



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
NORTH ATLANTIC DIVISION, US ARMY CORPS OF ENGINEERS
FORT HAMILTON MILITARY COMMUNITY
BROOKLYN, NEW YORK 11252-6700

MAR 26 2012

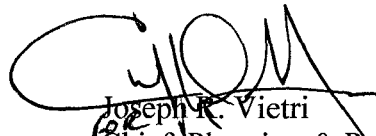
CENAD-PD-PP

MEMORANDUM FOR Commander, New York District, ATTN: CENAN-PL

SUBJECT: Review Plan Approval for Passaic River Basin, New Jersey General Reevaluation Report

1. The attached Review Plan for the subject study has been prepared in accordance with EC 1165-2-209, Civil Works Review Policy.
2. The Review Plan has been coordinated with the Flood Risk Management Planning Center of Expertise of the South Pacific Division, which is the lead office to execute this plan. For further information, contact Mr. Eric Thaut at 415-503-6852. The Review Plan provides for Independent External Peer Review.
3. I hereby approve this Review Plan, which is subject to change as study circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution will require new written approval from this office.

Encl


Joseph R. Vietri
Chief, Planning & Policy Division
Programs Directorate

REVIEW PLAN

Passaic River Basin, New Jersey
General Reevaluation Report

New York District

MSC Approval Date: 26 March 2012
Last Revision Date: 26 March 2012



**US Army Corps
of Engineers ®**

REVIEW PLAN

Passaic River Basin, New Jersey General Reevaluation Report

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1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This Review Plan defines the scope and level of peer review for the Passaic River Basin, New Jersey, General Re-evaluation Report.

b. References

- (1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 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) Project Management Plan, dated September 2011 – approval pending
- (6) MSC and/or District Quality Management Plan(s)

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 Flood Risk Management Center of Expertise, South Pacific Division

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies. Because there is potential risk for life safety, the Risk Management Center of Expertise (RMC) will be consulted during the development of the scope of the Type I IEPR to include those Safety Assurance Review factors that should be reviewed for this study.

3. STUDY INFORMATION

a. **Decision Document.** The study is the Passaic River Basin, New Jersey and New York General Re-evaluation Report for Flood Risk Management. The purpose of this study is to identify and re-evaluate Flood Risk Management (FRM) options within the Passaic River Basin's previously authorized project. The decision document will present planning, engineering and implementation details of the recommended plan to allow final design and construction to proceed subsequent to approval of the plan. The effort is a General Investigations funded study undertaken to evaluate structural and non-structural flood risk management measures, including but not limited to a

diversion tunnel and channel modifications. The General Re-evaluation of this study is cost-shared 50% Federal and 50% non-Federal with the project sponsor, the New Jersey Department of Environmental Protection (NJDEP). Approval authority of the General Re-evaluation Report and Environmental Impact Statement lies with the Chief of Engineers and will require Congressional Authorization.

- b. Study/Project Description.** The Corps involvement in Passaic River Basin planning was first authorized in the Flood Control Act of 1936. Since then, reports recommending plans of action were issued in 1939, 1948, 1962, 1969, 1972, 1973, 1987 and 1995. None of these plans were implemented. Further, Section 101(a)(18) of the Water Resources Development Act (WRDA) of 1990, as amended in 1992, 1996, and 2000 authorized a project for construction, which included a diversion tunnel alternative. However, none of these plans were constructed. As of the date of this Review Plan, this project has not been de-authorized.

Section 101(a)(18) of WRDA 1990 partially states: Passaic river main stem, New Jersey and New York. --

(A) Flood control elements. --

(i) In general. --The project for flood control, Passaic River Main Stem, New Jersey and New York: Report of the Chief of Engineers, dated February 3, 1989, except that the main diversion tunnel shall be extended to include the outlet to Newark Bay, New Jersey, at a total cost of \$1,200,000,000, with an estimated first Federal cost of \$890,000,000 and an estimated first non-Federal cost of \$310,000,000.

