US Army Corps of Engineers ®

REVIEW PLAN

Cedar Bayou, Texas
Dredged Material Management Plan

Galveston District

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Dredged Material Management Plan

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Cedar Bayou, Texas Dredged Material Management Plan (DMMP). The Cedar Bayou, Texas Project is a federally authorized navigation channel that is currently maintained at dimensions of 10-feet deep (Mean Low Tide) by 100-feet wide from its junction with the Houston Ship Channel at Mile -2.5 and ending at approximately Mile 3 on Cedar Bayou. Navigation improvements to Cedar Bayou were originally authorized by the Rivers and Harbor Act of 1890 and included channel from Mile -2.5 to Mile 11. The channel was authorized to its present dimensions under the Rivers and Harbor Act of 1930; however, the segment from Mile 3.0 to Mile 11 was subsequently deauthorized in 1986, leaving only the lower 5.7 miles of channel. In 2007 the upper portion of the channel from Mile 3.0 to Mile 11 was reauthorized. That portion of the Channel from Mile 3.0 to Mile 11 is not covered under this DMMP. The DMMP addresses dredging management needs over a 20-year period of analysis with consideration of alternatives to produce the most viable means of dredge material placement.

b. References

(1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, Change #1, 31 Jan 2010
(2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2010
(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) Cedar Bayou, Texas, Dredged Material Management Plan Study, Project Management Plan, September 2011.

c. Requirements. This review plan was developed in accordance with EC 1165-2-209, 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 1165-2-209) 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 Inland Navigation Center of Expertise.

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to conduct ATR of cost estimates, construction schedules, risk analysis, Total Project Cost Summary (TPCS), and contingencies.

3. STUDY INFORMATION

a. Decision Document. The decision document being reviewed under this plan is the Cedar Bayou, Texas, Dredged Material Management Plan (DMMP). The DMMP addresses changes and needs in placement area capacities since the original coordination of placement areas in the *Maintenance Dredging, Cedar Bayou Channel, Texas, Final Environmental Statement*, US Army Engineer District, Galveston, Texas, dated 12 June 1975. The level of approval for this decision document will be at Division level through Operations. The decision document will include an Environmental Assessment (EA). The approval level for the DMMP is the Southwestern Division.

b. Study/Project Description.

Cedar Bayou is a natural stream originating east of Houston in Liberty County, Texas (Figure 1). The bayou flows approximately 45 miles to its confluence with Galveston Bay, and forms the boundary between Harris and Chambers Counties. The bayou becomes navigable by commercial barge traffic just south of State Highway (SH) 146 in the City of Baytown. From SH 146, the navigation channel follows Cedar Bayou along the east edge of the urbanized portion of Baytown to its confluence with Galveston Bay, then turns westward and traverses Upper Galveston Bay and Tabbs Bay to the Houston Ship Channel. The name of the project encompassing this lower 14 miles of channel (HSC to State Highway 146) is referred to as Cedar Bayou, Texas.

Galveston District has improved and currently maintains the lower 5.7 mile portion of channel from the HSC at Mile -2.7 to Mile 3.0 (Figure 2). This is the portion of the channel covered this DMMP. The authorized 5.7 mile project is a shallow draft channel measuring 10 feet deep (Mean Low Tide) by 100 feet wide. The suggested dredging frequency for the channel is approximately every five years. Historically, approximately 503,500 cubic yards of material have been dredged during each dredging cycle. That equates to a shoaling rate of approximately 100,700 cubic yards annually.

Cedar Bayou is not federally maintained for navigation above Mile 3; however, the reach above Mile 3 is used for commercial shipping, and the *Cedar Bayou Navigation District Channel Improvement Project, Chambers and Harris Counties, Texas, Final Feasibility Report* (Report) dated August 2005, and revised March 2006, recommended channel improvements from Mile 3 to just south of SH 146.

