

REVIEW PLAN

HOUSTON SHIP CHANNEL EXPANSION CHANNEL IMPROVEMENT PROJECT, HARRIS, CHAMBERS AND GALVESTON COUNTIES, TEXAS

PRECONSTRUCTION ENGINEERING AND DESIGN PORT OF HOUSTON AUTHORITY DESIGN AND CONSTRUCTION PACKAGES 2 THROUGH 9

USACE Galveston District

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REVIEW PLAN

HOUSTON SHIP CHANNEL

EXPANSION CHANNEL IMPROVEMENT PROJECT

HARRIS, CHAMBERS, & GALVESTON COUNTIES, TEXAS

Preconstruction Engineering and Design
(Plans, Specifications and Design Documentation Report)

Port of Houston Authority
Design and Construction
Packages 2 Through 9

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1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This Review Plan (RP) defines and delineates the scope and level of peer review for Preconstruction Engineering and Design Phase (PED) to support contracts to be awarded and executed by the Port of Houston Authority to construct elements of the Houston Ship Channel (HSC) Expansion Channel Improvement Project (ECIP), Harris, Chambers and Galveston Counties, Texas. The related documents are Implementation/Design Documents that consist of Plans and Specifications (P&S) and the Design Documentation Report (DDR) for the **HSC ECIP**.

b. References

- (1) ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 Aug 1999
- (2) Project Management Plan, 09 July 2020
- (3) ER 1110-1-12, Engineering and Design Quality Management, 21 Jul 2006
- (4) Final Integrated Feasibility Report and Environmental Impact Statement, Houston Ship Channel Expansion Channel Improvement Project, December 2019.
- (5) ER 1110-1-8159, Engineering and Design DRCHECKS, 1 Jan 2015
- (6) ER 1110-2-1302, Civil Works Cost Engineering, 30 Jun 2016
- (7) EC 1165-2-217, Water Resources Policies and Authorities, Review Policy for Civil Works, 20 Feb 2018
- (8) ER 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews, 1 Jan 2013

c. **Requirements.** This RP was developed in accordance with EC 1165-2-217, 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 outlines three general levels of review applicable to the Implementation Documents addressed by this Review Plan: District Review (DR), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and states that a Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Review will be included in the Review Plan.

d. **Review Plan Approval and Updates.** The Southwestern Division (SWD) Commander is responsible for approving this RP. The Commander's approval reflects vertical team input (involving District, Division, and HQUSACE members) as to the appropriate scope and level of review. The RV is a living document and will change as the project progresses. The Galveston District is responsible for keeping the RP up to date. Plans specific to individual contracts will be documented in succeeding Chapters. Minor changes to the RP since the last Major Subordinate Command (MSC) Commander approval will be documented in an attachment. Significant changes to the RP (such as changes to the scope and/or level of review) will be approved by the MSC Commander following the process used for initially approving the plan. The latest version of the RP, along with the Commander's approval memorandum, will be posted on the Galveston District's webpage. The latest RP will be provided to the home MSC.

e. **Review Management Organization (RMO).** SWD is designated as the RMO. The RMO, in cooperation with the vertical team, will determine/select/approve the ATR team members.

Galveston District may assist SWD with management of the ATR and development of the “charge to reviewers.”

2. PROJECT INFORMATION

- a. Project Title.** Houston Ship Channel Expansion Channel Improvement Project, Harris, Chambers and Galveston Counties, Texas
- b. Project Authority.** The recommended plan for the HSC ECIP is pending authorization as described in the 23 April 2020 signed Chief of Engineers’ Report and December 2019 Final Integrated Feasibility Report and Environmental Impact Statement (FIFR-EIS) for the Houston Ship Channel Expansion Channel Improvement Project (HSC ECIP), also known as Port Houston Authority’s (PHA) Project 11.
- c. Project Sponsor.** The project non-Federal sponsor (NFS) is the Port of Houston Authority (PHA), a non-Federal political sub-division of the State of Texas. The NFS has requested to provide a significant amount of engineering and environmental analyses and design work for PED. The Draft Design Agreement between the Department of the Army and PHA is pending review and approval. There has been no Project Coordination Agreement signed yet. Products and analyses provided by NFSs are subject to DR and ATR. The NFS has awarded contracts to AE firms to perform PED efforts to include, but not limited to: design, Plans and Specification (P&S), DDR, environmental studies, and multitude of surveys: magnetometer, geotechnical, cultural and archaeological, etc.
- d. Project Location.** The HSC is a federally constructed deep-draft navigation channel, which serves Port Houston, and is located in Chambers, Galveston, and Harris Counties, Texas. The HSC is a high use channel and one of the busiest waterways in the United States with over 9,000 deep draft and 200,000 barge transits per year and provides access to various private and public docks and berthing areas associated with Port Houston. A map and table (**Figure 1, Table 1**) showing the project location and recommended channel improvements can be found on the following pages.

Project Description.