The Passaic River and major tributaries is approximately 95 mi long within the project area limits in northern New Jersey (Figure 1). The river in its upper course flows in a highly circuitous route, meandering through the swamp lowlands between the ridge hills of rural and suburban northern New Jersey, called the Great Swamp, draining much of the northern portion of the state through its tributaries. In its lower portion, it flows through the most urbanized and industrialized areas of the state, including along downtown Newark. The lower river suffered from severe pollution and industrial abandonment in the twentieth century. The Passaic River Basin lies within portions of Bergen County, Essex County, Hudson County, Morris County, Passaic County, Somerset County, Sussex County, and Union County, New Jersey and Orange County and Rockland County, New York

The Passaic River Basin drains an area of 935 square miles of which 787 are in New Jersey and 148 are in New York. Seven major tributaries bring water into the main stem of the Passaic River. They are the Whippany, Rockaway, Pompton, Pequannock, Wanaque, Ramapo and Saddle Rivers. Of primary significance to the flood problem are the three (3) distinctly different regions that comprise the basin. The mountainous and heavily wooded Highland area is 500 square miles in extent, 13 miles wide and 38 miles long. It has steep sided narrow valley and rushing streams and many natural and artificial lake areas. Development is mostly rural in character and there is much open land. The Ramapo, Wanaque, and Pequannock Rivers join to form the Pompton River, which flows into the Passaic River.

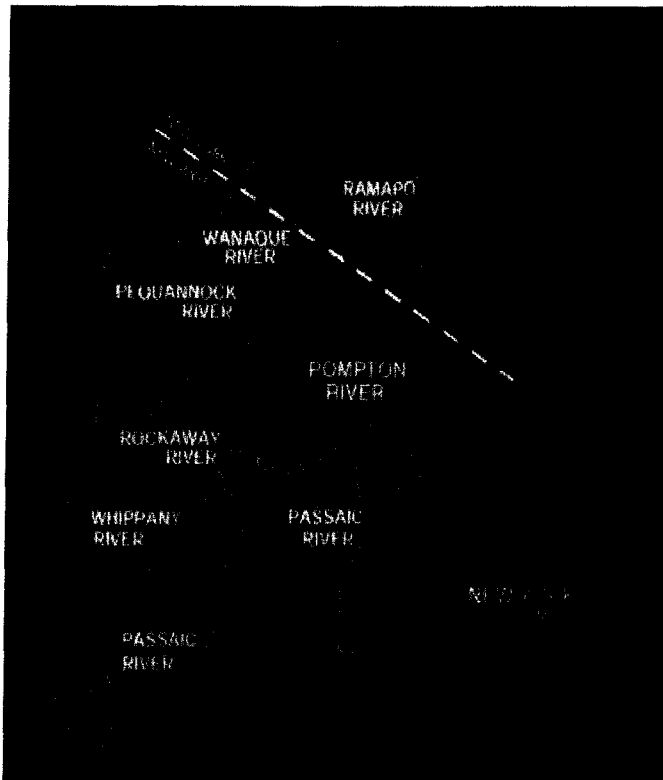


Figure 1: Passaic River Basin Project Area Map

The Central Basin is 262 square miles in extent, 9 miles wide and 30 miles long. Low lying and marshy lands adjacent to the various streams form extensive frequently inundated floodplains totaling 21,000 acres above Little Falls. These floodplains include the Great Piece Meadows, Hatfield Swamp, Troy Meadows, and Black Meadow as well as the Bog and Vly Meadows adjacent to the Pompton River. The Passaic River passes out of the Central Basin through the narrow rock gorge restriction at Little Falls. Although the Whippany River and Rockaway River tributaries flow as rapidly as streams in the Highland area, the flood effect is greatly dampened by broad floodplains in their lower reaches and the slow rising of the Passaic.

The Lower Valley is 173 square miles in extent, about 7 miles wide and 24 miles long. Heavily urbanized and densely populated, the valley has rolling sides and a comparatively wide rolling bottom land that narrows down to about three-quarters of a mile below Dundee Dam. The major tributary in the Lower Valley is the Saddle River which joins the Passaic about 15.5 miles upstream of Newark Bay. Areas downstream of Dundee Dam are subject to high water levels from tidal events as well as from flow in the Passaic River.

