REVIEW PLAN

For

Savannah Harbor Expansion Project
Engineering Design Phase

In-House & A-E Design Products

Chatham County, Georgia and
Jasper County, South Carolina

Savannah District

May 2016

NOTE: This Update of the August 2014 Engineering Design Phase Review Plans combines the In-House and AE Design products into one Review Plan and updates the list of products involved.

US Army Corps
of Engineers ®

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ACRONYMS AND ABBREVIATIONS

ASA (CW)	Assistant Secretary of the Army for Civil Works
ATR	Agency Technical Review
BCOES	Biddability, Constructability, Operability, Environmental, and Sustainability
DQC	District Quality Control
DDR	Design Documentation Reports
EC	Engineering Circular
ER	Engineering Regulation
GPA	Georgia Ports Authority
GRR	General Re-evaluation Report
IEPR	Independent External Peer Review
MLW	Mean Low Water
NAS	National Academies of Science
NED	National Economic Development
NEPA	National Environmental Policy Act
OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
PDT	Project Delivery Team
PED	Pre-construction Engineering and Design
PMP	Project Management Plan
P&S	Plans and Specifications
RMO	Review Management Organization
ROD	Record of Decision
RTS	Regional Technical Specialists
SAD	South Atlantic Division
USACE	United States Army Corps of Engineers
WRDA	Water Resources Development Act
SME	Subject Matter Experts

1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of review activities for the Savannah Harbor Expansion Project, Savannah Harbor, Chatham County, Georgia and Jasper County, South Carolina. The project is in Construction; however, the Pre-Construction, Engineering, and Design (PED) Phase continues for features not yet constructed. The related documents are Implementation Documents that consist of Plans and Specifications (P&S) and Design Documentation Reports (DDRs). Upon approval, this review plan will be included in the Project Management Plan as an appendix to the Quality Management Plan.

b. References.

(1) ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999.
(2) ER 1110-1-12, Engineering and Design Quality Management, 21 July 2006
(3) EC 1165-2-214, Water Resources Policies and Authorities Civil Works Review, 15 December 2012
(4) ER-415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews 1 January 2013.
(5) Project Management Plan, Savannah Harbor Expansion Project, 113006, 5 November 2012.
(6) Savannah Harbor Expansion Project Record of Decision dated 26 October 2012.
(7) Savannah Harbor Expansion Project Chief's Report dated 17 August 2012.
(8) Water Resources Reform Act (WRRDA) of 2014, Section 7002, Approval of Savannah Harbor Expansion Project dated 3 January 2014.
(9) Project Partnership Agreement, Savannah Harbor Expansion Project, between the Department of the Army, the Georgia Department of Transportation, and the Georgia Ports Authority signed 8 October 2014.

c. Requirements. This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R). The EC provides the procedures for ensuring the quality and credibility of U.S. Army Corps of Engineers (USACE) decision, implementation, and operations and maintenance documents and work products. The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), Policy and Legal Compliance Review and Biddability, Constructability, Operability, Environmental, and Sustainability (BCOES) Review. In addition to the review policy outlined in the EC, design documents are also subject to a value engineering study of the project design, per ER 11-1-321 Value Engineering, Change 1, 1 January 2011.

(1) <u>District Quality Control (DQC).</u> DQC is the backbone of the Corps' quality process. It is an internal review process of basic science and engineering work products focused on

fulfilling the project quality requirements defined in the Project Management Plan (PMP). Reliance on subsequent levels of review by external teams is not an acceptable substitute for DQC. Basic quality control tools include a Quality Management Plan providing for seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc. Quality checks and reviews occur during the development process and are carried out as a routine management practice. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts. PDT reviews are performed by members of the PDT to ensure consistency and effective coordination across all project disciplines. Additionally, the PDT is responsible for a complete reading of any reports and accompanying appendices prepared by or for the PDT to assure the overall coherence and integrity of the report, technical appendices, and the recommendations before approval by the District Commander.