The overall recommended plan for the HSC ECIP is the Locally Preferred Plan (LPP) as described in the 23 April 2020 Report of the Chief of Engineers. The Recommended Plan includes the following channel improvements:

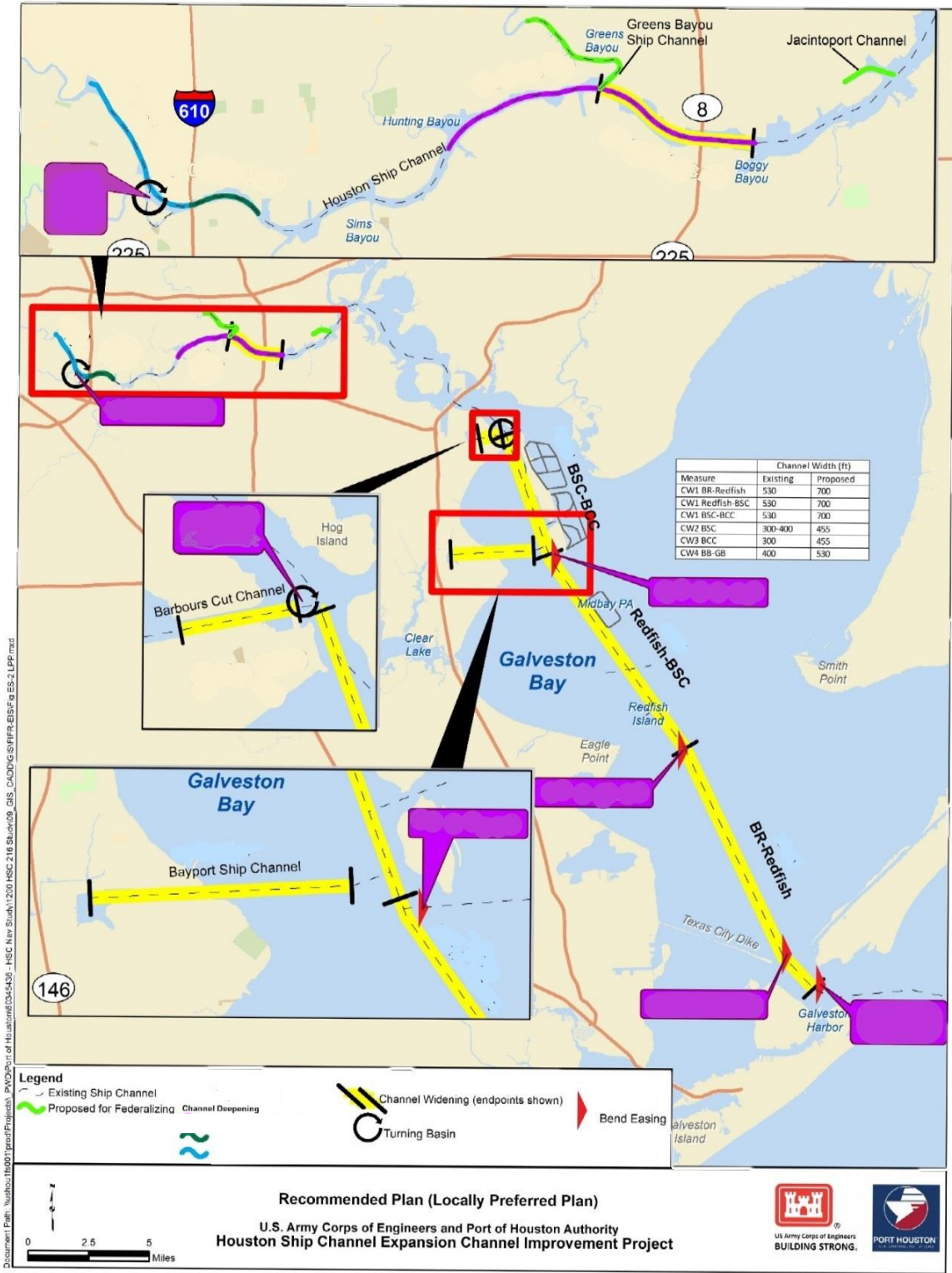


Figure 1. Project Location Map

Segment 1 – Bolivar Roads to Boggy Bayou

- Widen HSC from 530 feet to 700 feet with associated barge lane relocation
 - Segment 1a - Bolivar Roads to Redfish Reef
 - Segment 1b - Redfish Reef to Bayport Ship Channel (BSC) – LPP Feature
 - Segment 1c – BSC to Barbours Channel (BCC) - LPP Feature
- Four HSC bend easings with associated barge lane relocation
 - Inclusion into the Federal Project, the Greens Bayou Channel, a 1.6-mile-long combination 41.5- feet and 16.5 feet deep channel

Segment 2 – Bayport Ship Channel (BSC)

- Widen BSC on the north side from existing 350 to 455 feet in land-cut and 400 feet to 455 feet in water
- BSC inclusion in the Federal Project

Segment 3 – Barbours Cut Channel (BCC)

- Widen BCC on the north side from existing 400 feet to 455 feet
- BCC Combined Flare and Turning Basin
- BCC inclusion in the Federal Project

Segment 4 – Boggy Bayou to Sims Bayou

- Deepen HSC from 41.5 feet to 46.5 feet from Boggy Bayou to Hunting Turning Basin
- Widen HSC from 400 feet up to 530 feet from Boggy to Greens Bayou
- Hunting Turning Basin Improvements
- Inclusion into the Federal Project, the Jacintoport Channel measuring 0.76-mile long by 41.5 feet deep

Segment 5 – Sims Bayou to I-610 Bridge

- Deepen HSC from 37.5 feet up to 41.5 feet from Sims Bayou to I-610 Bridge

Segment 6 – I-610 Bridge to Main Turning Basin

- Deepen HSC from 37.5 feet up to 41.5 feet from I-610 Bridge to Main Turning Basin
- Improve Brady Island turning basin to 900-foot diameter