In the 70 years since the Corps was first directed to prepare solutions to the Passaic River Basin's flood problems, opposition has prevented the implementation of any of the six plans that were deemed feasible. This opposition revolved around objection to the use of the upstream floodplain to protect downstream damage areas; to the impacts of intensive structural measures, including dams and levees; as well as high implementation costs. These plans could not find universal acceptance and were rejected based on environmental, economic, and social arguments effectively put forward by various Passaic River Basin interests, including local governments and non-governmental organizations. The many levels of political jurisdiction within the basin have further complicated resolution of the multiple issues surrounding flood risk management planning. Flooding has been and continues to be a major problem in the Passaic River Basin in New Jersey and New York (See Figure 2 for location map).

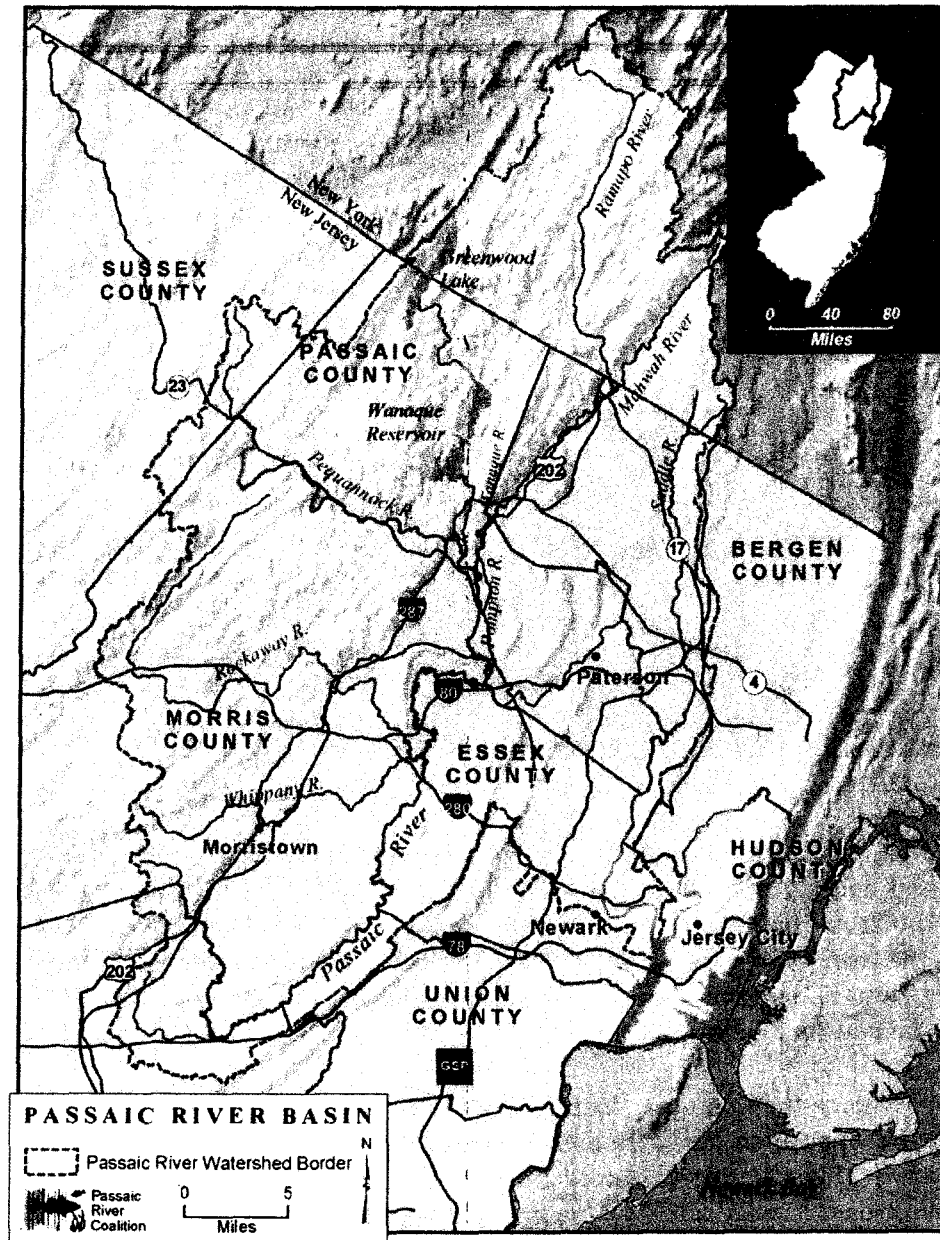


Figure2: Location of the Passaic Mainstem River Basin New York and New Jersey
<http://mapmaker.rutgers.edu>