(2) Agency Technical Review (ATR). ATR is an in-depth review, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of the project/product. The purpose of this review is to ensure the quality and credibility of the government's scientific information and the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR team reviews the various work products and assures that all the parts fit together in a coherent whole. ATR teams will be comprised of senior USACE personnel (Regional Technical Specialists (RTS), etc.), and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the parent MSC.

(3) Independent External Peer Review (IEPR). IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. Any work product, report, evaluation, or assessment that undergoes DQC and ATR also **MAY** be required to undergo IEPR under certain circumstances. A risk-informed decision will be made as to whether IEPR is appropriate for that product. IEPR panels will be made up of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. Panel members will be selected using the National Academies of Science (NAS) policy for selecting reviewers. IEPR teams are not expected to be knowledgeable of Army and administration policies, nor are they expected to address such concerns. However, an IEPR team should be given the flexibility to bring important issues to the attention of decision makers. For clarity, IEPR is divided into two types, Type 1 is generally for decision documents and Type II is generally for implementation documents. The differing criteria for conducting the two

types of IEPR can result in work products being required to have Type I IEPR only, Type II IEPR only, both Type I and Type II IEPR, or no IEPR.

d. Review Management Organization (RMO). The USACE organization managing a particular review effort is designated the Review Management Organization (RMO) for that effort. The South Atlantic Division (SAD) is designated as the RMO responsible for managing any non-DQC review activities.

e. Review Plan Approval & Updates. The South Atlantic Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input as to the appropriate scope and level of review. Like the PMP, the Review Plan is a living document and may change as the project progresses. The district is responsible for keeping the Review Plan up to date with the most current information.

2. PROJECT INFORMATION AND BACKGROUND

a. Project Background. Savannah Harbor is a deep-draft navigation channel located along the Savannah River on the northern coast of Georgia / southern coast of South Carolina in Chatham and Jasper Counties, respectively. The state boundary between Georgia and South Carolina runs along the Savannah River. The Georgia Ports Authority (GPA) conducted a feasibility study of potential navigation improvements at Savannah Harbor, Georgia under the authority granted by Section 203 of Water Resources Development Act (WRDA) of 1986 (P.L. 99-662). The US Army Corps of Engineers (the Corps) adopted these documents prepared by the GPA and published a Draft Tier I EIS in May 1998 and the Final Tier I EIS in September 1998. In the Water Resources Development Act of 1999 (Section 101(b)(9)), the US Congress conditionally authorized deepening the Savannah Harbor navigation channel to a maximum depth of -48 feet Mean Low Water (MLW). The conditional authorization stipulated that approval of additional studies and the project is required from the Administrator of the Environmental Protection Agency, the Secretary of Commerce, the Secretary of Interior, and the Secretary of the Army.

The Corps completed the Tier I EIS process when it signed a Record of Decision (ROD) in December 1999. The ROD included additional requirements, including additional review by the Corps of Engineers and approval of the Chief of Engineers to ensure that construction of the project would comply with all applicable laws and policies.

The Savannah District of the Corps in conjunction with the USACE Deep-Draft Navigation Planning Center of Expertise developed a General Re-evaluation Report (GRR) to fulfill the conditions of the conditional authorization granted in 1999 and to conduct investigations required by the National Environmental Policy Act of 1969 (NEPA). This GRR and EIS provide documentation of the technical and plan formulation analyses conducted in the development of a recommended plan for navigation improvement at Savannah Harbor and associated environmental mitigation. The GRR and EIS assess mitigation plans for

alternative channel depths. The EIS includes a final mitigation plan and an incremental analysis of alternative channel depths from -42 to -48 feet MLW, as required by the conditional authorization. The project sponsors are the Georgia Department of Transportation & the Georgia Ports Authority. The GRR and EIS were approved by a Record of Decision signed by the ASA (CW) on 26 October 2012.

This study identifies and selects the National Economic Development (NED) plan, the plan that has the greatest net economic benefits consistent with protection of the Nation's environment.

b. Project Description. The Approved Plan is the NED Plan, which includes navigation improvements to the existing channel and mitigation that extends into the upper harbor beyond the extent of the navigation improvements. The NED plan is identified as the -47-foot plan.

