements will also be included in this task. This task will be initiated once the recommended alternatives have been developed.

2.2.4.7. Resource Inventory Report

W/O project - Search, compilation and analysis of relevant data associated with all navigation improvement projects (completed, on-going and planned) within the Mobile Harbor project area. This would include ongoing coordination with those efforts and potential future addition of new data/proposals. Assemble existing aerial photography (at a scale and resolution to readily interpret vegetative types in wetland areas) and remote sensing data to facilitate mitigation site selection.

2.2.4.8. Hydrodynamic and Environmental Modeling

In order to perform activities associated with project impact assessments, employment of various modeling efforts is necessary to provide an understanding of how the project affects hydrodynamic processes, sediment transport, sedimentation patterns, water quality, and habitat suitability. Much of the project impacts evaluations will be based on outputs of detailed hydrodynamic and water quality modeling (see Sections 2.2.1.2.3 and 2.2.1.2.7) . The goals of the modeling effort will be to characterize the existing hydrodynamic conditions, salinity, and dissolved oxygen (DO) concentrations, nutrients, and sedimentation transport and deposition patterns in the estuary, and to estimate and analyze the effects of the alternatives on those parameters. Much of the required modeling will be conducted under the engineering portion of this PMP. However, some modeling and tool development that is specific to habitat assessment impact evaluations associated with project conditions will be conducted. Recommendations as to the types and applicability of habitat modeling will be provided by the cooperating agencies but cannot be initiated until the engineering models have been completed.

2.2.4.9. Mitigation Analysis Report

The task involves conducting a mitigation analysis to determine if mitigation in necessary to compensate for impacts associated with implementing the recommended navigation improvements. This task will include an incremental cost/output analysis. The approach of the study is to identify the type of mitigation that may be required, evaluate habitat areas in the bay and/or the watershed available for mitigation, and identify mitigation opportunities (e.g., fill removal, vegetation of shoreline, filling of hypoxic depressions, wetland restoration, etc.) that is technically suitable and practicable. A major effort will be the inclusion of beneficial uses of dredged material and the implementation of appropriate action items from the Federal, state, and local interests. Major activities concerning development of mitigation are included in tasks described above. A mitigation report will be prepared to document the results of this analysis.

2.2.4.10. Prepare SEIS

This task includes the preparation of the various versions of the SEIS document to include the tasks described above. Versions of the document will include a preliminary draft, draft, and final SEIS.

2.2.4.11. Public Involvement

NEPA is intended to ensure full public participation in the SEIS process. Public participation includes effective communication between all Federal, state, and local agencies, tribal governments, and other persons or organizations that may have an interest in the project. As required by NEPA, the public will be invited to attend public meetings and hearings as part of the development of the Mobile Harbor GRR. Other methods implemented to reach the general public and interested stakeholders will include but not limited to meeting announcements, news releases to local print and broadcast news media, internet, social media, and a web site.

2.2.4.12. Incorporate Review Comments

At the completion of each review it is required that all agency and public comments be evaluated and incorporated into the document as appropriate. The task also requires recording the comments and how they were addressed in the SEIS.

2.2.4.13. Record of Decision (ROD)

Upon the completion of the Final SEIS public review and completion of associated environmental studies, a Record of Decision (ROD) will be prepared for signature by the Commander of the USACE South Atlantic Division. The ROD will detail the recommended action and the basis for taking that action.

2.2.4.14. Coordination with Other Agencies

This subtask includes the organization, preparation, and distribution of agendas and minutes from environmental coordination meetings. In general, the initial meetings will focus on progress updates and meetings to discuss and comment on technical outputs. Activities will be undertaken to ensure compatibility to other Federal programs and plans. In particular dredged material evaluations will be conducted to determine possible beneficial uses of dredged materials in accordance with regional sediment management practices. The USFWS, NMFS, EPA, ADEM, ADCNR, ASD, and representatives from environmental and community groups will be requested to actively participate in this evaluation identify and evaluate disposal alternatives and mitigation efforts, as necessary. Activities under this task include holding meetings and developing consensus reports.

2.2.4.15. Fish and Wildlife Coordination Act Report

Coordination with the U.S. Fish and Wildlife Service will be initiated upon receiving study funds to provide an update of the fish and wildlife resources of the Mobile River and Mobile Bay area. These activities will be undertaken by the USFWS in Daphne, AL under a transfer of funds agreement. It is assumed that the Service will prepare an initial Planning Aid Letter to aid in the development of focused analyses. A final FWCA Report will also be prepared.

2.2.4.16. Biological Assessment

Supplemental environmental documentation will be prepared during the GRR, including information related to the re-evaluation of project alternatives and the selection of the NED and/or recommended plan. In addition to the information necessary for the development of the SEIS, specific biological assessments are required to indicate compliance with Section 7 of the ESA and amendments to the MSFCMA that requires specific coordination concerning Essential Fish Habitat (EFH). This assessment will be conducted utilizing results from the modeling efforts, included in the engineering component of this study, pertaining to sediment processes and water quality. The Mobile District's Coastal Environment Team in coordination with the US Fish and Wildlife Service and the National Marine Fisheries Service will perform this task upon selection of the recommended plan.

2.2.4.17. Section 7 Coordination

The biological assessment prepared by the Coastal Environment Team as discussed above will disclose potential impacts to federally listed threatened and endangered species and provide the District's determination based on those impacts. This assessment will likely end in a requirement for the preparation of a biological opinion by the USFWS and the NMFS concerning at a minimum the Gulf sturgeon, sea turtles, manatees, piping plover, and a number of other avian species. Activities will be undertaken during the GRR to identify methods to avoid or minimize impacts to these species or where possible to provide activities that may enhance the species continued survival or it's critical habitat. This activity will begin once the recommended alternatives have been developed.

2.2.4.18. Essential Fish Habitat Coordination

Amendments to the MSFCMA require all Federal agencies to coordinate their activities with the NMFS in regards to marine fishery species that are currently managed by the agency. All estuarine areas adjacent to the Gulf of Mexico and all Gulf of Mexico waters are currently considered essential fish habitat for a number of species including shrimp, red drum, reef fish and coastal migratory pelagics. Activities undertaken under this task will assure that plans proposed in the GRR are not in conflict with existing Federal fishery management plans or do not result in unacceptable impacts to the habitats of managed species. In addition, activities will be evaluated which may enhance the habitats of managed species. This activity will begin once the recommended alternatives have been developed.

2.2.4.19. Section 404(b)(1) Analysis Report

In compliance with CWA, the 404(b)(1) evaluation report will be prepared to discuss any potential water quality impacts associated with the placement of fill materials from the recommended navigation improvement. This task will include a re-evaluation of sediment suitability as required by the Inland Testing Manual. Performance of this task will be the responsibility of the Coastal Environment Team or its contractors and will be conducted using results from sediment testing results.

2.2.4.20. Determine Sediment Suitability

The suitability of sediments will be determined for possible disposal/placement alternatives including upland, open water within-bay, and ocean disposal. This work will be done under contract with activities under the task including preparation of the scope of work by the Coastal Environment Team, supervision of the contract, and contractual expenses. This information will be used in the preparation of the Section 103 Evaluation Report to demonstration suitability criteria for disposal in the ODMDS. Information from this task will also be utilized in the preparation of 404(b)(1) report to show compliance with state water quality requirements. Both reports will provide required information for determining disposal alternatives for the new work material.

2.2.4.21. Preparation 404 (b)(1) Report

The 404(b)(1) evaluation is used to determine compliance with Section 404 of the CWA regulating the placement of dredged or fill materials in waters of the United States. This would include any activities resulting in beneficial use of dredged material whether upland, within-bay, or ocean waters as well as any activities associated with dredged material placement. Tasks include the preparation of the report and issuance of a Public Notice.