At a minimum, the potential Flood Risk Management measures that may be examined in the reevaluation report include channel modification, levees, floodwalls, detention, diversion, as well as non-structural measures and the “no action” alternative. Solutions may include, but will not be limited to; variations of the recommended plan’s components i.e. channel work, diversion tunnel, levees and floodwalls. More specifically, the tunnel’s alignment, desired level of protection and detention upstream will be scrutinized. Non-structural measures such as “buyouts” and preservation and/or creation of open space in the floodplain will also be reconsidered in light of changes to existing conditions and changes to environmental policy.

However, because the Feasibility Report and draft GDM have already been completed, the PDT will focus efforts on review of plans which were the most feasible, based on the prior information. The following items will be quantitatively reevaluated in the proposed post-authorization change report. The remaining items will be qualitatively discussed. We propose to examine a number of preliminary alternatives as listed below.

1. Alternative 1: Levee/Floodwall/Nonstructural/Bridge & Dam Modification Alternative (Alternative 14A from GDM Figure 4)
2. Alternative 2: Levee/Floodwall/Nonstructural/ Channel Modification Alternative (Alternative 16A from GDM Figure 5)
3. Alternative 3: In accordance with re-evaluation requirements, the NED plan, and the tunnel component must be reevaluated. Passaic/Pompton River Dual Inlet Tunnel Diversion Alternative (Alternative 30E –NED Plan Figure 6).
4. Alternative 4 – Beatties Dam/Two Bridges improvements: Modifications to Beatties Dam, channel improvements both downstream and upstream (including the Two Bridges Area) will be evaluated. Consideration will be given to entirely removing Beatties Dam or removing a portion of the dam and possible installation of gates. A gated structure just upstream of the Pomptom & Passaic confluence to regulate the flow between the two rivers will also be considered. The goal would be to prevent discharge of the Pompton River from flowing upstream into the Passaic River and the Great Piece Meadows. This might preserve the available storage in the Great Piece Meadows and attenuate the peak discharge on the Passaic River. High spots in the channel between Beatties Dam and the Pompton & Passaic confluence will be removed. Utilization of the undeveloped land in the two bridges area as flood storage will also be considered. Alternatives to mitigate downstream impacts associated with the modification of Beatties dam will also be evaluated.
5. Alternative 5: 10 year non-structural –As part of a complete alternatives analysis, a non-structural only alternative will be analyzed. This measure will be examined throughout the Passaic Basin.
6. No Action Plan – as required by NEPA and other regulations, the No Action Plan (Future without Project Condition) will be identified and the impacts will be clearly discussed and analyzed.

Items that will not be quantitatively reevaluated but qualitatively discussed in the reevaluation study will include:

1. Continuation of floodway buyouts – floodway buyouts will continue under a separate and existing authority and also evaluated in this reevaluation.
2. Bridge cleaning – likely a non-Federal responsibility and opportunity for local municipalities to accomplish quickly.
3. De-snagging/sediment removal – likely a non-Federal responsibility and opportunity for local municipalities to accomplish quickly. This evaluation will also require minor hydraulic modeling.
4. Preservation/creation of flood storage and wetlands – project already funded and will continue but will not be evaluated in the reevaluation study. However, in accordance with Section 3116 of WRDA, the re-evaluation is required to “include the benefits and costs of preserving natural flood storage in any future economic analysis of the project.”
5. River gauge system – existing gauges funded through O&M of the “Passaic Flood

Warning” project. However, any additional gauges will be considered in the reevaluation report.

