

REVIEW PLAN

**Houston Ship Channel 45-Foot Expansion Channel Improvement Project
(HSC ECIP), Harris and Chambers Counties, Texas
Feasibility Study**

**U.S. Army Corps of Engineers
Galveston District**

MSC Approval Date: 15 January 2016

Last Revision Date: 17 December 2015



**US Army Corps
of Engineers®**

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1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This Review Plan defines the scope and level of peer review for the Houston Ship Channel 45-foot Expansion Channel Improvement Project (HSC ECIP), Harris and Chambers Counties, Texas, Feasibility Study. Given the complexity and large scope of this feasibility study effort, a mega study protocol will be adopted. The mega study protocol (MSP) includes a framework for executive and technical oversight and project delivery team member and reviewer qualifications, as well as communications and cost/schedule management. The MSP supplements this document, and like the Review Plan is an addendum to the project management plan (PMP). The purpose of this study is to develop a feasibility report to evaluate opportunities for navigational improvements to the Houston Ship Channel (HSC).

b. References

- (1) Engineering Circular (EC) 1165-2-214, Civil Works Review, 15 Dec 2012
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- (4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- (5) Houston Ship Channel Expansion Project Management Plan (under development)
- (6) SWG Quality Management Plan
- (7) SWD Quality Management Plan

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 outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the U.S Army Corps of Engineers National Deep-Draft Navigation Planning Center of Expertise (DDNPCX) located in the Mobile District.

The RMO will coordinate with the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules, risk analysis, Total Project Cost Summary (TPCS), and contingencies.

3. STUDY INFORMATION

Authorization for the study is Public Law 91-611; Title II - Flood Control Act of 1970, Section 216 dated December 31, 1970. The study is being performed in response to the standing authority of Section 216 of the Flood Control Act of 1970, as amended, which authorizes studies to review the operation of completed Federal projects and recommend project modifications “when found advisable due to significantly changed physical or economic conditions...and for improving the quality of the environment in the overall public interest”.

Section 216 of the Flood Control Act of 1970 (33 USC 426 et seq) as amended reads: *“The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operations of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest.”*

- a. **Decision Document.** The HSC 45-Foot Expansion study will result in an integrated feasibility report and Environmental Impact Statement (EIS) that will require Congressional authorization. The study fits into the overall concept of the authorization to conduct a review of the operations of the constructed project in the interest of navigation due to changed physical or economic conditions. Pursuant to the National Environmental Policy Act (NEPA), an EIS will be integrated in the Draft Feasibility Report (DFR). The study effort will result in a Report of the Chief of Engineers.

- b. **Study/Project Description.** The HSC provides access to various private and public docks and berthing areas associated with the Port of Houston. It is the longest major navigation channel of a larger system of navigation channels of the Galveston Bay Area located in Harris, Chambers and Galveston Counties, Texas. The HSC is approximately 50 miles in length. It begins at Bolivar Roads at mile 0 and continues to the Main Turning Basin (terminal point for the HSC at mile 50). The authorized channel dimensions within the HSC vary. From Bolivar Roads (mile 0) to Boggy Bayou (mile 38.5) the channel depth is 45 feet and width is 530 feet. Between Boggy Bayou and Sims Bayou (mile 47.5) the channel depth is 40 feet and width is 300 feet. From Sims Bayou to the Main Turning Basin (mile 50), the channel depth is 36 feet and width is 300 feet. Additionally, barge lanes are immediately adjacent to and on either side of the HSC from Bolivar Roads to Morgan’s Point (mile 26), a distance of approximately 26 miles. Each barge lane measures approximately 125 feet wide by 12 feet deep. Dredged material is typically deposited in a variety of upland confined placement area (PA) sites and beneficial use (BU) sites, but some material from the lower bay region has, at times, been placed offshore in the Ocean Dredged Material Disposal Site (ODMDS).