The navigation components of the NED Plan consist of the:

- -47-foot deepening alternative, which includes channel bend wideners, and expansion of the Kings Island Turning Basin;
- Deepening of the entrance channel to -47 feet from Stations 0+000 to Station -14+000 and to -49 feet from Station -14+000 to Station -60+000 and extending the entrance channel from Station -60+000 to -97+680;
- Long Island Meeting Area at -47 feet; and
- Oglethorpe Meeting Area at -47 feet.

From the final GRR and EIS, the estimated total cost for the project based on fiscal year 2012 cost levels is $652,000,000, cost-shared by the Federal government and the State of Georgia. The FY 2012 total project investment cost which consists of the first cost plus interest during construction is $709,000,000 for the Approved Plan. The Fully Funded Mid-Point of Construction Cost is currently $791,000,000 with the Section 902 Limit estimated at $920,300,000. The Approved Plan FY 2012 annual average equivalent cost (including annual maintenance) is $39,000,000. The average annual equivalent benefits for the Selected Plan are $213,000,000, which result in average annual equivalent net benefits of $174,000,000 and a benefit-to-cost ratio of 5.5. The Savannah District is conducting a project cost update during FY 2016.

The Approved Plan would result in marsh conversion and brackish marsh loss. Impacts to fisheries would include some loss of habitat for Striped bass and Shortnose sturgeon. The Project would increase chloride concentrations in Abercorn Creek at the water intake for the City of Savannah's water treatment plant during droughts and at industrial intakes on the Savannah River.

The natural resource mitigation plan consists of the following components:

- Constructing and operating flow re-routing features in and near the Savannah National Wildlife Refuge to reduce salinity impacts to tidal freshwater and brackish wetlands and fishery habitat;
- Acquiring bottomland hardwoods/freshwater wetlands to compensate for salinity increases to tidal freshwater wetlands. The acquired lands would become part of the Savannah National Wildlife Refuge and be managed by the USFWS;
- Marsh restoration in Disposal Area 1S to compensate for loss of 15.68 acres of brackish marsh that would be lost due to excavation requirements of the project;
- Constructing and operating an oxygen injection system to remove the incremental effects of the harbor deepening project;
- Constructing and operating a fish bypass channel at the New Savannah Bluff Lock and Dam to compensate for impacts to Shortnose sturgeon habitat;
- Funding a Striped bass stocking program to compensate for adverse impacts to Striped bass spawning and nursery habitats within the estuary;
- Constructing a raw water impoundment to supply the City of Savannah water treatment plant with water during periods of high chloride concentrations;
- Implementing adaptive management features if post-construction monitoring shows them to be needed. Those features include removing the Tide Gate sill, enlarging the diversion structure at the mouth of McCoys Cut, a diversion structure at the junction of Middle and Back Rivers, and acquisition of additional freshwater wetlands if required. Implementation of any or all of these features may not be needed, but the project would include funding sufficient to implement all of them. Implementation of these features would be dependent on findings through environmental monitoring.

Other features of the mitigation plan include:

- Recovery and preservation of the remains of the CSS *Georgia*
- Environmental monitoring

Projects included in this review plan designed within the Savannah District include:

- ~~Disposal Areas 14 A Dike Raising –~~ (Reviews completedunder 24 August 2014 Review Plan approved on 25 September 2012) The District awarded the Construction contract on 8 April 2016.
- ~~Outer Harbor Dredging~~ – (Reviews completed under 24 August 2014 Review Plan approved on 25 September 2012) The District awarded the Construction contract on 4 March 2015; NTP issued 18 March 2015; dredging commenced 10 Sep 2015.
- Inner Harbor Dredging
- Upper Estuary Dredging
- Sediment Basin Modifications/Tide Gate Removal and Boat Ramp Construction
- Disposal Area 1S Marsh Restoration

- Final Dike Raising to Restore Disposal Area Capacity

Projects included in this review plan designed for the Savannah District by A-E Contractors include:

- ~~Dissolved Oxygen Injection System~~ – (Reviews completed under 24 August 2014 Review Plan approved on 25 September 2012) Construction contract awarded 31 July 2015; NTP issued 21 October 2015.
- ~~Raw Water Storage Impoundment~~ – (Reviews completed under 24 August 2014 Review Plan approved on 25 September 2012) Construction Contract awarded 11 December 2015.
- McCoys Cut Diversion Structure – (Reviews completed under 24 August 2014 Review Plan approved on 25 September 2012) A-E Design Completed in April 2014 and will be rolled into the Upper Estuary Dredging Solicitation. Through that process the design will undergo additional reviews as part of the complete package prior to solicitation.
- Fish Passage at New Savannah Bluff Lock & Dam – (Reviews completed under 24 August 2014 Review Plan approved on 25 September 2012) A-E Design Completed in April 2014 with Plans and Specifications scheduled to be updated with BCOES in FY 2017.

3. DISTRICT QUALITY CONTROL

District Quality Control and Quality Assurance activities for implementation documents (DDRs and P&S) are stipulated in ER 1110-1-12, Engineering & Design Quality Management. The design of all in-house and A-E design products will be in accordance with Savannah District procedures and will undergo DQC. DQC will be verified by the ATR Team.

4. AGENCY TECHNICAL REVIEW

a. Scope. Agency Technical Review (ATR) is undertaken to "ensure the quality and credibility of the government's scientific information" in accordance with EC 1165-2-214 and ER 1110-1-12. An ATR will be performed on the P&S and DDR pre-final submittal.

ATR will be conducted by individuals and organizations that are external to the Savannah District. The ATR Team Leader is a Corps of Engineers employee outside the South Atlantic Division. The required disciplines and experience are described below.

ATR comments are documented in the DrChecks^{sm} model review documentation database. DrChecks^{sm} is a module in the ProjNet^{sm} suite of tools developed and operated at ERDC-CERL (www.projnet.org).

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organization affiliations, and include a short paragraph on both the credentials and relevant expertise of each reviewer;
- Include the charge to the reviewer;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issues (if any); and
- Include a verbatim copy of each reviewers comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

b. ATR Disciplines. As stipulated in ER 1110-1-12, ATR members will be sought from the following sources: regional technical specialists (RTS); appointed subject matter experts (SME) from other districts; senior level experts from other districts; Center of Expertise staff; experts from other USACE commands; contractors; academic or other technical experts; or a combination of the above. The ATR Team will be comprised of some of the following disciplines; knowledge, skills, and abilities; and experience levels, depending on the component and required disciplines.

ATR Team Leader. The ATR Team Leader shall be a registered professional with experience in Navigation projects and have previous experience as an ATR Team Leader. The team leader may be a co-duty to one of the review disciplines.

Geotechnical Engineering. The team member shall be a registered professional. Experience needs to encompass geotechnical analyses that are used to support the development of Plans and Specifications for navigation projects including navigation projects, coastal structures and dike embankments. Knowledge of coastal design, disposal area design and dredging operations is required. A minimum of 10 years of relative experience is required.

Structural Engineering. The team member shall be a registered professional engineer. Experience needs to encompass structural analyses that are used to support development of plans and specifications for projects including stone construction, HDPE, sheet or timber piling, and structural steel design. A minimum of 10 years of relative experience is required.

Civil Engineering. The team member shall be a registered professional engineer with civil/site work project experience that includes dredging and disposal operations, embankments, channels, and coastal structures. A minimum of 10 years relative experience is required.

Hydraulic or Coastal Engineering. The team member shall be a registered professional engineer with hydraulic or coastal engineering work project experience that includes dredging and disposal operations, channels, and environmental restoration projects. A minimum of 10 years relative experience is required.

Mechanical Engineering. The team member shall be a registered professional engineer with mechanical engineering work project experience that includes pumps and control systems. A minimum of 10 years relative experience is required.

Electrical Engineering. The team member should be a registered professional engineer with electrical engineering work project experience that includes electrical distribution systems and control systems. A minimum of 10 years relative experience is required.