Table 1. New Work Placement Plan

Channel Segment	Feature	Stations	Placement Feature	Available New Work (KCY)	Required New Work (KCY)
1A	Widen HSC Bolivar Roads to Redfish Reef to 700 feet with Barge Lane Relocation Bend Easing (3 locations)	138+369 - 100+00	Long Bird Island 8-ac Bird Island	1,944	1,944
		100+000 - 073+934	Existing ODMDS	3,038	3,038
1B	Widen HSC Redfish Reef to BSC 700 feet with Barge Lane Relocation ¹ Bend Easing	073+794 - 028+605	Existing ODMDS ¹	2,474	2,474
			Oyster Mitigation ¹	2,030	2,030
			Bird Island Marsh ²	3,181	TBD
2	BSC Widening to 455 feet	25+58 - 221+000	Bird Island Marsh ²	2,108	2,108
1C	Widening to 700 feet	-3.94 - 28+605	Atkinson Marsh Cell M11 ¹	2,800	2,800
			Complete Atkinson Marsh Cell M7/8/9 ¹	1,000	1,000
			Bird Island Marsh ²	1,541	XXXX
3	BCC Widening to 455 feet BCC Combined Flare/Turning Basin	08+78 - 67+11	Atkinson Marsh Cell M12	2,825	2,825
4	Widen HSC up to 530 feet Deepen HSC up to 46.5 feet MLLW	684+03 - 850+00	Even lift on BW8	3,272	3,272
		850+00 - 930+00	Even lift on E2Clinton		0
5	Deepen HSC up to 46.5 feet MLLW	1110+78 - 1160+62	Even lift on Glendale	176	N/A
6	Deepen HSC up to 46.5 feet MLLW	1160+62 - 1266+49	Even lift on Glendale	734	N/A
	Brady Island Turning Basin	00+00 - 30+95	Even lift on Filterbed	267	N/A

NOTE: ¹ LPP Feature; ² Partial LPP Feature

Compensatory mitigation will be provided as outlined in the Feasibility Report, Appendices P1 and P2 for oysters and wetlands respectively.

e. **Risks During Construction.** The potential risks which cause delays and budget increases associated with the project are as follows:

- (1) Interference with port operations during construction.
- (2) Unanticipated increase in shoaling.
- (3) Performing O&M dredging jointly with new work.
- (4) Successful and timely pipeline relocations.
- (5) Unknown pipelines.
- (6) Placement/Beneficial Use Area and Mitigation Site Conditions.
- (7) NFS Contracting Dredging Job.
- (8) Real Estate issues.

f. **Public Participation.** The Galveston District Public Affairs Office continually keeps the affected public informed on Galveston District projects and activities. There are no planned activities, public participation meetings or workshops that are expected to generate issues to be addressed by the review teams. The project RP will be posted on the Galveston District Internet. Any comments or questions regarding the RP will be addressed by the Galveston District.

3. DISTRICT REVIEW (DR)

District Review activities (**Table 2**) for the project implementation documents are stipulated in ER 1110-1-12, Engineering & Design Quality Management as DQC however this project is being delivered as work in kind. Therefore, the NFS is responsible for quality control and assurance. The Federal Review role is to ensure that the project complies with Federal authorities and regulations and to ensure that the design is consistent with the Owners (This is a federally owned and operated channel) intent for operations and maintenance. The P&S and DDR will be prepared by the NFS AE using ER 1110-1-12 procedures and will undergo District Review instead of District Quality Control. This review will be conducted in parallel with ATR and BCOES.

a. **Documentation.** In compliance with EC 1165-2-217, the Galveston District will conduct a full review. The review will include quality checks and reviews, and PDT reviews. All work products and reports, evaluations, and assessments will undergo necessary and appropriate reviews. The reviews will cover all contract products and any in-kind services provided by the local sponsor.

- (1) **Required Expertise.** The desired expertise will be determined by the District Engineering Chief and may be augmented from District staff outside of the Galveston District. The Chiefs will ensure personnel have adequate experience to complete the review.

b. **Legal Review.** In order to comply with all legal requirements including those covered under ER 1165-2-28, OC will review during each review and provide a final review at the conclusion of BCOES.

Table 2. District Review Team Member Expertise Requirement

DR Team Members/Disciplines	Expertise Required
District Lead	The team member should have at least 3 years of experience preparing Civil Works decision documents and conducting DCQ. May also serve as discipline specific reviewer.
Project Manager (PM)	The team member should have at least 3 years of project management related to navigation projects.
Real Estate	The team member should have at least 3 years of Real Estate experience associated with navigation projects.
Environmental	The team member should have at least 3 years of environmental experience associated with the SWG District, State of Texas and Federal interests relating to navigation projects.
Construction Engineer	The team member should have at least 3 years of construction experience associated with navigation projects.
Engineering	The team member should have at least 3 years of geotechnical engineering, structural engineering, civil engineering and/or hydraulics & hydrology engineering experience relating to navigation projects.
Operations Manager	The team member should have at least 3 years of operation management relating to navigation projects.

4. AGENCY TECHNICAL REVIEW (ATR)

The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate.

- a. **ATR Scope.** ATR comments will be documented in the DrCheckssm model review documentation database. DrCheckssm is a module in the ProjNetsm suite of tools developed and operated at ERDC- CERL (www.projnet.org). At the conclusion of ATR, the ATR Team Leader will prepare a Review Report that summarizes the review. The report will include at a minimum the Charge to Reviewers, ATR Certification Form from EC 1165-2-217, and the DrCheckssm printout of the comments, evaluations, and backchecks.
- b. **ATR Disciplines.** As stipulated in ER 1110-1-12, ATR Team members will be sought from the following sources: regional technical specialists (RTS); subject matter experts (SME); 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 will be comprised of the following disciplines, knowledge, skills and abilities, and experience levels (**Table 3**). Civil Engineering and Construction team members may be combined if a qualified individual is available.