The HSC system also includes side channels known as Bayport Ship Channel and Barbours Cut Channel. The Bayport Ship Channel extends west from the main HSC (mile 21.4) approximately 4.1 miles to the Bayport Terminal. The authorized channel depth is 40 feet, with a width of 300 feet. The Port of Houston Authority (PHA) recently obtained Section 408 approval and a Section 404/10 permit to deepen the channel to 45 feet and widen the bay portion of the channel by 100 feet and widen the constricted portion of the channel within the land cut by 50 feet. The Bayport Ship Channel serves the Bayport Container and Cruise Terminals and two liquid bulk terminals at Odfjell and LBC. Barbours Cut Channel is approximately 1.5 miles in length extending to the west from the main HSC (mile 26.5), north of Morgan’s Point. The Barbours Cut Channel is approximately 300 feet

wide with an authorized depth of 40 feet. The PHA recently obtained Section 408 approval and a Section 404/10 permit to deepen the channel to 45 feet and shift a portion of the channel to the north to provide sufficient berthing space for adjacent private facilities. The Barbours Cut Channel serves the Barbours Cut Container Terminal.

The purpose of the study is to determine if there are opportunities to undertake improvements to the existing HSC, specifically the reach from Boggy Bayou to the Main Turning Basin. The Port of Houston is interested in a depth for this reach of the upstream channel equal to the 45 foot depth of the main channel (from the Entrance up to Boggy Bayou). The study will evaluate deepening and widening of this 12 mile reach of the HSC (mile 38.5 to 50) beyond the existing depth. In addition, the study will evaluate the channel configurations that lead to shipping transit inefficiencies, evaluation of new turning basins, maneuvering and anchorage areas, and revisit dimensions of existing turning basins. The study analysis will also evaluate Bayport and Barbour's Cut Channels, taking into consideration whether to include the Port of Houston's channel deepening for Federal authorization, and to evaluate flare improvements. Given the complexity and geographic scale, the feasibility study will be managed as a mega study with additional requirements as described in the MSP.

- c. **Factors Affecting the Scope and Level of Review.** The costs for the construction of potential deepening and widening alternatives are expected to exceed the mandatory IEPR threshold cost and the study will require an Environmental Impact Statement (EIS). Accordingly, the project will undergo both Agency Technical Review (ATR) and Independent External Peer Review (IEPR).

The factors affecting the risk informed decisions on the appropriate scope and level of review are included below with the assessment (*in italicized font*) of the applicability of that factor to the HSC ECIP Feasibility Study:

- (1) Whether the project will have significant economic, environmental, and social affects to the nation. ***The project will have a positive significant effect to all of these in that the channel will be able to handle larger draft commercial vessels and cargo in a safe manner.*** Additionally, additional placement for dredged material is critical to this effort to ensure that maintenance dredging activities are performed in an environmentally acceptable manner, use sound engineering techniques that are economically justified, and ensure that long-term placement facilities are available.
- (2) Will the project be justified by life safety or is the project likely to involve significant threat to human life/safety assurance. ***The project poses no significant threat to human life.*** It is anticipated that any channel deepening, widening, or construction of placement areas (including any beneficial use or BU areas) would follow established design and construction methods. Expectations are that dredging, placement, and/or construction of new PAs would fall under standard dredging and disposal operations and would not include technologies new to industry.
- (3) Total Project Cost > \$45M. In considering the \$45 million cost trigger, the term "total cost", means the cost of construction (including planning and designing) of the project and includes lands, easements, rights of way, relocations, and disposal areas (LERRDs): *The Water Resources Reform and Development Act of 2014 (WRRDA 2014), Section 1044*

*(Independent Peer Review) increased the \$45M threshold for IEPR to \$200M. The tentatively selected plan for this study has not been identified at this time. **Considering the likelihood that new upland confined placement areas are needed to contain the material for the deepening and widening, and the associated LERRDs required, it is quite likely the cost of the project would exceed \$200M. As such, the District has included IEPR in the schedule.***