Items that will not be quantitatively nor qualitatively discussed or reevaluated will include:

1. Vacant land/open space acquisition – not in the Federal interest as the Corps cannot acquire upland properties
2. Combined sewer systems repair – may be pursued under separate Section 219 authority, however, likely a non-Federal responsibility and opportunity for local municipalities to accomplish quickly.
3. Modify operations of gates at the Pompton Lake Dam – this is a “stand-alone” project already authorized and any analysis of the gate operation will occur as part of the existing project.
4. Pequannock/Ramapo Rivers junction –an investigation of the river conditions where the Ramapo River joins the Pequannock River and is the start of the Pompton River is already being undertaken by the NJDEP and will not need to be re-evaluated in this study. Many dams and levees, constructed in the 1800’s are being evaluated for impacts on the flow characteristics and flood elevations upstream.

The estimated cost for a potentially recommended plan may exceed \$500M which would be cost-shared 65% Federal and 35% non-Federal (NJDEP).

- c. Factors Affecting the Scope and Level of Review.** Project risks are high and are likely to occur when presenting the study results to the Passaic Basin Flood Task Force. The State of New Jersey may look to accept a lower level of protection than the NED plan would provide. If this occurs, the team must communicate the residual risks to the affected communities. The study is likely to have significant interagency interest as this is a large, highly urbanized watershed, where the agencies need to protect the limited environmental and/or cultural resources in the area. The study will be highly controversial as the affected community is not in agreement with any flood risk management solution. Additionally, the community does not want another study; it wants construction to begin immediately. Public disputes with respect to the scope, cost or impact of the study are anticipated. With any flood risk management study, there exists a threat to human life and safety, but any residual risk resulting from the eventual NED (or LPP) recommendations will be clearly communicated to the residents within the affected project areas.

As such and in accordance with EC 1165-2-209, the District Chief of Engineering’s statement of finding, dated 8 February 2012 is presented in Attachment 5 of this Review Plan.

Failure to recommend and implement an appropriate flood risk management project will continue to have negative consequences to life and safety, the environment, national economic viability, and general social well-being such as public safety and social justice. Additionally, because of climate variability, the above factors may not only continue but devastate one or all of these factors.

- c. In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include: The in-kind products and analyses to be provided by the non-Federal sponsor are currently being negotiated under the Project Management Plan. This Review Plan will be updated as in-kind services are indentified.

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.** District Quality Control will be conducted on all decision documents and interim reports as noted below in Section 4(b) of this Review Plan. Documentation for all DQC reviews will be provided in DrChecks and included in a Quality Control Appendix of all decision documents and interim reports.
- b. **Products to Undergo DQC.** Products under this study to undergo DQC include the IPR (FSM equivalent for a GRR study), AFB report, and draft Feasibility Report. Further, due to the size and complexity of this study, an additional Interim Progress Report will be prepared and undergo DQC after the FSM but prior to AFB. Further, the Final report will also require DQC.
- c. **Required DQC Expertise.** The expertise required for this study will be extensive. Expertise will be required for structural engineering, civil engineering, geotechnical engineering, cost engineering, hydraulic engineering, hydrologic engineering, environmental resources, cultural Resources, HTRW, Plan Formulation, Real Estate and Economics. Additional expertise may be required by Public Affairs and the Office of Counsel.

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.** Products under this study to undergo ATR include the IPR (FSM equivalent for a GRR study), AFB report, and draft/final GRR. Further, due to the size and complexity of this study, an additional Interim Progress Report will be prepared and undergo DQC after the FSM but prior to AFB. Further, the Final report will also require DQC. Additionally, where practicable, technical products that support subsequent analyses may be reviewed prior to being used in the study and may include: surveys & mapping, hydrology & hydraulics, geotechnical investigations, economic, environmental, cultural, and social inventories, annual damage and benefit estimates, cost estimates, etc.
- b. **Required ATR Team Expertise.** The appropriate RMO, in cooperation with the PDT, vertical team, and other appropriate centers of expertise, will determine the final make-up of the ATR team. The

following table provides the types of disciplines that should be included on the ATR team and the expertise required. The names, organizations, contact information, credentials, and years of experience of the ATR members will be included in Attachment 1 once the ATR team is established.