Table 3. ATR Team Member Expertise Requirement

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR Lead will be from outside the MSC and should have a minimum of 10 years of experience with navigation features and have previously performed ATR Team Leader duties. ATR Team Leader can also serve as a co-duty to one of the review disciplines.
Project Manager (PM)	The team member should have at least 3 years of project management related to navigation projects.
Real Estate	The team member should have at least 7 years of Real Estate experience associated with navigation projects.
Environmental	The team member should have at least 7 years of environmental experience associated with the SWG District, State of Texas and Federal interests relating to navigation projects.
Construction Engineer	The team member should have at least 7 years of construction experience associated with navigation projects.
Engineering	The team members should have at least 7 years of geotechnical engineering, structural engineering, civil engineering and/or hydraulics & hydrology engineering experience relating to navigation projects.
Operations Manager	The team member should have at least 7 years of operation management relating to navigation projects.

c. Documentation of ATR. DrCheckssm review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be organized according to the nature of the comment, not the reviewer’s field of expertise. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

- (1) The review concern – Identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- (2) The basis for the concern – Cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
- (3) The significance of the concern – Indicate the importance of the concern with regard to its potential impact; and
- (4) The probable specific action needed to resolve the concern – Identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially where there appears to be incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrCheckssm will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in ER 1110-1-12. Unresolved concerns can be closed in DrCheckssm with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR Lead 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 organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have either been resolved, or elevated to the vertical team for resolution within appropriate timeframes. The ATR Lead will be provided with notification of the implementation of any follow-up measures necessary to achieve issue resolution. A Statement of Technical Review will be completed, based on work reviewed to date, for the draft report and final report.

5. BIDDABILITY, CONSTRUCTABILITY, OPERABILITY, ENVIRONMENTAL, AND SUSTAINABILITY (BCOES) REVIEW.

These projects will be constructed by the NFS, therefore, the BCOES process as described in ER 415-1-11 does not apply. The SWG BCOES process will be followed to document compliance with Owners Intent for Operation and Maintenance, as a process for engaging all District resources in the project review, and as a comprehensive check prior to authorizing the NFS to initiate construction. The value of a BCOES review is based on minimizing problems during the construction phase through effective checks performed by knowledgeable, experienced personnel prior to advertising for a contract. BCOES requirements must be emphasized throughout the planning and design processes for all programs and projects, including during planning and design. It will also help ensure that the construction will be done efficiently and in an environmentally sound manner, and that the construction activities and

documents will reduce risks of cost and time growth, unnecessary changes and claims, as well as support safe, efficient, sustainable operations and maintenance by the facility users and maintenance organization after construction is complete. A BCOES Review will be conducted for this project. Requirements and further details (**Table 4**) are stipulated in ER 1110-1-12 and ER 415-1-11.

Table 4. BCOES Team Member Expertise Requirement

BCOES Team Members/Disciplines	Expertise Required
Project Manager (PM)	The team member should have at least 7 years of project management related to navigation projects.
Construction Project Engineer (CPE)	The team member should have at least 7 years of construction contract management with navigation project features.
Real Estate	The team member should have at least 7 years of Real Estate experience associated with navigation projects.
Safety & Occupational Health	The team member should have at least 7 years of safety and occupational health related experience associated with navigation projects.
Environmental	The team member should have at least 7 years of environmental experience associated with the SWG District, State of Texas and Federal interests relating to navigation projects.
Resident/Area Engineer	The team member should have at least 7 years of construction experience associated with navigation projects.
Value Engineering (VE) Officer	The team member should have at least 7 years of Value Engineering Management experience relating to navigation projects.
Operations Manager	The team member should have at least 7 years of operation management relating to navigation projects.
Contract Specialist	The team member should have at least 7 years of contract specialist experience relating to navigation projects.
Office Of Counsel/Attorney	The team member should have at least 7 years of legal experience relating to navigation projects.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

- 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 Preconstruction Engineering and Design Phases). The EC defines Section 2035 Safety Assurance Review (SAR), Type II Independent External Peer Review (IEPR). The EC also requires Type II IEPR be managed and conducted outside USACE.
- b. Decision on Type I IEPR.** A Type I IEPR is typically associated with decision documents.
- c. Decision on Type II IEPR.** A Type II IEPR is typically associated with WRDA 2007 Section 2035 factors for Safety Assurance Review (termed Type II IEPR in EC 1165-2-217). The factors in determining whether a Type II IEPR review of design and construction activities of a project is necessary are based on the EC 1165-2-217 Type II IEPR Risk Informed Decision Process. The following EC 1165-2-217 risk decision criteria are followed by a statement that forms the basis for the Type II IEPR determination.
 - (1) The failure of the project would pose a significant threat to human life.
 - (2) The project involves the use of innovative materials or techniques.
 - (3) The project design lacks redundancy.
 - (4) The project has unique construction sequencing or a reduced or overlapping design construction schedule.

The District Engineering & Construction Chief has assessed the project and determined that a Type II IEPR is not necessary; none of the 4 criteria are met.

7. POLICY AND LEGAL COMPLIANCE REVIEW

The Galveston 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 will be reviewed for legal sufficiency prior to approval for advertisement.

8. PACKAGE RECEIPT AND REVIEW

Each package submitted by the NFS will be initially screened by the Lead Engineer against requirements in Appendix A to determine suitability for the package to start the review. If any items from the checklist are missing or content of the submission has clear quality control/assurance problems, the package will be returned to PHA to correct. The reviews will be rescheduled to start without a reduction in duration when the corrected package can be resubmitted.

9. MODEL CERTIFICATION AND APPROVAL

The project does not propose the use of any engineering or planning models that have not been certified or approved for use by USACE.

10. PROJECT DELIVERY TEAM DISCIPLINES

Discipline
Project Manager
Engineering, Project Lead
Engineering, Hydraulics & Hydrology
Engineering, Geotechnical & Structures
Engineering, Cost Engineering
Construction Management
Operations Manager
Environmental, NEPA
Real Estate
Contracting
Counsel

11. REVIEW SCHEDULES AND COSTS

a. Review Schedule. Duration includes review and conference. Does not include backcheck, resolving comments, and/or revisions. All reviews will be conducted concurrently at the 65% and final level. An interim presentation-style meeting (2-hours per meeting for Segments 1-2 and Segments 3-4), performed between the 95% and 100% deliverables, will be conducted by PHA to USACE to address the major comments received at the 65%.