- (4) A request by a State Governor of an affected state for a peer review by independent experts. ***It is not anticipated that the office of the Governor or Texas will request a peer review by independent expert; however, the District is not pursuing an exemption from IEPR.***
- (5) Significant public dispute as to size, nature, or effects of the project: ***It is possible there will be significant public dispute as to the size, nature, or effects of the project. It is anticipated that PAs (including any BU areas) would follow established design or construction methods. Dredging methodologies are pretty constant for the HSC; however, the locations of any BU, PAs, or widening efforts could result in public dispute and significant interagency interest.***
- (6) Significant public dispute as to the economic or environmental cost or benefit of the project. ***It is not anticipated that any significant public dispute as to the economic or benefit of the project would occur; however, environmental impacts, mitigation, and/or mitigation costs are very likely open to dispute. Environmental considerations are taken into account through the National Environmental Policy Act (NEPA) EIS. Environmental cost would be in light of adverse effects on environmentally sensitive areas. Depending on location, PAs or widening of the HSC within Galveston Bay, could have impacts on oysters. Dredging within the upper section of the HSC in the land locked portion brings concerns over whether material could be contaminated due to dioxins and proximity to the two superfund sites. If upland PAs are constructed there could be impacts to forested areas.***
- (7) Information is based on novel methods, innovative materials or techniques, presents complex challenges for interpretation, contains precedence-setting methods or models, or presents conclusions that are likely to change prevailing practices: ***The decision document is not likely to contain influential scientific information or be a highly influential scientific project.*** The project is a typical channel improvement project involving traditional methods of dredging, traditional placement of dredged material, and beneficial use of dredged material where possible. Therefore, it is anticipated that there is a minimal risk involved with the project. The final Feasibility Report and supporting documentation will contain standard engineering, economic, and environmental analyses and information. Novel methods will not be utilized and methods, models or conclusions will not be precedence setting or likely to change policy decisions.
- (8) The project design will be typical to normal dredging, placement area construction, BU construction and placement methodologies conducted by the district for navigation projects. As such the project design is not anticipated to require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design construction schedule

- d. **In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC by the SWG (and DDNPCX for the economic analysis), ATR, and IEPR. The non-Federal sponsor for the study is the Port of Houston Authority (PHA). The PHA will perform the majority of the environmental (EIS/NEPA documents) and the engineering analyses. The District will provide oversight of those efforts and perform any activities inherently governmental in nature. Currently, the WIK is being negotiated for specific activities.

4. DISTRICT QUALITY CONTROL

Both the draft report/EIS and the final report/EIS (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC 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). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC. Because this has been deemed a mega-study by SWD, there are 2 layers of DQC planned. The first layer is made up of senior or subject matter experts who are ATR certified within or outside the home District who are not directly involved in this study (see table below). The second layer of DQC is made up of supervisors or section chiefs of the respective disciplines from Galveston District. DQC qualification standards are described in the MSP.

a. Required DQC Level 1 Team Expertise.

DQC Team Members/Disciplines	Expertise Required
DQC Lead	The DQC lead should have extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the DQC process. The DQC lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).
Planning	The Planning reviewer should be certified by the Plan Formulation Sub-CoP as a senior water resources planner with experience related to deep-draft navigation.
Economics	Economics reviewer should be certified by the Economic Sub-CoP as a senior economist with experience in conducting benefits and costs analyses related to deep-draft navigation projects.
Environmental Resources	The Environmental Resources reviewer will have expertise in assessing impacts and developing mitigation for coastal marsh habitats and oyster reef using Habitat Evaluation Procedures and CE/ICA. The reviewer should also have experience related to Hazardous, Toxic and Radioactive Waste (HTRW) assessments.
Geotechnical	The geotechnical engineering reviewer should have an extensive knowledge of the design of open water environments (bays) and upland placement areas (land).
Real Estate	The Real Estate (RE) reviewer should be experienced in deep-draft channels and placement areas real estate requirements, and be selected

DQC Team Members/Disciplines	Expertise Required
	from the enterprise level RE CoP list of approved and qualified reviewers.
Cost Engineering/Estimating	The Cost Engineering/Estimating reviewer should have a strong knowledge of the cost estimating practices for deep draft navigation projects and placement areas.
Hydrology & Hydraulic Engineering/or Coastal Engineering	The H&H or Coastal Engineer Reviewer should have experience with deep-draft navigation channel design and dredged material placement areas.
Construction/Operations	The Operations reviewer should have experience with deep-draft navigation and upland and open water confined placement areas.
Risk Reviewer	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. This review can be combined with either the Economics or H&H reviews.

- b. Documentation of DQC.** District Quality Control will be documented using the Dr. Checks review software/website. The final DrChecks report will be supplied to the ATR team prior to initiation of their review efforts (i.e., prior to ATR of the draft and final reports).