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. 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 a senior water resources planner with experience in formulation of flood risk management studies especially in urban, highly developed areas.
Economics	The economics reviewer should have extensive experience in urban flood risk management studies and a thorough understanding of HEC-FDA.
Environmental Resources	Team member will have independently completed EA/EIS's and be well versed in the NEPA process, partnerships with other environmental resource agencies and environmental concerns and constraints within urban settings.
Cultural Resources	Team member will have experience with 106 actions and documentation including mitigation for historical structures and archeological artifacts.
Hydrology	Team member should be an expert in the field of urban hydrology and hydraulics, have a thorough understanding of flash flooding and the use of HEC computer modeling systems.
Hydraulic Engineering	Team member should be an expert in the field of urban hydrology and hydraulics, have a thorough understanding of open channel systems and the use of HEC computer modeling systems. A certified professional engineer is required
Geotechnical Engineering	Team member should have expertise in tunnel design and large auger boring construction techniques. A certified professional engineer is required
Civil Engineering	Team member will have a thorough understanding of design of diversion tunnels and channel improvements in an urban setting. A certified professional engineer is required.
Structural Engineering	Team member will have a thorough understanding of both structural and non-structural measures to include, but not be limited to, retaining walls, channel improvements and tunnels. A certified professional engineer is required.
Risk Reviewer	A team member will be added to the ATR team to assess risk in accordance with the November 2010 memorandum by Mr. James Dalton (USACE)
Cost Engineering	Team member will be familiar with cost estimating for similar projects in MII. Review includes construction schedules and contingencies for any document requiring Congressional

	authorization. The team member will be a registered Professional Engineer, Certified Cost Technician, a Certified Cost Consultant, or a Certified Cost Engineer. As the Cost Engineering Center of Expertise, Walla Walla District will assign this team member as part of a separate effort coordinated by the ATR or IEPR team lead in conjunction with the geographic district's project manager. The team member will also be required to review a cost risk analysis as the total project cost is more than likely to exceed \$40M.
Real Estate	Team member will be have at least 5 years experience with flood risk management studies and be familiar with urban planning and acquisition strategies.
Hazardous, Toxic and Radioactive Waste (HTRW)	Team member should have knowledge of HTRW issues common to urban environments and developed areas.

c. **Documentation of ATR.** DrChecks review software (<https://www.projnet.org/projnet/>) 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 initial IPR, the subsequent IPRs, AFB, 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 1165-2-209, 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 1165-2-209.
 - **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.** IEPR (Type I and Type II,) will be conducted for the decision document and, if appropriate, follow-on project implementation. This decision is based on the criteria in EC 1165-2-

209 and the discussion in Section 3 – Factors Affecting the Scope and Level of Review. The risk informed decision explicitly considers:

- The decision document meets the mandatory triggers for Type I IEPR described in Paragraph 11.d.(1) and Appendix D of EC 1165-2-209; and also:
 - That the project has consequences of non-performance on project economics, the environmental and social well-being (public safety and social justice);
 - That the product is likely to contain influential scientific information or be highly influential scientific assessment; and
 - That the Federal action is justified by life safety or failure of the project would pose a significant threat to human life.
- The status of any request to conduct IEPR from a head of a Federal or state agency charged with reviewing the project, if applicable; and
- The proposed project meets the criteria for conducting Type II IEPR described in Paragraph 2 of Appendix D of EC 1165-2-209, therefore, Safety Assurance will also be addressed during the Type I IEPR per Paragraph 2.c.(3) of Appendix D of EC 1165-2-209.

Type 1 IEPR will be required for the Passaic Main Stem River Basin Flood Risk Management General Reevaluation Report, based on projected implementation costs of at least \$50M as well as the potential for life and safety impacts. Close coordination with the sponsor and public meetings are expected to negate significant public dispute with regard to a recommended plan as are coordination with USFWS and EPA and cultural/archeological interests. Flood risk management methods and models used in this study are typical of all Corps flood risk management studies with little room for interpretation and are not expected to change prevailing practices on this or future studies.

As this is a flood risk management (FRM) study, a Safety Assurance Review as part of a Type I IEPR is presumed to be warranted due to the potential for risk to life safety involved in any FRM study. However, it is too early in the study process to accurately predict the level of risk involved to human life. Therefore, the risk informed assessment of significant threat to human life will be revisited once the tentatively selected plan is identified and optimized.