2.2.4.22. State Water Quality Certification

Certification will be obtained from the State of Alabama that the proposed navigation project enhancements would not be in violation of State water quality standards.

2.2.4.23. Section 103 Evaluation (Ocean Disposal)

As stated previously, it is assumed that a significant portion of the new work material will be placed in the Mobile ODMDS. To determine compliance with Section 103 of the MPRSA, an evaluation of the action against the criteria listed at Section 102 of the Act is required. To perform this evaluation, a determination of the suitability of the sediment for ocean disposal is required as well as concurrence from the EPA. This task will include some level of sediment testing of the new work material to ensure that it meets the ocean disposal criteria and will be conducted under contract.

2.2.4.24. Prepare 103 Evaluation

The Section 103 Evaluation is the vehicle for requesting concurrence from EPA under Section 102 of the MPRSA. This evaluation documents compliance with the criteria listed at Section 102. Included also is the requirement for Public Notice.

2.2.4.25. Coordinate with EPA

A letter requesting concurrence from the USEPA is required to finalize compliance with the requirements of the MPRSA.

2.2.4.26. Coastal Zone Management Consistency Determination Report

A Coastal Zone Management Consistency report will be prepared to document compliance with the State of Alabama coastal zone management practices and criteria. Since State water quality certification and coastal zone consistency are vested in the same agency in the State of Alabama some of the activities to determine consistency are included in the tasks above.

2.2.4.27. All Other Environmental Documents

This subtask includes determination of compliance with other applicable environmental laws and regulations not specifically mentioned above. Included in this task is an Air Conformity Determination as required by the Clean Air Act and compliance with applicable Executive Orders.

2.2.4.28. References.

References that will be used during the completion of work tasks include the following:

- ER 1105-2-100 Guidance for Conducting Civil Works Planning Studies
- National Environmental Policy Act of 1969 (NEPA)
- President's Council of Environmental Quality (CEQ) Rules and Regulations as defined and amended in 40 Code of Federal Regulations (CFR) Parts 1500-1508
- Endangered Species Act of 1973 (ESA)
- Clean Water Act (CWA)
- Clean Air Act (CAA),
- U.S. Fish and Wildlife Coordination Act (FWCA)
- Marine Protection Resources and Sediment Act (MPRSA)
- Coastal Zone Management Act (CZMA).

2.2.5. Cultural Resources Studies and Reports

All applicable existing cultural resource information from previous studies for the study area will be summarized during this task by a Mobile District Inland Environmental Team archaeologist and coordinated with the Alabama State Historical Preservation Officer (AL SHPO). Sediment placement alternatives not addressed as part of previous studies will require further investigation; however these efforts will be conducted during the PED phase of the project. Additional placement alternatives that may be considered include upland, open bay thin-layer disposal, as well as other potential beneficial use alternatives.

Reports of the cultural resource findings will be coordinated with the AL SHPO. Plans to avoid or conduct more intensive evaluations of any cultural resources identified during the assessment will be developed and coordinated with the AL SHPO for completion during PED.

The Inland Environment Team historic resources staff will provide the appropriate write ups for the draft and final documentation summarizing the results of the cultural resources assessment and coordination with the SHPO. If significant cultural resources are identified, a plan for public involvement must be developed and implemented that addresses concerns of the general public and Federally recognized Native Americans. The public involvement plan can be implemented within the time frame of the NEPA process.

References that will be used during the completion of work tasks include the following:

- ER 1105-2-100 - Guidance for Conducting Civil Works Planning Studies
- ER 1130-2-540 - Environmental Stewardship Operations and Maintenance Policies, Chapter 6 Historical Preservation
- EP 1130-2-540 - Environmental Stewardship and Maintenance Guidance and Procedures, Chapter 6 Historical Preservation
- The Antiquities Act of 1906, PL 59-209 (16 USC 431,432, 433)
- The Historic Sites Act of 1935, PL 74-292 (16 USC 461 *et seq.)*
- The Reservoir Salvage Act of 1960, PL 86-523 as mended by the Archeological and Historical Preservation Act of 1974
- The National Historic Preservation Act of 1966, PL 89-655 as amended including the National Historic
- National Environmental Policy Act of 1969, PL 91-190 (42 USC 4371 *et seq.)*
- The Archeological and Historic Preservation Act of 1974, PL 93-291 (16 USC 469-469c)
- The Archaeological Resources Protection Act of 1979, PL 96-95 (16 USC 470aa-470mm)
- American Indian Religious Freedom Act, PL 95-341 (42 USC 1996)
- Abandoned Shipwreck Act of 1987, PL 100-298 (43 USC 2101 *et seq.)*
- Native American Graves Protection and Repatriation Act (NAGPRA), PL 101-601 (25 USC §§3001-3013) Executive Order 11593
- Abandoned Shipwreck Act; Final Guidelines, Department of the Interior. Federal Register, Tuesday, December 4, 1990, Pages 50116-50145
- 32CFR229, Archaeological Resources Protection Act of 1979; Final Uniform
- Regulations

2.2.6. Public Involvement

2.2.6.1. Public Workshop

A project fact sheet will be prepared and provided to interested parties at the beginning of the study process to inform them of study initiation and request public input regarding their perception of proposed needs and concerns.

It is anticipated that a series of public workshops will be held during the study process; at least one to discuss the study initiation and a second to report on the initial findings of the GRR. Workshops will be held at appropriate locations within the project area to obtain input to and report the results of the plan formulation and decision making process. Methods that will be implemented to reach the general public and interested stakeholders will include but not limited to meeting announcements, news releases to local print and broadcast news media, internet, social media, and a web site. The estimated cost for this task includes newsletter production, reproduction, and distribution as well as labor and transportation expenses for the study team to attend the workshops. It is anticipated that Engineering Division study team members will attend one meeting, with the exception of the PA/E who, like the remaining team members, will attend both. The project study team and their respective contractor(s) will perform this task. The non-Federal sponsor will also attend the public workshops.

2.2.6.2. Public Input Report

Information provided by the public either by mail-in or at the workshops will be collected and assembled and included as an Appendix within the GRR.

2.2.7. Plan Formulation and Evaluation

The senior planner will lead the study team and coordinate the plan formulation process. Management of the plan formulation effort will include such activities as planning team meetings, upward reporting, preparation of study management documents, project coordination, and integration of all technical investigations.

The GRR study will follow an approach that emphasizes risk-based decision-making and early vertical team engagement. This process will also recognize the guidance provided in ER 1105-2-100. During the study, the PDT will use the six planning steps set forth in the Water Resource Council's Principles and Guidelines to focus the planning effort to select a plan for recommendation. In general, steps in the plan formulation process will include:

- Identifying the specific problems and opportunities that will be addressed in the study, discussing and documenting the causes of the problems. Planning goals will be set, objectives will be established, and constraints will be identified.
- Identifying, analyzing, and forecasting existing and future without project conditions. The existing condition of resources, problems and opportunities critical to plan formulation, impact assessment, and evaluation will be characterized and documented.

- The PDT will formulate alternative plans that address the planning objectives. An initial set of alternatives will be developed and will be evaluated in order to identify the NED Plan.
- Evaluating alternative plans for effectiveness, efficiency, completeness and acceptability. The impacts of alternative plans will be evaluated using the system of accounts framework (NED, EQ, RED, OSE) specified in the Principles and Guidelines and ER 1105-2-100.
- Comparing alternative plans. A benefit-cost analysis will be conducted to prioritize and rank the navigation alternatives and to identify the NED Plan (plan with the greatest net economic benefit consistent with protecting the Nation's environment). The public involvement program will be used to obtain public input to the alternative evaluation process.
- Selecting a plan for recommendation. Justification for plan selection will be prepared.

The following tasks will be completed by PD's senior planner and the non-Federal sponsor's study coordinator.