The Report recommended channel improvements beginning at Mile 3, which is the northern end of the existing 5.7 miles of federally maintained channel, and ending at Mile 11 just downstream from the SH 146 Bridge. The Report recommended that the dimensions match the existing federally maintained channel along with selective widening and bend easing, a passing lane at approximately Mile 8, and a cut-off channel at Devil's Elbow. The Report also included a 50-year DMMP with three Placement Areas (PAs) that were designated for the placement of dredged material from that portion of the channel located above Mile 3.

Figure 1 – Vicinity Map

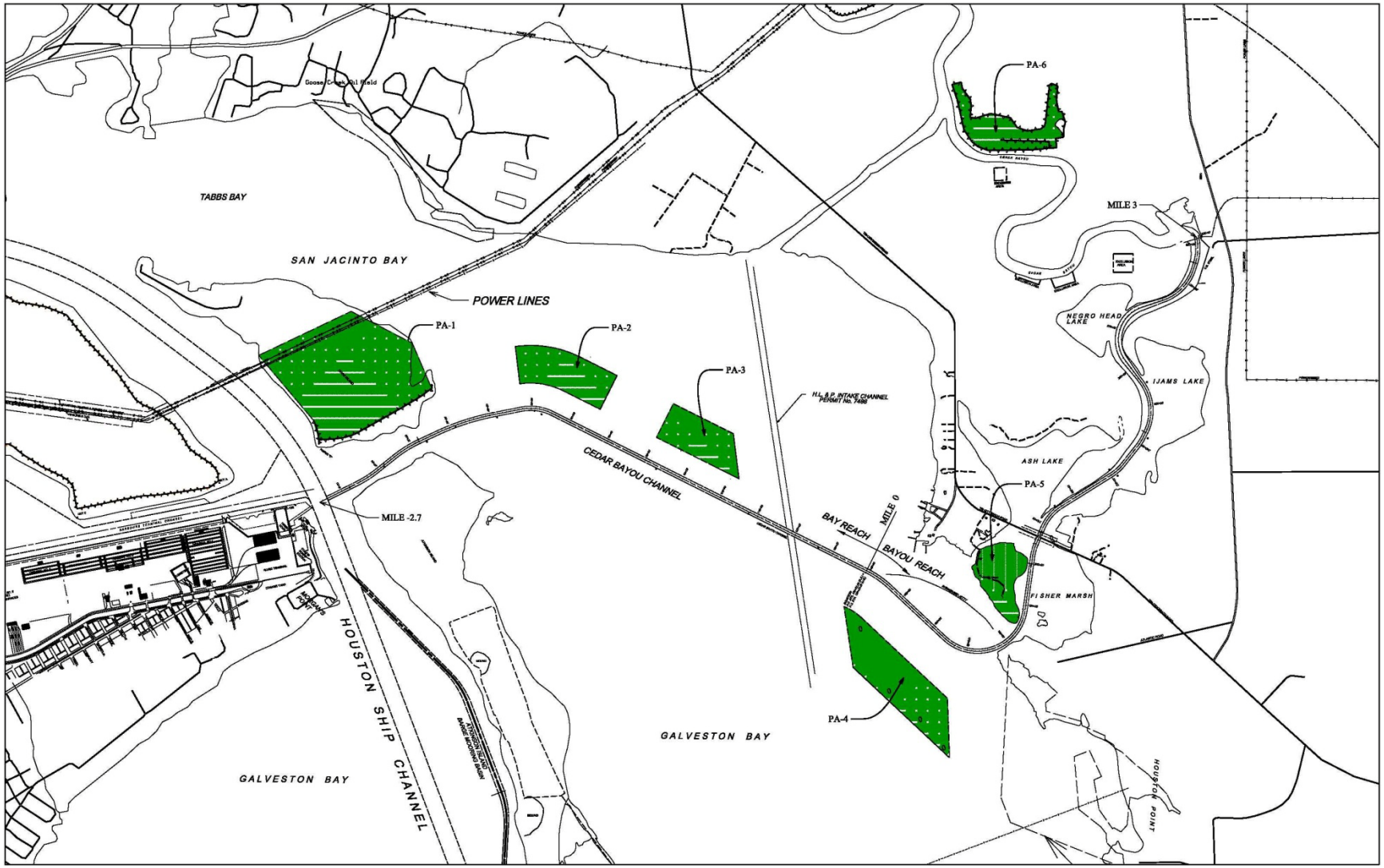

Figure 2 – Location of lower 5.7 mile channel segment of Cedar Bayou, Texas

Barge traffic occurs in both the lower and upper portions of the channel. Major commodities that are shipped on the channel include steel, non-metallic minerals (aggregates), industrial chemicals, and petroleum.

The Corps is committed to environmentally sound dredging and placement or management of dredged materials as defined by applicable laws and policies. This can best be achieved through the development of a long-term management strategy for dredged material as delineated in a DMMP. It is the policy of the Corps that all DMMPs include an assessment of potential beneficial use of dredged material for environmental purposes, including fish and wildlife habitat creation and restoration and/or hurricane and storm damage reduction.

Dredged material management planning for all Federal harbor projects is conducted by the Corps to ensure that maintenance dredging activities are performed in an environmentally acceptable manner, use sound engineering techniques, are economically justified, and ensure that long-term placement facilities are available. Ultimately, the DMMP identifies specific measures necessary to manage the volume of material likely to be dredged within the lower channel segment of the Cedar Bayou, Texas project over the next 20-year period.

The Corps is responsible for maintaining the channel to its authorized dimensions to ensure navigability of the waterway. Six placement areas (PAs) were authorized for the placement of dredged material from the lower 5.7 miles of Cedar Bayou, Texas Channel. Of the six existing sites, five are no longer viable for environmental or other reasons. The Federal navigation project does not have the available dredged material disposal capacity sufficient to accommodate 20 years of maintenance dredging.