The District Chief of Engineering's statement of finding is presented in Attachment 5 of this Review Plan.

- b. Products to Undergo Type I IEPR.** At minimum, Type I IEPR will be performed for the entire decision document (including supporting documentation), which is typically available at the draft report stage; however, it is anticipated to initiate IEPR early in the study process to reduce the chances of significant changes to the decision document occurring at the end of the study due to IEPR panel findings and recommendations. Because of likely complexity and magnitude of the study, IEPR may be performed for key interim technical products and major milestone documents (e.g., FSM and AFB).
- c. Required Type I IEPR Panel Expertise.** The expertise represented on the Type I IEPR panel will be similar to those on the ATR team. Because this GRR will be a very large and/or complex study, the IEPR panel is anticipated to involve as many disciplines/individuals as the ATR team. 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 1165-2-209, Appendix D. The PDT has made the initial assessment of what expertise is needed based on the PMP and the factors

affecting the scope and level of review outlined in Section 3 of the review plan. The Outside Eligible Organization (OEO) will determine the final participants on the panel. The following table provides the types of disciplines that might be included on the IEPR team and a description of the expertise required.

IEPR Panel Members	Expertise Required
Plan Formulation	The Planning reviewer should be a senior water resources planner with experience in formulation of flood risk management studies especially in urban, highly developed areas.
Economics	The economics reviewer should have extensive experience in urban flood risk management studies and a thorough understanding of HEC-FDA.
Environmental Resources	Team member will have independently completed EA/EIS's and be well versed in the NEPA process, partnerships with other environmental resource agencies and environmental concerns and constraints within urban settings.
Hydrology	Team member should be an expert in the field of urban hydrology and hydraulics, have a thorough understanding of flash flooding and the use of HEC computer modeling systems.
Hydraulic Engineering	Team member should be an expert in the field of urban hydrology and hydraulics, have a thorough understanding of open channel systems and the use of HEC computer modeling systems. A certified professional engineer is required
Geotechnical Engineering	Team member should have expertise in tunnel design and large auger boring construction techniques. A certified professional engineer is required
Civil Engineering	Team member will have a thorough understanding of design of diversion tunnels and channel improvements in an urban setting. A certified professional engineer is required.
Structural Engineering	Team member will have a thorough understanding of both structural and non-structural measures to include, but not be limited to, retaining walls, channel improvements and tunnels. A certified professional engineer is required.

d. **Documentation of Type I IEPR.** The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-209, Appendix D. 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 should generally include the same four key parts as described for ATR comments in Section 4.d 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.

Type I IEPR interim products (such as individual technical products or milestone documents) may be performed. These interim reviews will be documented as noted above.

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. 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 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.

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 (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.** 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
HEC-FDA 1.2.5a (Flood Damage Analysis)	The Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating flood risk management plans using risk-based analysis methods. The program will be used to evaluate and compare the future without- and with-project plans along the Passaic River and major tributaries to aid in the selection of a recommended plan to manage flood risk.	Certified
Habitat Evaluation Procedures (HEP)	HEP is an established approach to assessment of natural resources. The HEP approach has been well documented and is approved for use in Corps projects as an assessment framework that combines resource quality and quantity over time, and is appropriate throughout the United States. The Habitat Suitability Index (HSI) models are the format for quantity determinations that are applied within the HEP framework.	New HSI models developed by the Corps are subject to certification. Published HIS models, while peer reviewed and possibly tested by the developers are subject to review and approval by the PCX. Modifications to published HSI models where relationships or formulas are changed may be subject to certification.
Stream Impact Assessment - spreadsheet model	<p>Given the variety of alternatives formulated for this project and the urbanized nature of the Project Area, a two phased approach will be utilized to evaluate and quantify the impacts to natural resources and the associated mitigation requirements of each impact.</p> <p>For the screening of preliminary alternatives, the following method will be used:</p> <ul style="list-style-type: none"> • Consideration of the extent of development within and surrounding the Project Area and its effect on the identification of suitable mitigation sites; • New Jersey Flood Hazard Area Control Act Rules, which regulates activities in the riparian zone and 	Not certified; will initiate approval process during FSM documentation.