2.2.7.1. Plan Formulation Management and Report

A senior planner will be assigned from PD to lead the plan formulation effort. The non-Federal sponsor will also assign a study coordinator to work with the Corps' senior planner and coordinate plan formulation effort. The senior planner and non-Federal study coordinator will lead in this effort and coordinate the plan formulation process. Management of the plan formulation effort will include such activities as PDT meetings, preparation of plan formulation documents, coordination with the non-Federal sponsor and other agencies, and integration of all technical investigations.

The senior planner will summarize the results of the technical studies leading to plan selection the GRR. The GRR will document the alternative formulation, evaluation and selection process that was used to identify the NED Plan. The costs and benefits and environmental and hydraulic impacts presented in the report will be developed at the feasibility level of detail.

The annual and periodic activities and responsibilities for operating and maintaining the completed project will be described in the GRR, including environmental mitigation sites if required. The magnitude of these activities will be described for the alternative recommended for implementation. All operation and maintenance requirements will be clearly described so that the non-Federal sponsor will be aware of its future operation and maintenance (O&M) responsibilities.

Management of the plan formulation process and preparation of the GRR will be performed by PD and the non-Federal sponsor. Locally preferred plans will also be evaluated, if different from the NED Plan. Specific phases of the plan formulation process and how they are conducted are listed below.

2.2.7.1.1. Scoping

The senior planner will lead the PDT during the Scoping Phase in identifying and screening project alternatives. Based on review of existing data, reconnaissance, and input from resource agencies,

the public and others, the PDT will identify a range of likely measures that can be potential alternatives, develop concept level designs and reconnaissance level cost estimates, and a preliminary benefit-cost analysis of alternatives. This information will be used to screen alternatives to develop an array of alternatives to be presented to the Vertical Team for concurrence for further detailed analysis leading to the development of a TSP. The preliminary set of formulated plans will include a no-action alternative. The formulation of alternatives task will be performed by PD and the non-Federal sponsor.

2.2.7.1.2. Alternative Formulation and Analysis.

The senior planner will lead the PDT in the analysis of the array of alternatives developed during the Scoping Process. The study will consider technical feasibility, economic feasibility, environmental impact, real estate acquisition, and views of the public. Performance of the alternatives will be assessed to identify the NED Plan and satisfy NEPA. The plan that most effectively satisfies the project objectives for NED and NEPA will be designated the TSP. Work during this phase will be performed by PD and the non-Federal sponsor.

2.2.7.1.3. Feasibility-Level Analysis.

The senior planner will lead the PDT in conducting additional design of the recommended plan to reduce risk and uncertainty with more detailed cost data, engineering effectiveness, environmental impacts, and economic benefits. Work during this phase will be performed by the PDT and the non-Federal sponsor.

2.2.8. Report Preparation

2.2.8.1. Draft Report Documentation.

A draft GRR will be prepared following SMART Planning Milestones and the guidance contained in ER 1105-2-100. Detailed appendices will be prepared that document the results of the technical analyses. The contents of the draft feasibility report are summarized below:

- Concise main report summarizing the study's technical findings, conclusions and recommendations;
- A draft NEPA document;
- Technical appendices presenting the detailed background, justification and results of individual work tasks;
- Other supporting documentation, including the project management plan (PMP).

2.2.8.2. Draft GRR and NEPA Document.

Preparation of the draft GRR includes assembling, writing, editing, typing, drafting, reviewing, reproducing and distributing the draft GRR, draft NEPA document and other related documentation required for public and agency review. The draft GRR and draft NEPA

document will be prepared by the Mobile District's Planning and Environmental Division. The costs of preparing the draft NEPA document and technical appendices are included under other Sub-Products. Preparation of the draft GRR will be performed by the Mobile District's Planning and Environmental Division.

2.2.8.3. Public Review Comments and Responses.

This task involves reviewing and preparing responses to letters received from agencies and the public in response to the draft feasibility report and draft NEPA document. Responses to the comments will be included in the final feasibility report and final NEPA document. This task will be performed by the Mobile District's Planning and Environmental Division.

2.2.8.4. Final GRR Documentation.

The final GRR will incorporate comments from agencies, the public and higher authority review. The steps in producing a final GRR include the following:

- Finalize draft GRR for internal/non-Federal sponsor review;
- Conduct review board meetings;
- Revise the draft GRR in response to HQUSACE comments;
- Modify the draft GRR in response to comments received during the agency and public comment period;
- Coordinate with the non-Federal sponsor and internal Mobile District elements; and
- Reproduce and distribute the final GRR.

2.2.8.5. Final GRR and NEPA Document.

The final GRR and final NEPA document will be prepared by the Mobile District's Planning and Environmental Division. The costs of preparing the final NEPA document and the technical appendices are included under other Sub-Products.

2.2.9. District Quality Control/Agency Technical Review/Independent External Peer Review/Value Engineering and Policy Review.

The purpose of technical review is to ensure execution of a technically sound study according to its authorization and existing USACE policies and guidance. District Quality Control will involve a District technical review team that meets at critical checkpoints throughout the study to review the work of the study's development team to confirm that proper criteria, regulations, laws, codes, principles and professional procedures have been followed. The South Atlantic Division Technical Quality Control Guidelines require a technical review support document be signed by the technical review team members.

All Civil Works decision and implementation documents must undergo Agency Technical Review (ATR) to be conducted through the DDNPCX to confirm quality and credibility with

regard to USACE guidance, policy, and technical analyses. The ATR team will consist of professionals experienced in disciplines relevant to the technical areas addressed in the study that are external to the Mobile District. The ATR will be conducted on the draft GRR and draft NEPA document and on the final GRR and final NEPA document.

During a period of potential opportunity of the General Reevaluation Report, the value officer will conduct a value engineering study. A presentation and written report will be prepared for the final decision. Coordination between various disciplines of Engineering Division, Planning Division, Operations Division, and Project Management will be required.

If needed, an Independent External Peer Review (IEPR) is the vehicle by which the draft GRR, design, construction and safety issues are evaluated. The National Deep Draft Navigation Planning Center of Expertise (DDNPCX) will be responsible for contracting an objective, qualified panel from qualified professionals external to the Corps of Engineers. The IEPR panel should ensure that the interpretations, analysis, and conclusions are reasonable and scientifically sound.

2.2.10. Management Documents

This sub-product includes all documents related to the management of the General Reevaluation Report, including A-E contract administration and in-house control.

2.2.10.1. A-E Contract Documents

This activity includes the preparation, negotiation, and award of contract administration documents required when utilizing of A-E Contractors to complete or assist in the completion of feasibility phase products.

2.2.10.2. Study Funds Control Documents

This task includes preparation and management of internal funds control documents for the allocation and management of the General Reevaluation Report. The Mobile District PM is responsible for managing the overall study cost and schedule; preparing present and future budget year submissions and financial reports; and conducting fiscal coordination with the non-Federal sponsor.

The non-Federal sponsor will appoint a representative to assist in project management. The Mobile District PM, with assistance by the non-Federal sponsor's PM, will: monitor expenditures, keep the PMP current, prepare project management reports, and report study status and issues to the Executive Committee. The project management structure will continue into the P&S phase. Updates of the PMP will include monthly finance and accounting reports regarding expenditures and obligations, executive summary reports for the Project Review Board (PRB), schedule and cost changes, and changes to work elements.

At the end of the study a final audit will be performed. Preparation of the sponsor's letter of intent and participation in the P&S and construction phases will be also be prepared under this task.

2.2.10.3. Trip Reports

Written trip reports will be prepared to document study area visits and meetings with the non-Federal sponsor; reports will also be prepared for any other trip that affects the scope, cost or schedule of the General Reevaluation Report or the project.