Cost Engineering. The team member should have demonstrated experience in the preparation of cost estimates, cost risk analyses, and cost engineering. Experience is needed for dredging projects to include navigation, disposal area design, and coastal structures. The cost engineering review will be on the PED Phase current working estimate. The cost engineering review will be conducted as part of the ATR for the P&S final submittal. A minimum of 10 years relative experience is required.

Environmental Compliance Specialist. The team member should be a senior biologist with experience in compliance with environmental laws (NEPA, Clean Water Act, Endangered Species Act, National Historic Preservation Act, etc) including coastal environmental projects. A minimum of 10 years of relative experience is required.

The required disciplines will vary by project. ATR team requirements are as follows:

		ATR Team Leader	Geotechnical Engineer	Structural Engineer	Civil/Site Engineer	Hydraulic/Coastal Engineer	Mechanical Engineer	Electrical Engineer	Cost Engineer	Environmental Compliance Specialist
In-House Design	~~Disposal Areas 14A Dike Raising*~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~	~~x~~
	~~Outer Harbor Deepening*~~	~~x~~			~~x~~				~~x~~	~~x~~
	Inner Harbor Deepening	x			x				x	x
	Upper Estuary Dredging	x	x	x	x	x			x	x
	Sediment Basin/Tide Gate	x	x	x	x	x			x	x
	Boat Ramp	x	x	x	x	x			x	x
	1S Marsh Restoration	x	x		x	x			x	x
	Final Dike Raising to Restore Capacity	x	x	x	x				x	x
A-E Design	~~Dissolved Oxygen Injection System*~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~
	~~Raw Water Storage Impoundment*~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~
	~~McCoys Cut Diversion Structure**~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~x~~	~~x~~
	~~Fish Passage at New Savannah Bluff Lock & Dam**~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~

*Construction contracts awarded.

**Review is completed; however construction contract has not yet been awarded.

5. INDEPENDENT EXTERNAL PEER REVIEW

a. General. EC 1165-2-214 provides implementation guidance for both Sections 2034 and 2035 of the Water Resources Development Act (WRDA) of 2007 (Public Law (P.L.) 110-114). The EC addresses review procedures for both the Planning and the Design and Construction Phases (also referred to in USACE guidance as the Feasibility and the Pre-construction, Engineering and Design Phases).

b. Type I Independent External Peer Review (IEPR) Determination (Section 2034). A Type I IEPR is associated with decision documents. A Type I IEPR is not applicable to the implementation documents (DDR and P&S) covered by this review plan. Additionally, the documents addressed by this review plan do not contain technical, scientific or engineering information that is relied upon to support recommendations. A Type I IEPR is not required/recommended.

c. Type II Independent External Peer Review (IEPR) Determination (Section 2035). This project does not trigger WRDA 2007 Section 2035 factors for Safety Assurance Review (termed Type II IEPR in EC 1165-2-214) and therefore, a Type II IEPR review is not required/recommended. If the project scope is changed, this determination will be reevaluated. The factors in determining whether a review of design and construction activities of a project is necessary as stated under Section 2035 along with this review plans applicability statement follow.

(1) The failure of the project would pose a significant threat to human life.
This project consists of channel dredging, disposal area construction away from any populated areas, construction of mitigation features and construction of coastal structures away from populated areas. Failure of these features will not pose a significant threat to human life. The mitigation feature for impacts to water quality with regards to chloride concentrations requires construction of a dam. This project feature is known as the Raw Water Storage Impoundment. The Georgia Safe Dams program has reviewed this project design and the associated hazard potential. They have indicated in a letter received in November of 2012 that they have classified the dam as a "Category II" dam based on their analysis. A "Category II" dam as defined by the Georgia Safe Dams Program signifies that "Improper operation or failure would not be expected to result in a probable loss of human life". Inundation limits associated with a failure of this dam were developed as part of the design process and were included in project reviews. A review of the land use within these inundation limits was conducted in November 2015 and was not found to have changed in a manner that would constitute a re-evaluation of the hazard classification. Recent development within the vicinity of the project site, to include construction of a new elementary school, is outside the bounds of the dam failure inundation limits.

(2) The project involves the use of innovative materials or techniques.