Table 5. ATR Review Schedules

Task	Start	Finish
Design Package 2: Beltway 8 Site Preparation (Segment 4)		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021
Design Package 3: Segment 1A, Widen HSC from to 700 feet BOLIVAR ROADS TO REDFISH, HSC STA 138+369 to 100+000		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021
Design Package 4 – Segment 1A/1B, Widen HSC from to 700 feet BOLIVAR ROADS TO REDFISH, HSC STA 100+000 to 73+934, HSC REDFISH TO BAYPORT, STA 73+934 to 57+000		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021
Design Package 5: Segment 1B, 2, Widen HSC from Redfish to Bayport to 700 feet/Relocate Barge Lanes, HSC STA 57+000 to 28+605; Widen BSC to 455 feet, Bayport Ship Channel STA 24+187.31 to 2+558.69		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021

Task	Start	Finish
Design Package 6: Segment 1C, Widen HSC to 700 feet/Relocate Barge Lanes Dredging: Bayport (Beacon 76) To Morgans Point HSC STA 28+605 To 14+000, HSC STA 14+000 To -3.94		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021
Design Package 7: Segment 3, Widen BCC to 455 feet/Combined Flare/Turning Basin Dredging: Barbours Cut Ship Channel, Station 28+605 to 14+000		
PHA Submits 65 Percent Plans and Specifications	-	14 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	15AUG 2020	28 SEP 2020
PHA Submits Final Plans and Specifications		28 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	28 DEC 2020	11 FEB 2021
Design Packages 8: Segment 4, Beltway 8 New DMPA One Time Placement for New Work Dredging, HSC STA 684+03.19 to 930+00 (see Design Package 9 for new work dredging details)		
PHA Submits 65 Percent Plans and Specifications	-	14 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	15AUG 2020	28 SEP 2020
PHA Submits Final Plans and Specifications		28 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	28 DEC 2020	11 FEB 2021
Design Package 9: Segment 4, Widen HSC Boggy Bayou to Greens Bayou up to 530, Deepen HSC Boggy Bayou to Hunting Turning Basin up to 46.5 feet MLLW		
PHA Submits 65 Percent Plans and Specifications	-	14 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	15AUG 2020	28 SEP 2020
PHA Submits Final Plans and Specifications	-	14 AUG 2020
USACE Reviews (Final Review/ATR/BCOES)	15AUG 2020	28 SEP 2020

b. **ATR Cost.** Funds will be budgeted to execute ATR and schedule, as outlined above.

12. FINAL APPROVAL TO SOLICIT CONTRACTS

In accordance with ER 1165-2-208 (Section 6), construction may not be initiated by the NFS until the designs, detailed plans and specifications, and arrangements for such work have been approved by the Government. USACE, Galveston District, will base that approval, in the form of a memo provided to PHA, on the results of these reviews. Approval will be granted after all reviews are completed and successfully back checked, all comments closed in PROJNET, and the final legal compliance review is completed.

13. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- Galveston District Project Manager, Andrea Catanzaro, (409)-766-6346
- Galveston District Technical Lead Engineer, Nancy C. Young, (409)-766-3147
- Galveston District Deputy Chief, Engineering Division, Joseph L. King, (409) 766-6373
- Southwestern Division Engineering, Michael C. Sterling, (409) 487-7096

ATTACHMENT 1 – ACRONYMS AND ABBREVIATIONS

Term	Definition
ATR	Agency Technical Review
BCOES	Biddability, Constructability, Operability and Environmental and Sustainability Review
BUS	Beneficial Use Site
USACE	U.S. Army Corps of Engineers
DQC	District Quality Control
DQC/QA	District Quality Control/Quality Assurance
EA	Environmental Assessment
E&C	Engineering and Construction
EC	Engineer Circular
EIS	Environmental Impact Statement
ER	Engineer Regulation
HFP	Hurricane Flood Protection
HQUSACE	Headquarters, U.S. Army Corps of Engineers
IEPR	Independent External Peer Review
ITR	Independent Technical Review
MSC	Major Subordinate Command
NEPA	National Environmental Policy Act
NFS	Non-Federal Sponsor
NW	New Work Dredging
PDT	Project Delivery Team
PMP	Project Management Plan
QA	Quality Assurance
QC	Quality Control
RMO	Review Management Organization
RMC	Risk Management Center
RP	Review Plan
SNND	Sabine Neches Navigation District
SNWW	Sabine Neches Waterway
SWG	Southwest Galveston District
VE	Value Engineering
WRRDA	Water Resources Reform and Development Act

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**US Army Corps
of Engineers** ®

CHAPTER I

**Houston Ship Channel Expansion
Channel Improvement Project
Harris, Chambers and Galveston Counties, Texas**

Preconstruction Engineering and Design
(Plans, Specifications and Design Documentation Report)

Port of Houston Authority Contracts

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CHAPTER I:

DESIGN PACKAGE DESCRIPTONS

1. DESIGN PACKAGES INFORMATION

- a. The NFS and its AE contractors will prepare a total of eight (8) design packages (Design Packages 2-9) for construction by the NFS which will be review by USACE during PED. Reviews for Design Package 1 are covered under a separate review plan. Design Packages 2-9 are described as follows:

Design Package 2. Design Package 2 is for work associated with Segment 4 and includes work for site preparation the one-time use of Beltway 8 DMPA. Site preparation includes design for site clearing and grubbing, concrete demolition (removal of ammunition bunkers and roadways), pipeline permitting, design, coordination and relocation, and temporary access road design and coordination. The actual design of DMPA features (e.g. dike) for the Beltway 8 DMPA is Design Package 8.