2.2.10.4. Coordination Documents

This major task includes the following items: copies of letters exchanged with the local sponsor that affect study costs; scopes and/or schedules; official correspondence with higher authority on similar subjects; internal memoranda which bear on significant study elements; and any other correspondence that affects significant aspects of the study. The Mobile District's Programs and Project Management Division will perform this task.

2.2.10.5. Minutes of Technical Review Conference

This major task is to provide minutes of the final technical review. Mobile District's Programs and Project Management Division will perform this task.

2.2.10.6. Planning Study Management

Tasks include all activities of the Senior Planner related to the management of the study such as scheduling, coordination, budget preparation, and correspondence and other "daily housekeeping" activities required to manage the production of the GRR. This includes tracking funds issued for the GRR, initiated by the Senior Planner as needed; arranging for and attendance at the Alternatives Formulation Briefing (AFB); AFB Memo by CESAD (senior planner responsible for disseminating this document to the study team and coordinating responses if necessary); CESAD review of draft GRR with senior planner being responsible for dissemination to the study team, incorporation of any comments on this document and coordinating responses if necessary; and the Division Commander's Notice. Work effort for this subaccount assumes a minimum of quarterly meetings of the District Commander and the local sponsor, meeting with the ATR team as well as monthly progress reports and numerous meetings between the Corps' senior planner and the sponsor's counterparts.

2.2.10.7. Engineering Management

The EN Project Architect/Engineer (PAE) will be responsible for managing the EN contribution to the GRR. This includes coordinating with the Project Manager and Senior Planner regarding the status of engineering work efforts. Specific duties of the PAE also include providing quality assurance, resolving technical issues, ensuring products are delivered in a timely manner,

providing appropriate technical representation and participation in study team meetings, managing the EN portion of the project budget and schedule, chairing EN team meetings, and reporting on the status of the EN portion of the study. The PAE will compile all text, cost estimates, drawings, tables, charts, and figures for the draft and final engineering appendices. This activity also includes supervision and computer costs within EN. This task will extend over the duration of all activities required for completion of the engineering appendix.

2.2.10.8. Program Management

This task involves work performed by the Civil Works Programs and Project Management section. Work includes the preparation, review and submission of annual budget documents, preparation of annual work allowances and the processing of other work orders relating to the financial management of the study.

2.2.10.9. Project Management

This sub-account includes costs for overall tracking of the study progress and its funding by the Project Manager. The Project Manager is the single point of contact between the Corps and the local sponsor, as well as Congress and higher headquarters elements. Work effort for this sub-account assumes a minimum of quarterly meetings with the District Commander and the local sponsor, meetings with the ATR team, as well as numerous meetings between the Corps' Project Manager, the local sponsor, and project stakeholders. Effort is assumed to include attendance by senior level management at meetings with the local sponsor as well as for public meetings and the Alternatives Formulation briefing. This sub-account also includes funds for the technical review of products and the draft report, as well as for development of the Project Cooperation Agreement.

2.2.10.10. Sponsor Management/Coordination

Credit for GRR coordination team activities will be provided to non-Federal sponsors. In accordance with the amendment to the Design Agreement, the Government shall afford credit, toward the share of total project costs for the Project that is required of the Port Authority during the GRR, for the Non-Federal Sponsors 50 percent share of total design costs.

2.2.10.11. Reference to Statutes, Regulations, and Guidance

Following is a list of statutes, regulations, Corps guidance, and other source materials that will be referred to during the General Reevaluation Report to guide completion of General Reevaluation Report tasks. Table 3 provides a summary of the acronyms and subject matter of various types of guidance. This table was extracted from the U.S. Army Corps of Engineers IWR Report 96-R-21, Planning Manual, November 1996.

Table 3: Source Material and Acronyms	
Acronym	**Source Material**
AR	Army Regulation
ASPA	Alabama State Port Authority
EC	Engineering Circular
EI	Engineering Instructions
EM	Engineering Manual
EP	Engineering Pamphlet
OM	Office Memorandum
PGL	Planning Guidance Letter
TL	Technical Letter
1105	Planning
1110	Engineering
1120	Construction - Operations
1130	Construction - Operations
1140	Construction - Operations
1165	Policy

The principal ER which guides the Corps of Engineers planning process is ER 1105-2-100, revised. Appendix A of ER 1105-2-100 contains references to the applicable statutes, public laws, executive orders, and engineering regulations that guide preparation of General Reevaluation Reports.

Additional references that will be utilized during the completion of work tasks, include:

CEAO-I Memorandum, dated 10 August 1988, Subject: HQUSACE Internal Review Guides - Compliance with General Reevaluation Report Guidance

CECW-A Policy Memorandum, Implementation of New Technical and Policy Review Procedures, 14 April 95, U.S. Army Corps of Engineers

CECW-A Policy Memorandum No. 2, Civil Works Decision Document Review - Review Compliance, 6 April 95, U.S. Army Corps of Engineers

CECW-PE, Planning Guidance Letter 97-10, Shortening the Planning Process, 26 March 1997, U.S. Army Corps of Engineers

CECW-PE, Planning Guidance Letter 97-06, Cruise Ships and Benefits to Navigation, 7 July 1997, U.S. Army Corps of Engineers

CECW-PD, Economic Guidance Memorandum 11-04, Deep Draft Vessel Operating Costs, 18 February 2011 , U.S. Army Corps of Engineers

EC 1105-2-208, Preparation and Use of Project Management Plans, 23 December 1994, U.S. Army Corps of Engineers

EC 1165-2-203, Technical and Policy Compliance Review, 15 October 1996, U.S. Army Corps of Engineers

EC 1165-2-214, Civil Works Review, 12 December 2012, U.S. Army Corps of Engineers

EM 1110-1-1003, NAVSTAR Global Positioning System Surveying, 1 August 1996, U.S. Army Corps of Engineers

EM 1110-1-1005, Topographic Surveying, 31 August 1994, U.S. Army Corps of Engineers

EM 1110-1-1802, Geophysical Exploration for Engineering and Environmental Investigations, 31 August 1995, U.S. Army Corps of Engineers

EM 1110-1-1904, Settlement Analysis, 30 September 1990, U.S. Army Corps of Engineers

EM 1110-1-1905, Bearing Capacity of Soils, 30 October 1992, U.S. Army Corps of Engineers

EM 1110-1-1906, Soil Sampling, 30 September 1996, U.S. Army Corps of Engineers

EM 1110-2-6058, Engineering & Design: Construction Cost Estimating Guide for Civil Works, 30 September 2008, U.S. Army Corps of Engineers

EP 715-1-4, Architect-Engineer Contracts, 10 November 1997, U.S. Army Corps of Engineers

EP 1110-1-8, Construction Equipment Ownership and Operation Expense Schedule, 30 June 1999, U.S. Army Corps of Engineers

EP 1165-2-1, Digest of Water Resource Policies and Authorities, 15 February 1996 (updated annually), U.S. Army Corps of Engineers

ER 5-1-11, Program and Project Management, 27 February 1998, U.S. Army Corps of Engineers

ER 11-1-321, Value Engineering, Change 1, 1 Jan 2011, U.S. Army Corps of Engineers

ER 220-2-2, Procedures for Implementing NEPA, (33 CFR 230), 4 March 1988, U.S. Army Corps of Engineers

ER 405-1-12 (Chapter 12), Real Estate Handbook - Local Cooperation, 28 May 1991, U.S. Army Corps of Engineers

ER 715-1-16, Selection of Architect-Engineer Firms, 3 March 1995, U.S. Army Corps of Engineers

ER 715-1-20, Architect-Engineer Contracting, 21 March 1997, U.S. Army Corps of Engineers

ER 1105-2-100, Planning Guidance Notebook, 22 April 2000, U.S. Army Corps of Engineers