This project uses methods and procedures used by the Corps of Engineers on other similar works. Innovative materials and techniques will not be used.

(3) The project design lacks redundancy.
The design is in accordance with applicable USACE Engineer Manuals. The project design does not require the addition of redundant project features. Resiliency or robustness incorporated into design features are a function of normal civil works design criteria and are not in excess of customary practice.

(4) The project has a unique construction sequencing or a reduced or overlapping design construction schedule.
This project's construction sequence and schedule have been used successfully by the Corps of Engineers on other similar projects. There is no unique construction sequencing or reduced or overlapping design construction schedule.

6. BIDDABILITY, CONSTRUCTABILITY, OPERABILITY, ENVIRONMENTAL AND SUSTAINABILITY REVIEW

Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews are conducted to ensure that the project can be built with ease; contract documents can be understood, bid administered and executed; project can be operated and maintained with ease and will protect air, water, land, animals, plants and other natural resources from the effects of the construction and operation of the project. The BCOE will be conducted and certified within the Savannah District Office in accordance with ER-415-1-11 dated 1 January 2013. This certification will also include the PM's certification of completion of required Value Engineering activities in accordance with ER 11-1-321, Change 1.

7. CUSTOMER REVIEW

The customer (Project Sponsor) review will be conducted to ensure the customer's expectations as agreed upon for the project are met. The customer review will take place concurrently with the ATR. The customer will provide all comments in Dr. Checks during the ATR review period. All customer comments will be addressed as part of the ATR review and included in the final ATR review report.

8. MODEL CERTIFICATION AND APPROVAL

All software used to develop project designs will comply with the USACE Enterprise Standard (ES)-08101 *Software Validation for the Hydrology, Hydraulics and Coastal Community of Practice*.

9. POLICY AND LEGAL COMPLIANCE

The Savannah District Office of Counsel reviews all contract actions for legal sufficiency in accordance with Engineer Federal Acquisition Regulation Supplement 1.602-2 Responsibilities. The subject implementation documents and supporting environmental documents will be reviewed for legal sufficiency prior to advertisement.

10. BUDGET AND SCHEDULE

a. Project Milestones. The following milestones are identified for planning purposes only and subject to change based on funding constraints and project decision documents.

	Design Feature	DQC Complete	ATR Complete	BCOES Complete	Advertisement	Contract Award
In-House Design	**14A Dike Raising**	20 Nov 2015	24 Nov 2015	4 Dec 2015	22 Dec 2015	8 Apr 2016
	Outer Harbor Deepening	19 Dec 2012	25 Jan 2013	4 Mar 2013	22 Sep 2014	4 Mar 2015
	Inner Harbor Deepening	Q3 FY16	Q4 FY16	Q4 FY16	Q4 FY17	Q1 FY18
	Upper Estuary Dredging	Q4 FY16	Q1 FY17	Q2 FY17	Q3 FY17	Q4 FY17
	Sediment Basin/ Tide Gate	Q3 FY16	Q3 FY16	Q3 FY16	Q4 FY16	Q1 FY17
	Boat Ramp	Q1 FY17	Q2 FY17	Q3 FY17	Q3 FY17	Q4 FY17
	1S Marsh Restoration	Q2 FY17	Q2 FY17	Q3FY17	Q4 FY 17	Q1 FY18
	Final Dike Raising to Restore Capacity	Q2 FY 19	Q2 FY19	Q3 FY19	Q4 FY19	Q4 FY19
A-E Design	**Dissolved Oxygen System**	17 Apr 2013	10 Oct 2013	24 Jan 2014	25 Sep 2014	31 Jul 2015
	Raw Water Storage Impoundment	1 Mar 2013	Aug 2013	20 Jul 2015	6 Aug 2015	11 Dec 2015
	McCoys Cut Diversion Structure	6 Dec 2013	Mar 2014	Q2 FY17*	Q2 FY17	Q4 FY17
	Fish Passage at NSBL&D	6 Dec 2014	Mar 2014	Q3 FY17*	Q4 FY17	Q1 FY18

* Conditional BCOES completed 23 April 2014.