Design Package 3. Design Package 3 is for new work dredging, placement and mitigation associated with Segment 1A to widen the HSC from 530 to 700 feet from Bolivar Roads to Redfish Reef (HSC STA 138+369 to 100+000). This design package also includes associated relocation of the HSC barge lanes to accommodate the proposed widening. Dredging of new work material would be performed with a hydraulic pipeline dredge with beneficial placement of the new work material into two locations: 8-acre Bird Island and Long Bird Island. Mitigation work included in this design package includes placement of oyster cultch to armor the two bird islands.

Design Package 4. Design Package 4 is for new work dredging and placement associated with Segments 1A and 1B to widen the HSC from 530 to 700 feet from Bolivar Roads to Redfish Reef (HSC STA 100+000 to 73+934) and Redfish Reef to BSC (HSC STA 73+934 to 57+000). This design package also includes associated relocation of the HSC barge lanes to accommodate the proposed widening. Dredging of new work material would be performed using mechanical dredging equipment (e.g. bucket and scows) with placement of the new work material into the existing ODMDS.

Design Package 5. Design Package 5 is for new work dredging, placement and mitigation associated with Segments 1B and 2 to widen the HSC from 530 to 700 feet from Redfish Reef to BSC (HSC STA 57+000 to 28+605) and widen BSC from 400 to 455 feet (BSC STA 24+187.31 to 2+558.69). This design package also includes associated relocation of the HSC barge lanes to accommodate the proposed widening. In addition, the package also includes design work for the bulkhead along the north shoreline of the BSC at San Jacinto College. Dredging of new work material would be performed using a hydraulic pipeline dredge with placement of the new work material beneficially to partially create containment dikes for the 3 Bird Island Marsh and oyster mitigation mounds at San Leon and Dollar Reef mitigation sites. Mitigation work includes placement of oyster cultch to armor the 3 Bird Island Marsh and oyster mitigation mounds.

Design Package 6. Design Package 6 is for new work dredging and placement associated with Segment 1C to widen the HSC from 530 to 700 feet from BSC to Morgans Point (HSC STA 28+605 to 227+48.18). This design package also includes associated relocation of the HSC barge lanes to accommodate the proposed widening. Dredging of new work material would be performed using a hydraulic pipeline dredge with placement of the new work material beneficially to create dikes

at Atkinson Island Marsh Cells M7/8/9 and M11, and to partially create containment dikes for the 3 Bird Island Marsh).

Design Package 7. Design Package 7 is for new work dredging and placement associated with Segment 3 to widen the BCC from 400 to 455 feet (BCC STA 10+00 to 67+10.85). Dredging of new work material would be performed using a hydraulic pipeline dredge with placement of the new work material beneficially to create dikes at Atkinson Island Marsh Cell M12. The package also includes design work for the bulkhead along the north shoreline at Spillman Island and performing a clean sweep of the Cedar Bayou Navigation Channel following completion of the proposed M12 beneficial use site.

Design Package 8. Design Package 8 is for construction of the Beltway 8 one-time use DMPA to contain new work material dredged to deepen and widen Segment 4, HSC Boggy Bayou to Hunting Turning Basin (HSC STA 684+03.19 to 930+00) up to 530 feet (See Design Package 9 for scope of channel modifications). Beltway 8 containment dikes will be raised to an elevation of approximately 29 feet NAVD 88.

Design Package 9. Design Package is for new work dredging and placement associated with Segment 4 to widen the HSC up to 530 feet and deepen the HSC to the Hunting Turning Basin up to 46.5 feet MLLW (HSC STA 684+03.19 to 930+00) up to 530 feet. Dredging of new work material would be performed using a hydraulic pipeline dredge with placement of the new work material beneficially to raise the elevation of the Beltway 8 to 27 feet NAVD 88.

- b. Non-Federal PED work.** The NFS has hired three AE firms - HDR Engineering, Inc (HDR), AECOM Inc. and a Joint Venture (JV) of Turner Collie and Braden, Inc. (TC&B), and Gahagan Bryant Associated, Inc. (GBA) - to provide the design, P&S, DDR and surveys for PED. NFS will deliver the Design Packages to consist of the P&S, DDR and documentation of their internal peer reviews.

2. REVIEW PLAN

a. District Review (DR)

District Quality Control and Quality Assurance activities for the project implementations documents are stipulated in ER 1110-1-12, Engineering & Design Quality Management. The P&S and DDR will be prepared by the NFS AE firms, HDR Engineering, Inc (HDR), AECOM Inc. and a Joint Venture (JV) of Turner Collie and Braden, Inc. (TC&B), and Gahagan Bryant Associated, Inc. (GBA) using ER 1110-1-12 procedures and will undergo District Review.

- (1) DR Certification.** The DR certification will not be required based on a low-risk decision on design and computations that do not involve life safety, operational adequacy or large economic consequences.

b. Agency Technical Review (ATR)

The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate.