ER 1110-1-12, Quality Management, 1 June 1993, U.S. Army Corps of Engineers

ER 1110-1-1300, Cost Engineering Policy and General Requirements, 26 March 1993, U.S. Army Corps of Engineers

ER 1110-1-8156, Policies, Guidance, and Requirements for Geospatial Data and Systems, 1 August 1996, U.S. Army Corps of Engineers

ER 1110-2-401, Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual for Projects and Separable Elements Managed by Project Sponsors, 30 September 1994, U.S. Army Corps of Engineers

ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 March 1994, U.S. Army Corps of Engineers

ER 1110-2-1302, Civil Works Cost Engineering, ENG 1738-R, ENG 1739-R, ENG 1740-R, ENG 1741-R, ENG 1741A-R, ENG 1741B-R, ENG 1741C-R, 31 March 1994, U.S. Army Corps of Engineers

ER 1110-2-1404, Hydraulic Design of Deep Draft Navigation Projects, 31 January 1996, U.S. Army Corps of Engineers

ER 1165-2-131, Local Cooperation Agreements for New Start Construction Projects, 15 April 1989, U.S. Army Corps of Engineers

ER 1165-2-132, Hazardous, Toxic and Radioactive Waste (HTRW) Guidance for Civil Works Projects, 26 June 1992, U.S. Army Corps of Engineers

Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, 10 March 1983, U.S. Water Resources Council

Planning Bulletin 2012-2: Planning SMART Guide. 04 March 2014, U.S. Army Corps of Engineers

Planning Bulletin 2012-03: SMART Planning Milestones, 14 March 2014, U.S. Army Corps of Engineers

Planning Bulletin 2014-02: Application and Compliance of SMART Planning and the 3x3x3 Rule, 14 March 2014, U.S. Army Corps of Engineers

3. ORGANIZATIONAL BREAKDOWN STRUCTURE (OBS)

The OBS identifies which organization has responsibility or input for completing each General Reevaluation Report task. In addition to identifying task responsibilities, this section includes mechanisms for ensuring proper coordination among Federal and non-Federal study team members.

3.1. Organizational Work Responsibilities

The OBS describes the responsibility of each organization in providing input to and/or completing tasks identified in the PMP and CWBS. The following paragraphs identify the management and technical responsibilities for the study. Two levels of management responsibility will be used to guide development of the study: the executive committee and the study management team. Responsibilities for performing General Reevaluation Report technical investigations are identified following the description of the management structure.

3.1.1. Executive Committee

Management of the overall study is the responsibility of the executive committee, which will be comprised of the Chief of Planning and Environmental Division, Mobile District, and the non-Federal sponsor. The executive committee will review study progress, finances, and findings as developed and reported by the study team. The representative for the non-Federal sponsor, the Alabama State Port Authority, will be an equal partner with the Corps' representative on the executive committee. The executive committee will maintain a working knowledge of the General Reevaluation Report; assist in resolving emerging policy issues; ensure that evolving study results and policies are consistent and coordinated; direct the study management team; and review and approve decisions made by the study management team.

The executive committee will participate in issue resolution conferences (IRCs), if applicable. The committee is also responsible for resolving any disputes that are not resolved by the study team that may arise during the study. The committee will agree on solutions and study direction, which could include study termination.

The executive committee is responsible for decisions on whether to suspend or terminate the study. They will appoint representatives from their respective organizations to serve on the study management team.

3.1.2. Study Management Team

The study management team will include representatives from the Alabama State Port Authority, the Corps (the senior planner and the Chief, Plan Formulation Branch), and other agencies, as appropriate. This team will ensure appropriate scopes of services for technical studies, guide their accomplishment, and participate in plan formulation and selection of potential alternatives. The team will be directly involved in establishing mutual roles for the study team members and in focusing feasibility investigations on the critical issues. The team

will recommend to the executive committee the tasks to be conducted and the extent of planning and evaluation to be carried out in the feasibility phase. The team will also report to the executive committee on the results of studies and recommend alternative courses of action for project implementation. Study management team conference calls will be held at approximately one-month intervals throughout the study process, but may occur more frequently as necessitated by critical decision points.

3.1.3. Programs and Project Management Division

The Mobile District Programs and Project Management Division will assign a PM to be responsible for reporting to the PRB and to prepare required upward reporting. In addition, the PM will be responsible for monitoring project schedules and finances, processing Schedule and Cost Change Requests (SCCRs), reviewing budget documents, coordinating preparation of the amendment to the Design Agreement, and identifying and resolving problems and issues.

3.1.4. Planning and Environmental Division

A senior planner will be assigned from the Mobile District Plan Formulation Branch. The senior planner will be responsible for performing study management activities, including: leading the study team, plan formulation, public involvement, monitoring the progress of technical work, and developing and preparing the General Reevaluation Report. An Economic Analysis Team member will be responsible for preparing the commodity forecast, the vessel/fleet forecast and determining the National Economic Development benefits of the proposed project. They will also develop economic data and demographic information, as well as the socioeconomic analysis. The Coastal Environment Team will be responsible for assessing cultural resource impacts, environmental impacts, and accomplishing NEPA compliance activities.

3.1.5. Engineering Division

The Engineering Division PAE will be responsible for managing Engineering Division's contribution to the General Reevaluation Report. The Hydrology and Hydraulics Branch will conduct and/or manage the coastal analyses and modeling studies. The Geotechnical, Environmental, and HTRW Branch will be responsible for subsurface and HTRW investigations. The Cost Engineering Branch will be responsible for developing cost estimates for initial construction and operation and maintenance of alternative plans, the NED plan, and the recommended plan, if different from the NED plan.

3.1.6. Operations Division

A team member will be assigned from Operations Division. The Operations team member will be responsible for obtaining the channel survey and reviewing the proposed plans to insure that they are practical and can be implemented.

3.1.7. Real Estate Division

The Real Estate Specialist will be responsible for performing all required real estate activities, such as, ensuring all lands, easements, and rights-of-way are provided for the project including all real estate analyses for facility/utility relocations, disposal areas/beneficial use sites, and potential mitigation requirements.

3.1.8. Non-Federal Sponsor

To ensure concurrence with project findings, the non-Federal sponsor may be involved in all aspects of the General Reevaluation Report. The non-Federal sponsor may attend progress meetings and public workshops; provide scientific/technical input to field studies; participate in the plan formulation process; assist in the development of recommended plans; and review study products.

3.1.9. Other Study Participants

Numerous agencies/organizations will be consulted throughout the study for their input.

3.2. Description of Coordination Mechanisms

Successful completion of the Mobile Harbor General Reevaluation Report will require input from numerous work elements, the sponsor, and other external organizations, such as consultants and government agencies. Proper coordination among these study participants is essential to maintain the project schedule, to avoid duplication of efforts, to detect problems in a timely manner, and to maintain agreement and cooperation on the direction of the study. The formal coordination mechanisms that will be utilized are described below.

3.2.1. Internal Coordination Mechanisms

Internal coordination mechanisms will be used to ensure that effective internal command, control, and coordination are maintained during the General Reevaluation Report. The primary internal coordination mechanisms will be the monthly PRB meetings, monthly study management team conference calls, and the identified independent technical reviews. An earned value analysis will also be accomplished on a monthly basis. The purpose of the analysis is to assess actual study progress against scheduled progress in regards to both cost and schedule. This analysis also will indicate cost and schedule variances.

An annual work plan that is based on the PMP and reflects anticipated funding levels and work efforts will also be developed. The District PRB will review the monthly project executive summary (PES) report for compliance with the PMP and provide comments to SAD and the project manager. The plan will include reports on study progress to date, a schedule for the efforts planned for the coming year, specific work tasks required to complete investigations, estimates of

costs from each work group, and other pertinent information. The executive committee will approve annual work plans.