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. 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. The ATR will be managed by the National Deep Draft Navigation Planning Center of Expertise (DDNPCX). A qualified ATR team shall be selected by the RMO. The ATR team will be comprised of senior USACE personnel that may be supplemented by outside experts as appropriate per the MSP. The ATR team lead will be from outside the home MSC. ATR qualification standards are described in the MSP. The public, including scientific or professional societies, will not be asked to nominate potential peer reviewers

- a. Products to Undergo ATR.** Products to undergo ATR will be the Draft and Final Integrated Feasibility Report/EIS and Appendices. ATR is required for this study and will focus on the following:
 - (1) Review of the planning study process as documented in the Main Report,
 - (2) Review of the economic analysis, modeling, and appendix,
 - (3) Review of anticipated environmental impacts and proposed mitigation,
 - (4) Review of engineering design and documentation,
 - (5) Review of the Real Estate Plan, and
 - (6) Completeness of study and support documentation.
- b. Required ATR Team Expertise.**

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATRs for deep-draft navigation studies. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).
Planning	The Planning reviewer should be ATR certified and a senior water resources planner with experience related to deep-draft navigation.
Economics	The Economics reviewer is required to be an economist certified for the deep-draft navigation business line. The economist should also have experience using HarborSym and performing CE/ICA analyses using IWR Plan.
Environmental Resources	The reviewer will have expertise in the preparation of NEPA documents and in assessing impacts and developing mitigation for coastal marsh habitats and oyster reef using Habitat Evaluation Procedures and CE/ICA. The reviewer should also have experience related to Hazardous, Toxic and Radioactive Waste (HTRW) assessments.
Geotechnical Engineering	The reviewer should have an extensive knowledge of the design of open water environments (bays) and upland placement areas (land).
Cost Engineering/Estimating	MCX Staff or MCX-Certified Professional with a strong knowledge of the cost estimating practices for deep draft navigation projects and placement areas.
Real Estate	The Real Estate will be ATR certified by that business line and experienced in deep-draft channels and placement areas real estate requirements.
Hydrology & Hydraulic Engineering/or Coastal Engineering	The H&H or Coastal Engineer Reviewer should have experience with deep-draft navigation channel design and placement areas. Experience with the CMS, ADH, ADCIRC, and STWAVE models.
Construction/Operations	The Operations reviewer should have experience with deep-draft navigation and upland and open water confined placement areas.

c. **Documentation of ATR.** DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. 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 be used:

- (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 on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; 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 addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks 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 either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR Team 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 Team Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for the draft report and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for decision documents under certain circumstances. 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. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist 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. There are two types of IEPR:

- Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.
 - Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.
- a. **Decision on IEPR.** EC 1165-2-214 identifies four mandatory triggers for Type I IEPRs:
- Project is a significant threat to human life.
 - Where the estimated total cost of the project, including mitigation costs, is greater than \$200 million.
 - Where the Governor of an affected State requests a peer review by independent experts.
 - Where the Director of Civil Works (DCW) or the Chief of Engineers (CE) determines that the project study is controversial due to significant public dispute over either the size, nature, or effects of the project or the economic or environmental costs or benefits of the project.

Based on the criteria in EC 1165-2-214, the project will meet one of the mandatory triggers for Type I IEPR, the estimated cost is anticipated to be above \$45 million. Although not one of the four mandatory triggers, it is also noted that the study will include preparation of an EIS. As previously stated, the project poses no significant threat to human life. It is anticipated that any channel deepening, widening, or construction of placement areas (including any beneficial use or BU areas) would follow established design and construction methods. Expectations are that dredging, placement, and/or construction of new PAs would fall under standard dredging and disposal operations and would not include technologies new to industry. As previously stated, the Governor, the DCW, nor the CE has requested nor are they anticipated to request IEPR. However, it is possible there will be significant public dispute as to the size, nature, or effects of the project. It is anticipated that PAs (including any BU areas) would follow established design or construction methods. Dredging methodologies are pretty constant for the HSC; however, the locations of any BU, PAs, or widening efforts could result in public dispute. Type II IEPR are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects (including deep draft) where existing and potential hazards pose a significant threat to human life. Type II IEPR is not warranted for this project.

- b. Products to Undergo Type I IEPR.** Products expected to undergo IEPR are the Draft Integrated Feasibility Report/ EIS and supporting documentation (appendices).
- c. Required Type I IEPR Panel Expertise.** At minimum, the panel should include the necessary expertise to assess the engineering, environmental, and economic adequacy of the decision document as required by EC 1165-2-214, Appendix D. The PDT has made an initial assessment of what expertise is needed based on the PMP and the factors affecting the scope and level of review outlined in the review plan. It is expected that coordination with the PCX and the Outside Eligible Organization (OEO) will determine the final participants on the panel.