- (1) Risk Informed Decision on Appropriate Level of Review.** The contract consists of new work (NW) dredging on the NRC as defined in the overall RP and Paragraph 2.c. The implementation/design documents are being prepared in accordance with EC 1165-2-217. An ATR of the P&S and DDR, will be required.

c. BIDDABILITY, CONSTRUCTABILITY, OPERABILITY, ENVIRONMENTAL, AND SUSTAINABILITY (BCOES) REVIEW

The value of a BCOES review is based on minimizing problems during the construction phase through effective checks performed by knowledgeable, experienced personnel prior to advertising for a contract. BCOES requirements must be emphasized throughout the planning and design processes for all programs and projects, including during planning and design. It will also help ensure that the construction will be done efficiently and in an environmentally sound manner, and that the construction activities and documents will reduce risks of cost and time growth, unnecessary changes and claims, as well as support safe, efficient, sustainable operations and maintenance by the facility users and maintenance organization after construction is complete. A BCOES Review will be conducted for this project. Requirements and further details are stipulated in ER 1110-1-12 and ER 415-1-11. This contract is expected to be Design-Bid-Build (DBB) method of delivery.

d. REVIEW SCHEDULE, COSTS, AND ROSTER.

The NFS awarded AE contracts to AECOM, HDR and the Joint Venture and began their internal process of performing engineering and environmental analyses and preparing plans and specifications for eight (8) design packages described in Section 1.a. above. The PM and Technical Lead provided guidance on the importance of this RP.

(1) Project Milestones.

Task	Start	Finish
Design Package 2: Beltway 8 Site Preparation (Segment 4)		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021
Design Package 3: Segment 1A, Widen HSC from to 700 feet BOLIVAR ROADS TO REDFISH, HSC STA 138+369 to 100+000		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021
Design Package 4 – Segment 1A/1B, Widen HSC from to 700 feet BOLIVAR ROADS TO REDFISH, HSC STA 100+000 to 73+934, HSC REDFISH TO BAYPORT, STA 73+934 to 57+000		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021
Design Package 5: Segment 1B, 2, Widen HSC from Redfish to Bayport to 700 feet/Relocate Barge Lanes, HSC STA 57+000 to 28+605; Widen BSC to 455 feet, Bayport Ship Channel STA 24+187.31 to 2+558.69		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021

Task	Start	Finish
Design Package 6: Segment 1C, Widen HSC to 700 feet/Relocate Barge Lanes Dredging: Bayport (Beacon 76) To Morgans Point HSC STA 28+605 To 14+000, HSC STA 14+000 To -3.94		
PHA Submits 65 Percent Plans and Specifications	-	03 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	04 AUG 2020	03 SEP 2020
PHA Submits Final Plans and Specifications	-	15 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	16 DEC 2020	05 FEB 2021
Design Package 7: Segment 3, Widen BCC to 455 feet/Combined Flare/Turning Basin Dredging: Barbours Cut Ship Channel, Station 28+605 to 14+000		
PHA Submits 65 Percent Plans and Specifications	-	14 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	15AUG 2020	28 SEP 2020
PHA Submits Final Plans and Specifications		28 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	28 DEC 2020	11 FEB 2021
Design Packages 8: Segment 4, Beltway 8 New DMPA One Time Placement for New Work Dredging, HSC STA 684+03.19 to 930+00 (see Design Package 9 for new work dredging details)		
PHA Submits 65 Percent Plans and Specifications	-	14 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	15AUG 2020	28 SEP 2020
PHA Submits Final Plans and Specifications		28 DEC 2020
USACE Reviews (Final Review/ATR/BCOES)	28 DEC 2020	11 FEB 2021
Design Package 9: Segment 4, Widen HSC Boggy Bayou to Greens Bayou up to 530, Deepen HSC Boggy Bayou to Hunting Turning Basin up to 46.5 feet MLLW		
PHA Submits 65 Percent Plans and Specifications	-	14 AUG 2020
USACE Reviews (65 Percent Review/ATR/BCOES)	15AUG 2020	28 SEP 2020
PHA Submits Final Plans and Specifications	-	14 AUG 2020
USACE Reviews (Final Review/ATR/BCOES)	15AUG 2020	28 SEP 2020

(2) **Contract Review Cost.** Funds will be budgeted to execute the ATR and schedule for reviews, as outlined above.

(3) Team Roster.

CONTRACT 1 – TEAM ROSTER

DISTRICT TEAM		
Discipline	Agency	Team Member Name
Project Manager	USACE-SWG	Andrea Catanzaro
Technical Lead	USACE-SWG	Nancy C. Young
Cost	USACE-SWG	Dale Williams
Geotechnical	USACE-SWG	Thomas West
Environmental (NEPA)	USACE-SWF(RPEC)	Harmon Brown
Real Estate	USACE-SWG	Kenny Pablo
Structural	USACE-SWG	Ignacio Toledo-Rodriguez
H&H	USACE-SWG	Patrick Kerr
Office of Counsel	USACE-SWG	Stakely McConnell
Contracting	USACE-SWG	Jeff Neill

DISTRICT REVIEW TEAM		
Title	Agency	Name
Cost Engineer	USACE-SWG	Willie Joe Honza
Environmental (NEPA)	USACE-SWF(RPEC)	Jeff Pinsky
Geotechnical Engineer	USACE-SWG	Brad Boothby
General Engineer	USACE-SWG	Lori K. Thomas
Structural	USACE-SWG	David Rocha
Civil Engineering	USACE-SWG	Cesar Ramos
Chief of Engineering	USACE-SWG	Willie Joe Honza
Deputy Chief of E&C	USACE-SWG	Joseph L. King
Chief of E&C	USACE-SWG	Robert C Thomas
H&H	USACE-SWG	Coraggio Maglio
Survey	USACE-SWG	Mike Sells

BCOES REVIEW TEAM		
Title	Agency	Name
Construction Project Engineer	USACE-SWG	TBD
Resident Engineer	USACE-SWG	Al Meyer
Operations Manager	USACE-SWG	Tricia Campbell
Safety & Occ Health Officer	USACE-SWG	Jason Shreve
Environmental (NEPA)	USACE-RPEC	Harmon Brown
Value Management	USACE-SWG	Jake Walsdorf
Real Estate	USACE-SWG	Kenny Pablo

Design Levels and Reviews for Navigation Projects

Appendix A

DESIGN LEVELS AND REVIEWS FOR THE HSC ECIP

PHA will provide 65%, 95% and 100% (Final) design for all design packages in three submittals for SWG review

- 65%
- 95%
- 100% (Final) (pertain only to USACE construction contracts)

95% level design provided by PHA will be input for USACE post-95% (pre-contracting) processes for Design Package 1.