3.2.2. External Coordination Mechanisms

Study coordination outside the Corps and non-Federal sponsor will be necessary to ensure the success of the General Reevaluation Report. External agency counterparts for work efforts include but are not limited to the EPA, Advisory Council on Historic Preservation (ACHP), USFWS, SHPO, U.S. Coast Guard, MARAD, USGS, and the State of Alabama.

3.2.3. Public Workshop

A Public workshop may be scheduled at the beginning of the study process to gather input. The study's senior planner and the non-Federal sponsor will arrange for and report on this gathering.

3.2.4. Study Briefings and Fact Sheets

As appropriate, study briefings will be provided and fact sheets prepared for congressional representatives, state and local officials, and others.

3.3. Development of Resource Codes

A set of resource codes has been developed for accounting and administrative purposes. The resource codes presented in Table 4 include abbreviations for the names of the technical elements responsible for conducting General Reevaluation Report tasks.

Table 4: Resource Codes

Resource Code	District	Technical Element / Resource Code Description
PM	**SAM**	**Programs & Project Management Division**
PD	**Regional**	**Planning and Environmental Division**
PD-FP	SAJ	Senior Planner
PD-FE	DDNPCX	Economist
PD-EC / PM-PL	SAM / SAC	Coastal Environmental Specialist
EN	**Regional**	**Engineering Division**
EN-E / EN-D	SAM / SAC	Cost Engineer
EN-HH	SAM / ERDC	Coastal / Hydraulic Engineer
EN-GG / ECP-EG	SAM / SAW	Geotechnical Engineer
OP	**SAM**	**Operations Division**
RE	**SAM / SAS**	**Real Estate Division**
OC	**SAM**	**Office of Counsel**

4. GENERAL REEVALUATION REPORT SCHEDULE AND COST ESTIMATE

The General Reevaluation Report schedule defines the schedule for completion of major milestones and tasks and is used to monitor the progress of the General Reevaluation Report. It includes all critical study tasks and their associated costs, key decision points, reviews, and critical meetings.

4.1. Cost and Timeline for Work Activities

The following Spreadsheet presents the cost and schedule for the Mobile Harbor General Reevaluation Report. The chart provides a visual representation of when the tasks begin, the associated costs by discipline, milestone dates, and a timeline for work activities. Each major task is listed, along with its start date, finish date, and duration in days.