IEPR Panel Members/Disciplines	Expertise Required
Civil Works Planner	Minimum of 10 years of demonstrated experience in public works planning with a Master’s degree in a related field. The reviewer should be very familiar with USACE civil works planning policies, methodologies and procedures for evaluating and comparing alternative plans for USACE deep draft navigation projects.
Economics	The Economics Panel Member should have extensive experience related to economic analyses for deep-draft navigation projects. Knowledge of tools employed for economic analysis, including HarborSym, risk analysis, and trade forecasts, as well as CE/ICA is required.
Environmental	The Environmental Panel Member should be an expert regarding NEPA compliance and deep-draft navigation projects and knowledgeable regarding environmental aspects of coastal systems and dredged material management as well as HTRW concerns. Experience with performing CE/ICA is also required.
Geotechnical Engineering	The geotechnical engineering reviewer should have an extensive experience in the design of deep draft navigation channels and dredged material placement areas.
H&H Engineering/ or Coastal Engineering	The H&H or Coastal engineering reviewer should have an extensive experience in channel design as well as the design of dredged material placement areas associated with deep-draft navigation projects.

- d. Documentation of Type I IEPR.** The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D, and no recommendation of panel members will be made by USACE. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments will include the same four key parts as described for ATR comments in Section 5.c. above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:
- 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; 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.

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. CIVIL WORKS COST ENGINEERING AND AGENCY TECHNICAL REVIEW MANDATORY CENTER OF EXPERTISE REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the MCX, located in the Walla Walla District. The MCX will assist in determining the expertise needed on the ATR team and in the development of the review charge. The MCX will also provide the Cost Engineering certification. The RMO is responsible for coordination with the MCX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of the planning product. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used

whenever appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

- a. **Planning Models.** The following planning models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEP-HSI, or WVA	The PDT anticipates use of Habitat Evaluation Procedure (HEP) Habitat Suitability Index (HSI) models and/or the Wetland Value Assessment (WVA) model to quantify, to the extent possible, potential impacts associated with the project or outputs of proposed beneficial use or mitigation. All U.S. Fish and Wildlife Service (USFWS) HSI models were approved by HQ for use (Policy Guidance on Certification of Ecosystem Output Models, 8/13/2008, Recommendation 3) and require no further approval or certification." The USFWS WVA model has been certified and is approved for use along the upper Texas Gulf shoreline. The selection and application of these models will require ATR review.	Certified HEP HSI and/or WVA models
HarborSym	The PDT will utilize HarborSym to evaluate expected economic benefits for multiple widening and deepening alternatives. HarborSym Economics Model – A planning-level simulation model designed to assist in economic analysis of coastal harbors by calculating vessel interactions within the harbor and analyzing delays. The model output can be used to calculate the cost of these delays and any changes in overall transportation costs resulting from proposed modifications to the channel’s physical dimensions or restrictions. HarborSym has been certified for use on Deep Draft navigation studies nationally.	Approved
Economic Reporter	Spreadsheet model used to summarize and annualize the vessel transportation cost savings simulated in HarborSym	TBD
RECONS	RECONS is a regional economic development model used to calculate the regional economic changes in labor income, employment, and gross domestic product as a result of large scale investments.	Approved

Engineering Models. The following engineering models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
Mii - cost estimating models	Cost Engineering's model for developing cost.	Cost Engineering Approved Model
Crystal Ball Risk Based Analysis	Cost Engineering's model for determining risk in cost estimating.	Cost Engineering Approved Model
Coastal Modeling System (CMS)	Two-dimensional model for simulation hydrodynamics, waves, and sediment transport	SET: COP Preferred
Adaptive Hydraulics (ADH)	Two-and three-dimensional model for simulating hydrodynamics and salinity.	SET: COP Preferred
Advanced Circulation Model (ADCIRC)	Two-dimension model of hydrodynamics for storm surge.	SET: COP Preferred
Steady State Spectral Wave Model (STWAVE)	Two-dimensional model of waves, coupled with ADCIRC.	SET: COP Preferred

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost.