c. **Factors Affecting the Scope and Level of Review.** The DMMP review document addresses the need to acquire placement capacity for dredged maintenance material. This is necessary to allow the Corps to maintain the Federal channel to its authorized depth to sustain navigation. The project is not justified by life safety nor does it involve significant threat to human/life safety assurance or the environment. The project does not pose significant challenges and risks. The project's function serves to provide continued channel maintenance for barge traffic associated with industry operations having significant contribution to our Nation's economy. The project is not anticipated to involve significant public dispute and is not based on novel, complex or innovative uses of materials or methods of construction.

d. **In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. However, no in-kind products and analyses by the non-Federal sponsor are anticipated. The non-Federal sponsor (Sponsor) for the project is the Chambers-Liberty Counties Navigation District, who has jurisdiction over Cedar Bayou from the Houston Ship Channel at Mile -2.7 to Mile 3.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (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.

a. Documentation of DQC. The DQC will be documented in accordance with the District's Quality Management Plan (QMP). DQC documentation will be provided to the ATR team.

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. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC.

a. Products to Undergo ATR. The only products to undergo ATR will be the Cedar Bayou, Texas. DMMP for the lower 5.7 mile channel segment. The DMMP document will include an EA and Appendices which will be included in the ATR process.

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 ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. Typically, the ATR lead will also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	The Planning reviewer should be a senior water resources planner with experience in shallow-draft navigation.
Economics	The Economics reviewer should be an economist with experience in shallow-draft navigation.
Environmental Resources	The Environmental Resources reviewer should be a reviewer with experience in shallow-draft navigation.
Real Estate	The Real Estate reviewer should be a reviewer with experience in shallow-draft navigation.
Cost Estimating	The Cost Estimating reviewer should be a reviewer with experience in shallow-draft navigation.
Engineering Design	The Engineering Design reviewer should be a reviewer with experience in shallow-draft navigation.
Operations	The Operations reviewer should be a reviewer with experience in shallow-draft navigation.

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 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 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 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 been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for the AFB, draft report (or in the case of a Dredged Material Management Plan an Issue Resolution Conference (IRC)), and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

a. Decision on IEPR.