MICROSOFT EXCEL
BUDGET AND SCHEDULE ATTACHMENT

MOBILE HARBOR GRR SCHEDULE - Risk Buy-Down Plan

Date: 17 November 2015

	Task	Duration (calendar days)	Start Date	End Date	Predecessors	FY	Initial	Proj Manager PM	Eng Supp EN-DW	Eng - Geo EN-GG	Cost Eng EN-E	Eng Coastal EN-HH	Eng PAE/Supervision/CADD EN-H	Eng Contract EN Contract	Legal OC	Contracting CT	Economics PD-D	Plan Enviro PD-EC	Archeology PD-EI	Plan Form PD-FP	PD Contract PD Contract	Operations OP	Real Estate RE	Reviews	Printing	Total	Notes	FY Totals
	FY14 ACTIONS																										
1	Scoping funds received	0	10-Nov-14	10-Nov-14		15	$250,000																		$250,000		
2	Charrette Meeting	1	28-Jan-14	29-Jan-14		15																			$0		
3	3x3 Compliance - Create draft PMP, review plan, budget, schedule, risk register, draft Agreement	171	11-Nov-14	1-May-15	1	15																			$0		
4	**Finalize & Execute Amendment to Design Agreement**	222	1-Apr-15	9-Nov-15	3	15																			$0	**Agreement Milestone**	**$250,000**
5	Obtain and set-up Sponsor Funds	21	10-Nov-15	1-Dec-15	4	16																			$0		
6	Prepare for NEPA/Scoping Meeting	14	2-Dec-15	16-Dec-15	5	16		$4,000	$5,000	$4,000		$4,000	$1,950		$2,000	$ 5,000	$1,000	$4,000		$4,000	$20,000	$2,000	$2,000			$58,950	**PD contract cost includes facilitator**	
7	NEPA/Scoping Meeting	7	19-Dec-15	26-Dec-15	6	16		$4,000		$4,000		$4,000	$1,200		$2,000		$1,000	$4,000		$4,000	$20,000	$2,000	$2,000			$48,200	**PD contract cost includes facilitator**	
8	Identify Problems and Opportunities and objectives/constraints	14	2-Dec-15	16-Dec-15	5	16		$4,000		$6,000	$2,000	$5,000	$1,950					$4,000		$5,000	$2,000	$500	$1,000			$31,450		
9	Determine Existing and baseline condition	75	19-Dec-15	3-Mar-16	8	16											$48,000									$48,000		
10	Develop SOW for Bathymetric Surveys	30	2-Dec-15	1-Jan-16	5	16		$2,500				$5,000	$750									$2,500				$10,750		
11	Develop SOW for Wave and Current Data Collection	30	2-Dec-15	1-Jan-16	5	16		$2,500				$5,000	$750													$8,250		
12	Collect Automatic Identification System (AIS) data from the Coast Guard	90	2-Dec-15	1-Mar-16	5	16						$7,500	$1,125	$0												$8,625		
13	Initiate development of SEIS and 404(b)(1) Eval	30	2-Dec-15	1-Jan-16	5	16												$10,000								$10,000		
14	Request Fish and Wildlife Coordination Act report	90	2-Dec-15	1-Mar-16	5	16												$6,000			$25,000					$31,000	**PD Contract is for FWS fees**	
15	Preliminary Formulation and Screening (incl NEPA scoping)	45	2-Dec-15	16-Jan-16	5	16		$35,000		$15,000	$15,000	$15,000	$6,750				$5,000	$10,000		$35,000	$10,000	$10,000	$8,000			$164,750		
16	In-Progress Review Meeting	1	17-Jan-16	18-Jan-16	15	16		$1,000		$1,000	$1,000	$1,000	$500				$1,000	$1,000		$2,000	$1,000	$500	$1,000			$11,000		
17	Prepare read-ahead package (update risk reg, DMP, report syn.) & submit to vertical team	21	17-Jan-16	7-Feb-16	15	16		$25,000		$5,000	$5,000	$5,000	$2,250		$5,000		$2,000	$2,500		$25,000	$10,000	$2,500	$2,500			$91,750		
18	Vertical team review of AM materials	7	8-Feb-16	15-Feb-16	17	16																			$0		
19	Alternatives Milestone Meeting	0	16-Feb-16	16-Feb-16	18	16		$2,000		$1,000		$1,000	$1,000					$1,000					$1,000		$7,000		
20	**Alternatives Milestone**	0	17-Feb-16	17-Feb-16	19	16																			$0	**Alternative Milestone**	**$529,725**
21	Alternatives Milestone Memorandum for Record	14	17-Feb-16	1-Mar-16	19	16		$2,000		$1,000		$1,000						$1,000					$1,000		$6,000		
22	Bathymetric Survey Complete	60	2-Jan-16	2-Mar-16	10	16						$3,750	$1,000									$75,000			$79,750		
23	Preliminary Real Estate Evaluation	90	20-Feb-16	20-May-16	20	16																	$18,000		$18,000		
24	Preliminary coordination with Resource Agencies (BA, T & ES, EFH, etc.)	365	2-Jan-16	1-Jan-17	13	16												$74,000							$74,000		
25	Archeological / Cultural Resources Evaluation	90	2-Jan-16	1-Apr-16	13	16													$60,000						$60,000		
26	Analyse disposal / beneficial use alternatives	90	2-Jan-16	1-Apr-16	13	16		$35,000		$15,000	$15,000	$15,000	$15,000					$15,000		$25,000		$5,000	$5,000			$145,000		
27	Wave and Current data collection complete	70	2-Jan-16	12-Mar-16	11	16						$9,825	$35,000	$196,500				$7,500								$248,825		
28	Existing condition hydrodynamic modeling (incl. wave modeling)	140	13-Mar-16	31-Jul-16	27	16						$8,000	$10,000	$60,000												$78,000		
29	Existing condition Sediment Transport modeling (Estuarine and Coastal)	70	1-Aug-16	10-Oct-16	28	16						$11,800	$25,000	$136,000												$172,800		
30	Existing condition water quality modeling	160	1-Aug-16	8-Jan-17	28	16						$13,300	$25,000	$166,000												$204,300		
31	Existing Condition Wave and Vessel Impact Analysis	90	2-Mar-16	31-May-16	12	16						$35,000	$20,000	$0												$55,000		
32	In-Progress Review Meeting	1	9-Jan-17	10-Jan-17	30	16		$2,000		$1,000	$1,000	$1,000	$1,000					$1,000		$2,000	$1,000	$500	$1,000			$11,500		
33	Future Without Project Condition hydrodynamic modeling	60	1-Aug-16	30-Sep-16	28	16						$2,400	$7,500	$48,000												$57,900		
34	Future Without Project Condition Sediment Transport modeling (Estuarine and Coastal)	45	1-Oct-16	15-Nov-16	33	16						$3,000	$10,000	$60,000												$73,000		
35	Future Without Project Condition water quality modeling	45	9-Jan-17	23-Feb-17	30	16						$1,550	$5,000	$31,000												$37,550		
36	Future Without Wave and Vessel Impact Analysis	90	1-Jun-16	30-Aug-16	31	16						$35,000	$5,000	$0												$40,000		
37	Develop commodity forecast	90	5-Mar-16	3-Jun-16	9	16											$40,000				$50,000					$90,000	**PD Contract cost includes commodity forecast contract**	
38	Develop Fleet Forecast	150	4-Jun-16	1-Nov-16	37	16											$80,000				$50,000					$130,000	**PD Contract cost includes commodity forecast contract**	
39	Build HarborSym Model	75	2-Nov-16	16-Jan-17	38	16/17											$40,000									$40,000	**FY16:**	**$2,151,350**
40	Develop ROM & Construction Costs for HarborSym Alternatives	90	2-Nov-16	31-Jan-17	38	16/17					$20,000		$3,750	$5,000												$28,750	**EN Contract cost is for Walla Walla Review of ROM costs**	
41	Analyze and compare future "with" & "without" Project Conditions	60	17-Jan-17	18-Mar-17	39	17		$10,000					$1,000				$40,000									$51,000		
42	Intermediate Review and Screening of Alternatives	30	19-Mar-17	18-Apr-17	41	17		$35,000		$15,000	$15,000	$15,000	$12,000				$5,000			$25,000	$30,000	$3,000	$4,000			$159,000		
43	In-Progress Review Meeting	1	19-Apr-17	20-Apr-17	42	17		$2,000		$1,000	$1,000	$1,000	$500				$1,000	$1,000		$2,000	$1,000	$500	$1,000			$12,000		
44	Geotechnical Investigation	90	19-Apr-17	18-Jul-17	42	17			$5,000	$10,000			$30,000	$177,000		$5,000										$227,000	**EN Contract cost is for Core drill**	
45	Sediment Testing data collection	120	19-Apr-17	17-Aug-17	42	17												$5,000			$500,000					$505,000		
46	Results of sediment testing complete	120	19-Aug-17	17-Dec-17	45	17												$5,000								$5,000		
47	Develop Hydrodynamics for Shipsym	120	2-Nov-16	2-Mar-17	38	17						$8,750	$27,500	$175,000												$211,250		
48	On-site Ship Simulation Testing	30	4-Mar-17	3-Apr-17	47	17						$2,500	$8,000	$50,000												$60,500		
49	Ship Simulation Report Complete	60	4-Apr-17	3-Jun-17	48	17						$7,500	$25,000	$150,000												$182,500		
50	Vertical Ship Motion Analysis Using CADET	60	18-Jan-17	19-Mar-17	47	17						$40,000	$6,000													$46,000		
51	Alternative Model Run (NED) - Hydrodynamics	60	19-Apr-17	18-Jun-17	42	17							$7,200	$48,000												$55,200		
52	Alternative Model Run (NED) - Water quality modeling	40	19-Jun-17	29-Jul-17	51	17						$1,550	$4,883	$31,000				$5,000								$42,433		
53	Alternative Model Run (NED) - Sediment transport modeling (Estaurine & Coastal)	40	19-Jun-17	29-Jul-17	51	17						$3,000	$9,450	$60,000		$10,000										$82,450		
54	Habitat Impact Assessment	60	30-Jul-17	28-Sep-17	53	18												$10,000								$10,000		
55	Mitigation evaluation (coord. with resource agencies)	60	30-Jul-17	28-Sep-17	53	18												$10,000								$10,000		
56	Disposal area LTFATE/STFATE modeling (ODMDS)	70	19-Jun-17	28-Aug-17	51	17						$20,000	$15,000	$61,000				$5,000								$101,000		
57	Prepare Modeling Report	30	30-Jul-17	29-Aug-17	53	17						$10,000	$9,000	$50,000												$69,000		
58	Alternative Model Run (NED) - Wave and vessel wake impact analysis	90	2-Nov-16	31-Jan-17	38	17						$60,000	$25,000	$0												$85,000		
59	Preliminary design of Alternative Plans	30	30-Sep-17	30-Oct-17	55	17		$35,000		$15,000	$10,000	$40,000	$20,000				$4,500	$40,000		$40,000	$5,000	$5,000	$8,000			$222,500	**FY17:**	**$2,165,583**
60	Final Screening of Alternatives to final array	90	31-Oct-17	29-Jan-18	59	18		$35,000		$15,000	$10,000	$15,000	$6,000				$4,000	$15,000		$35,000	$5,000	$5,000	$4,000			$149,000		
61	Evaluation of final array	30	30-Jan-18	1-Mar-18	60	18		$35,000		$10,000	$10,000	$15,000	$9,000	$25,000			$4,000	$15,000		$40,000	$2,500	$5,000	$5,000			$175,500	**EN Contract cost is for MCX**	
62	In-Progress Review Meeting	1	3-Mar-18	4-Mar-18	61	18		$2,000		$1,000	$1,000	$1,000	$1,000				$1,000	$1,000		$1,000	$1,000	$500	$1,000			$11,500		
63	Prepare read-ahead package (update risk reg, DMP, etc) & submit to vertical team	7	3-Mar-18	10-Mar-18	61	18		$35,000		$5,000	$5,000	$5,000	$2,250		$5,000		$4,000	$5,000		$10,000	$2,500					$78,750		
64	Vertical team review of TSP materials	14	11-Mar-18	25-Mar-18	63	18																			$0		
65	Tentatively Selected Plan Milestone Meeting	0	26-Mar-18	26-Mar-18	64	18		$2,000		$1,000	$1,000	$1,000	$1,000				$1,000	$1,000		$2,000	$1,000	$500	$1,000			$12,500		
66	**Tentatively Selected Plan (TSP) Milestone**	0	27-Mar-18	27-Mar-18	65	18																			$0	**TSP Milestone**	**$4,214,458**
67	TSP Memorandum for Record	14	27-Mar-18	10-Apr-18	65	18		$2,000		$1,000	$1,000	$1,000					$1,000	$1,000		$2,000			$1,000			$10,000		
68	Econ Risk & Uncertainty Analysis	30	27-Mar-18	26-Apr-18	65	18											$15,000									$15,000		
69	Econ Regional Impact Analysis	7	27-Mar-18	3-Apr-18	65	18											$4,000									$4,000		
70	Econ Multiport Analysis	7	27-Mar-18	3-Apr-18	65	18											$4,000									$4,000		
71	Develop Real Estate Gross Appraisal Report	45	3-Mar-18	17-Apr-18	61	18																	$18,500			$18,500		
72	Complete Cost Risk Analysis and VE Study	40	3-Mar-18	12-Apr-18	61	18				$2,000	$10,000	$2,000	$2,100											$50,000		$66,100	**Review for VE Study**	
73	Develop Detailed Costs for TSP (TCPS, MCASES, etc)	14	14-Apr-18	28-Apr-18	72	18					$10,000		$1,500													$11,500		
74	Complete draft report with NEPA	10	29-Apr-18	9-May-18	73	18		$35,000		$30,000	$10,000	$50,000	$13,500				$4,000	$150,000	$5,000	$40,000		$5,000	$5,000			$347,500		
75	DQC of Draft Report (incl legal)	21	12-May-18	2-Jun-18	74	18															$10,000			$30,000		$40,000		
76	Incorporate DQC Comments	14	3-Jun-18	17-Jun-18	75	18				$5,000	$5,000	$5,000	$2,250													$17,250		
77	In-Progress Review Meeting	1	18-Jun-18	19-Jun-18	76	18					$1,000	$1,000	$500				$1,000	$1,000			$1,000	$500	$1,000			$7,000		
78	Update DMMP (coord with EPA)	90	27-Mar-18	25-Jun-18	65	18												$20,000								$20,000		