Estimated schedule for ATR of the draft Integrated Feasibility Report and EIS

Public Review of Draft Reports	2018 July
ATR of Draft Report (<i>concurrent with Public & Policy Reviews</i>)	2018 July/August
ATR Certification of Draft Report	2018 August
ATR Review of Final Report	2019 February/March
ATR Certification of Final Report	2019 March

- The estimated cost for ATR on the draft report is \$50,000** (typically includes \$5,000 per reviewer plus \$3,000 for the ATR Lead, and \$3,500 for the DDNPCX). **The estimated cost for ATR on the final report is \$35,000** (typically includes \$3,000 per reviewer plus \$3,000 for the ATR Lead, and \$3,500 for the DDNPCX). Costs for participation of the ATR Lead in milestone conferences and any meeting to address the ATR process and any significant and/or unresolved ATR concerns is TBD based on level of involvement. Additional review standards and deliverables are described in the MSP.

b. Type I IEPR Schedule and Cost.

TASK	Date
IEPR – Initiate Coordination	2018 February
IEPR Review Period	2018 July
IEPR Report/Comments in Dr. Checks	2018 August
District Completes Draft Response	2018 August
IEPR Backcheck/Closeout Comments	2018 September
IEPR Certification/Final Report	2018 September
IEPR OEO/Panel participation in ADM	2018 October

IEPR OEO/Panel Lead participation in CWRB
The estimated cost for IEPR is \$250,000.

2019 July

c. Model Certification/Approval Schedule and Cost.

As part of the feasibility study, the District will use existing, certified models. No spreadsheet models will be required for this project.

11. PUBLIC PARTICIPATION

The Draft Integrated Feasibility Report and EIS will be coordinated with the public for a 30-day period concurrently with ATR/IEPR/Policy reviews. Public comments will be addressed and will be incorporated in the report, as appropriate. The public, including scientific or professional societies will not be asked to nominate potential peer reviewers. The final decision document, associated review reports, and USACE responses to IEPR comments will be made available to the public on the District and/or HQUSACE webpages, as appropriate. Public comments will be provided to the IEPR Panel for its consideration.

12. REVIEW PLAN APPROVAL AND UPDATES

The Southwestern Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the decision document as modified by the Mega Study Protocol. Like the PMP, of which this document is a component, the Review Plan is a living document and may change as the study progresses and the MSP is finalized. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, will be posted on the Home District's webpage. The latest Review Plan will also be provided to the DDNPCX and the SWD.

13. REVIEW PLAN POINTS OF CONTACT

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

TBD (Vacant) ¹	RPEC, Chief, Plan Formulation Section	
Saji Varghese	Southwestern Division	469-487-7069
Kim Otto	DDNPCX Review Manager	251-694-3842

¹ Mr. Varghese is the RPEC Plan Formulation Section POC until that position is filled.

ATTACHMENT 1: TEAM ROSTERS

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the <type of product> for <project name and location>. The ATR was conducted as defined in the project’s Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer’s needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

SIGNATURE

Name

ATR Team Leader

Office Symbol/Company

Date

SIGNATURE

Name

Project Manager

Office Symbol

Date

SIGNATURE

Name

Architect Engineer Project Manager¹

Company, location

Date

SIGNATURE

Name

Review Management Office Representative

Office Symbol

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: [Describe the major technical concerns and their resolution.](#)

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE

[Name](#)

Chief, Engineering Division

[Office Symbol](#)

Date

SIGNATURE

[Name](#)

Chief, Planning Division

[Office Symbol](#)

Date

¹ Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DX	Directory of Expertise	OEO	Outside Eligible Organization
EA	Environmental Assessment	OSE	Other Social Effects
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PAC	Post Authorization Change
ER	Ecosystem Restoration	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	QMP	Quality Management Plan
FRM	Flood Risk Management	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
GRR	General Reevaluation Report	RED	Regional Economic Development
Home District/MSD	The District or MSC responsible for the preparation of the decision document	RMC	Risk Management Center
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMO	Review Management Organization
IEPR	Independent External Peer Review	RTS	Regional Technical Specialist
ITR	Independent Technical Review	SAR	Safety Assurance Review
LRR	Limited Reevaluation Report	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act
<u>MSP</u>	<u>Major Study Protocol</u>		