Due consideration was given to Paragraph 15 of EC 1165-2-209 as well as Appendix D of the same EC. The total project costs for this project are not anticipated to approach $45 Million. Further, we do not anticipate that other criteria, such as public safety concerns, significant controversy, a high level of complexity, and significant economic, environmental and social effects to the nation,

innovative solutions, or life safety issues will trigger the requirement for IEPR. Lastly, the project does not include an Environmental Impact Statement (EIS). At this time an Environmental Assessment is deemed appropriate. Therefore, an IEPR is not anticipated for this document. The District expects to obtain exclusion for the project study from IEPR.

b. Products to Undergo Type I IEPR. Not Applicable.

c. Required Type I IEPR Panel Expertise. Not Applicable

d. D**ocumentation of Type I IEPR.** Not Applicable

7. 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 (if required).

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. An Economic Spreadsheet Model was developed by SWG to calculate benefits of continuing dredge maintenance of the lower 5.7 miles segment of the Cedar Bayou, Texas Project. Model review of the Economic Spreadsheet Model will be conducted in accordance with Engineering Circular (EC) 1105-2-412, Assuring Quality of Planning Models (March 2011) and the CECW-P Planning Models Improvement Program (PMIP) Protocols for Certification of Planning Models (July 2007). The Cedar Bayou economic benefits model was developed within the U.S. Army Corps of Engineers (USACE) Southwestern Division (SWD) and will be considered for certification/approval for a one-time use solely on the Cedar Bayou DMMP project. The model

proponent is the Galveston District (SWG). See attached document titled "Review Plan for Economic Spreadsheet Model Certification-Approval for Use."

b. Engineering Models. No Engineering Models are proposed for use in this study.

8. 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.

9. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering DX, located in the Walla Walla District. The DX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the development of the review charge(s). The DX will also provide the Cost Engineering DX certification. The RMO is responsible for coordination with the Cost Engineering DX.

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost. The ATR is scheduled to be completed in **June 2013**. Required review time is not expected to be significant given that the DMMP document being submitted for review: 1) involves placement for 5.7 miles of channel; and 2) the study involves an EA and not an EIS. Total cost for the ATR is expected to be approximately **$40K to $50K**.

b. Type I IEPR Schedule and Cost. IEPR is not anticipated for this study.

c. Model Certification/Approval Schedule and Cost. The PDT will pursue approval for a single-use as a local model. An Economics Model Review Plan for Economic Spreadsheet Model Certification-Approval for Use is included with this document.

11. PUBLIC PARTICIPATION

The Environmental Assessment will be coordinated with the public for a 30-day period once ATR is complete.

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. Like the PMP, the Review Plan is a living document and may change as the study progresses. 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, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

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

Robert Heinly	Chief, Planning Section	409-766-3992
T. Cheryl Jaynes	Planning Lead	409-766-3804
TBD	ATR Team Lead	
Wes Walker	Technical Lead, PCXIN	304-399-6938

ATTACHMENT 1: TEAM ROSTERS

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION 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 1165-2-209. 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 DrChecks[sm].

SIGNATURE _____ _____

Name Date
ATR Team Leader
Office Symbol/Company

SIGNATURE _____ _____

Name Date
Project Manager
Office Symbol

SIGNATURE _____ _____

Name Date
Architect Engineer Project Manager[1]
Company, location

SIGNATURE _____ _____

Name Date
Review Management Office Representative
Office Symbol

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 Date
Chief, Engineering Division
Office Symbol

SIGNATURE _____ _____

Name Date
Chief, Planning Division
Office Symbol

[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

Term	Definition	Term	Definition
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
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMC	Risk Management Center
IEPR	Independent External Peer Review	RMO	Review Management Organization
ITR	Independent Technical Review	RTS	Regional Technical Specialist
LRR	Limited Reevaluation Report	SAR	Safety Assurance Review
MSC	Major Subordinate Command	USACE	U.S. Army Corps of Engineers
		WRDA	Water Resources Development Act