79	Receive biological opinion	650	2-Jan-17	14-Oct-18	24	**17/18**												$40,000							$40,000		
80	Prepare for IEPR Start	1	29-Apr-18	30-Apr-18	73	**18**		$2,000	$5,000																$7,000		
81	Release for concurrent public, technical, policy and legal review	30	18-Jun-18	18-Jul-18	76	**18**		$7,500		$5,000	$5,000	$5,000	$2,500												$25,000		
82	Public Review of Draft Report and Draft EIS	45	21-Jul-18	4-Sep-18	81	**18**																			$0		
83	Agency Technical Review (ATR) Conducted by PCX - Draft Report	30	21-Jul-18	20-Aug-18	81	**18**																	$60,000		$60,000		
84	SAD/HQ Policy and Legal Review Draft Report	45	21-Jul-18	4-Sep-18	81	**18**																			$0		
85	IEPR team review of Draft Report	60	21-Jul-18	19-Sep-18	81	**18**			$5,000				$1,000			$5,000							$225,000		$236,000	**FY18:**	**$1,356,100**
86	Update policy guidance memorandum and commence finalizing report per reviews	30	22-Sep-18	22-Oct-18	85	**19**		$35,000		$5,000	$5,000	$20,000	$4,500				$20,000	$20,000		$20,000		$5,000	$4,000		$138,500		
87	In-Progress Review Meeting	1	23-Oct-18	24-Oct-18	86	**19**		$2,000		$1,000	$1,000	$1,000	$500				$1,000	$1,000		$1,000	$1,000	$500	$1,000		$11,000		
88	Create read-ahead package (update risk reg, DMP, report Syn.) & submit to vertical team	14	23-Oct-18	6-Nov-18	86	**19**		$30,000		$5,000	$5,000	$5,000	$2,250		$5,000		$5,000	$5,000		$5,000		$5,000	$5,000		$77,250		
89	Vertical team review of ADM materials	14	7-Nov-18	21-Nov-18	88	**19**																			$0		
90	Agency Decision Milestone Meeting	0	22-Nov-18	22-Nov-18	89	**19**		$2,000		$1,000	$1,000	$1,000	$1,000				$1,000	$1,000		$1,000	$1,000	$500	$1,000		$11,500		
91	**Agency Decision Milestone (ADM)**	0	23-Nov-18	23-Nov-18	90	**19**																			$0	**ADM Milestone**	**$1,167,100**
92	ADM Memorandum for Record	14	23-Nov-18	7-Dec-18	87	**19**		$2,000		$1,000	$1,000	$1,000					$1,000	$1,000		$1,000			$1,000		$9,000		
93	Finalize details on TSP, complete final report	30	23-Nov-18	23-Dec-18	87	**19**		$30,000		$5,000	$15,000	$20,000	$6,000				$20,000	$20,000		$20,000		$5,000	$5,000		$146,000		
94	DQC of Final Report	21	24-Dec-18	14-Jan-19	90	**19**															$10,000			$25,000	$35,000		
95	Incorporate DQC Comments	21	17-Jan-19	7-Feb-19	91	**19**		$20,000		$5,000	$5,000	$5,000	$2,250				$4,000	$10,000		$10,000		$5,000	$5,000		$71,250		
96	Cost Certification / Cost ATR	30	8-Feb-19	10-Mar-19	95	**19**					$10,000		$1,500											$25,000	$36,500	**Walla**	
97	Agency Technical Review (ATR) - Final Report/NEPA	30	8-Feb-19	10-Mar-19	95	**19**																		$35,000	$35,000		
98	Incorporate ATR Comments	21	11-Mar-19	1-Apr-19	97	**19**				$5,000		$5,000	$1,500												$11,500		
99	Submit Final Report package to SAD	7	4-Apr-19	11-Apr-19	98	**19**		$10,000							$5,000		$4,000	$5,000		$5,000				$10,000	$39,000		
100	SAD Review Final Report	21	12-Apr-19	3-May-19	99	**19**																			$0		
101	Provide responses to SAD comments and revise Final Report	14	4-May-19	18-May-19	100	**19**		$10,000		$5,000	$5,000	$5,000	$1,700				$4,000	$5,000		$5,000	$2,500	$5,000	$5,000		$53,200		
102	**Division Engineer Transmittal Letter**	0	21-May-19	21-May-19	101	**19**																			$0	**Division Transmittal**	**$436,450**
103	CECW (HQ) Review Final Report	30	22-May-19	22-Jun-19	102	**19**																			$0		
104	Provide responses to CECW (HQ) comments and revised Final Report	30	23-Jun-19	23-Jul-19	103	**19**		$5,000		$2,500	$2,500	$2,500	$1,125				$4,000	$10,000		$5,000		$5,000	$5,000		$42,625		
105	Publish Notice in Federal Register	14	24-Jul-19	7-Aug-19	104	**19**												$10,000							$10,000		
106	Final SEIS and Public Review Period	30	10-Aug-19	10-Sep-19	105	**19**												$10,000							$10,000		
107	Revise Final Report for public comments	30	11-Sep-19	11-Oct-19	106	**19**		$25,000		$2,500	$5,000	$15,000	$3,375		$2,500		$10,000	$15,000		$25,000	$2,500	$2,500	$2,500	$10,000	$120,875	**FY19:**	**$858,200**
108	HQ routing of final report	21	13-Oct-19	3-Nov-19	107	**20**												$5,000							$5,000		
109	**GRR Approval**	0	4-Nov-19	4-Nov-19	108	**20**																			$0	**PACR Approval**	**$188,500**
110	ROD Signed	30	5-Nov-19	5-Dec-19	109	**20**																			$0	**FY20:**	**$5,000**
				Subtotals			$250,000	$527,500	$20,000	$207,000	$209,500	$583,925	$450,308	$1,529,500	$26,500	$25,000	$385,500	$589,000	$65,000	$397,000	$765,000	$159,000	$126,500	$450,000	$20,000	**$6,786,233**		
				15% Contingency																					**$1,017,935**		
				Total																					**$7,804,167**		

Assumptions:

Notes:
1. PD Contract costs includes PD support from other districts
2. EN Contract costs includes support from ERDC
3. Pink cells denote tasks that are on the critical path
4. Blue cells denote In-progress Review Meetings

3 year check 4.0 years
Subtotal check $6,786,233