For Design Packages 2-9, PHA will provide two separate interim, presentation-style meetings (targeted to occur between the 95% and 100% submittals) to the USACE for Segments 1-2 (Design Packages 3, 4, 5, 6) and Segments 3-4 (Design Packages 2, 7, 8, 9), respectively. The intent of these 2-hour allotted meetings will be to discuss the substantial comments received at the 65% and the proposed pathway forward moving into the 100% and BCOES.

Definition of 35%, 65%, 95%, 100% BCOES design milestones for all contracts includes, but is not limited to, the following:

Pre-35% (not a review – just info needed by 35%)

- Project Schedule – preliminary Feasibility Study schedule, updated with projected contracts renumbered in Dec2019
 - Complete for entire project and committed to following Project Initiation/Change (PIC) process
- Project Management Plan (PMP) signed
- Review Plan (RP) signed
- Design Quality Control Plan (DQCP)
- AE DQCP submitted, to include Designer(s) of Record, and design team members. Submitted with each design task
- Prepare Value Management Plan for Value Engineering Study
- Acquisition plan- this is input from Contracting – USACE construction contract only
 - 95% draft for first contracts
 - Conceptual plan for all contracts with adaptive strategy
- Real estate access and requirements identified. Review of Feasibility Study Appendixes (FS)
 - *Real estate access might be verified after the size of the PA is determined.*
 - Engineering Appendix – design criteria established
 - Environmental Appendix – environmental criteria established
 - Identify elements needing additional analysis
 - Identification of long lead items, missing items; risks
 - Comparison between FS level and current conditions
 - Taking letter sent for required acquisition
- Geotechnical data is defined and is requested

- Hydrosurvey/land survey requirements are defined and requested Storyboard of needed drawings (prior to 35% milestone) - similar to a digital poster presentation to show what is going to happen, identify the scope of the work, and provide a broad overview of project.
 - Completed in Feasibility Study
- Rough estimate of quantities for planning purposes
 - Completed in Feasibility Study
- Placement areas defined, capacity and assessment, design criteria defined.
- Drawings
 - Rough typical section and or details (for VE study)
 - Plans to display, from upstream to downstream, the projected format
 - List of drawing sheets
 - Provided in appropriate MicroStation format
- ATON coordination with USCG

35% (over the shoulder intended to save time and money in future reviews – PHA has passed this review so the contents must be included at 65%)

- All of the pre-35% plus:
- Field investigations (including geotech) with reports and conclusions – confirmation of data collection, location & schedule
- Channel limits defined; channel alignment(s) defined; design criteria defined; identify deviations from Engineering Appendix.
 - Include global advanced maintenance plan
- Specifications – table of contents (determine needed sections)
 - General specifications for waterway
 - Contract specifications
- DDR – write-up of project scope, project introduction, complete design basis; establish outline
 - Identify any OM manuals required (provided by USACE if required)

65% (DQC, ATR, & BCOES)

- All of the pre-65% plus:
- Completed Value Engineering Study and Report
- VE study is completed during ATR and draft recommendations are incorporated into final ATR comments
- All H&H analysis complete (including Ship Simulation Report)
- Environmental Coordination and Compliance Documentation Complete (no unresolved issues)
- NFS Provided Design Quality Control Documentation Report
- Drawings
 - Add drawings needed for full package
 - Typical details, cross sections
 - Alignment, Vertical/horizontal data tables and such
- Specifications – prepared in SpecsIntact for Design Package 1, prepared to PHA specifications for Design Packages 2-9
- Design - design of project features

- Channel template defined; with draft volume calc.; advanced dredging analysis complete, incorporated in design and documented in DDR
- Channel alignment defined; slopes defined
- Channel material characteristics defined
- Placement Areas
 - Capacity
 - Location,
 - Drop outlet structure
 - Slope stability (all new PAs, to include BUS)
 - Soil analysis (all new PAs, to include BUS)
 - Rough order of magnitude quantities for major bid items only to enable funding evaluation
- Final commitment meeting on design template
 - Document in agreement memo
- DDR – discipline write-ups begin
 - Everything included for design up to this point
 - Identity designers by name, and what they're responsible for
 - Identify surveyors by name, and what they're responsible for
 - Identify POC for third party design elements used
 - Identify changes from the feasibility recommended plan and explain
- ECIFP (Engineering Considerations and Instructions for Field Personnel) – starting write-up
 - Rough draft for reviews
- Calculate LDs and construction duration
- Specification sections, to include all planned sections and a Bid Schedule with planned bid items and draft volumes
 - Spec sections should have initial edits

95% (DQC, ATR, BCOES)

- All of the pre-final plus:
- RE acquisition and utility/pipeline relocations complete
- Drawings
 - Complete set of details, cross sections, etc.
- Design
 - All analysis complete. Do not submit if designs are still ongoing.
- DDR - complete
- Specifications – complete
- ECIFP – complete

100% (Final) (DC, ATR, BCOES)

- Signed set of drawings (plans)
- Complete contract includes all required documentation and information ready for solicitation
- RE acquisition and utility/pipeline relocations complete
- Drawings
 - Complete set of details, cross sections, etc.
- Design

- All analysis complete. Do not submit if designs are still ongoing.
- DDR - complete
- Specifications –complete
- ECIFP – complete