	<p>outlines mitigation requirements;</p> <ul style="list-style-type: none"> • New Jersey Freshwater Wetlands Regulations; • New Jersey Green Acres Regulations, which regulates open space preservation and outlines mitigation requirements when the use on subject properties is modified for purposes other than recreation/open space; • Corps ETL 1110-2-571 Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams and Appurtenant Structures. <p>Currently, there is no state specific or regional method that focuses on quantifying stream function and impacts resulting from channel modification activities that could be applied to this project.</p>	
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b. 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
HEC-RAS 4.0 (River Analysis System)	The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady/unsteady flow analysis to evaluate the future without- and with-project conditions along the Passaic and its tributaries	HH&C CoP Preferred Model
HEC-HMS	This model will be used to define the watersheds' physical features; describe the metrological conditions; interior drainage analysis; estimate parameters; analyze simulations; and obtain GIS connectivity	HH&C CoP Preferred Model

10. REVIEW SCHEDULES AND COSTS (assumes Design Agreement is executed by 1 May 2012)

a. ATR Schedule and Cost. ATR Schedule and Cost. The following forthcoming products are expected to undergo ATR: In-Progress Review #1 November 2012 at a cost of \$15K; In-Progress Review #2 (FSM equivalent) May 2013 at a cost of \$35K; In-Progress Review #3 May 2014 at cost of \$15K; In-Progress Review #4 November 2015 at a cost of \$15K; AFB/ Draft Re-Evaluation Report, EIS and Appendices May 2017 at a cost of \$50K; Final Report, EA and Appendices (November 2017) \$15K. This budget and schedule includes participation of the ATR lead at the AFB meeting, and the CWRB to address the ATR process and any significant and/or unresolved ATR concerns.

b. Type I IEPR Schedule and Cost. Type 1 IEPR will be conducted on the draft General Reevaluation Report, EIS and appendices. The estimated date for the IEPR to occur is November 2017 at a cost of approximately \$500K (includes travel to CWRB and participation in the CWRB). For decision

documents presented to the CWRB, IEPR comments and responses will be discussed at the CWRB meeting.

- c. **Model Certification/Approval Schedule and Cost.** It is expected that the use of the Stream Impact Assessment model and or HEP model would require model certification/approval. The current schedule calls for the initiation of model approval process by July 2015 at a cost of \$150K. The HEC-FDA model in use for this study has been previously certified.

11. PUBLIC PARTICIPATION

Members of the public have opportunities to comment on the development of the study throughout the study process. There are monthly Passaic River Flood Task Force meetings, which are open to the public and the District will typically provide an update on the study in general. Also, as significant changes or developments in the re-evaluation study occur, the District will present this information to the Task Force. Any significant comments or concerns raised at these Task Force meetings will be brought to the attention of the ATR and IEPR panels. In addition, at the end of the re-evaluation study process, there will be a public meeting to outline the analysis, results and any residual risk to the public as a result of the decision. The final report will be available to the local municipalities, the flood Task Force and will be available on the New York District Website. It is not anticipated that the public or state partner would recommend IEPR panel members, although that option is not precluded. Further, to ensure appropriate public communication regarding the study, a Public Affairs officer has been assigned to the PDT.

12. REVIEW PLAN APPROVAL AND UPDATES

The North Atlantic 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. 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 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:

14. REVIEW PLAN POINTS OF CONTACT

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

- Karen Ashton, P.E., Plan Formulation, Flood Risk Management and Ecosystem Restoration Section, (917) 790-8607
- Cliff Jones, Deputy, NAD Planning and Policy CoP (347) 370-4514.
- Eric Thaut, Program Manager, Flood Risk Management Planning Center of Expertise, (415) 503-6852.

ATTACHMENT 1: TEAM ROSTERS

PDT

Name	Role	Phone Number	e-mail
Alicia Gould	Project Manager	917-790-8327	alicia.gould@usace.army.mil
Ray Schembri, P.E.	Project Engineer/Hydraulic Engineer	x-8265	raymond.l.schembri@usace.army.mil
Kevin Whorton, P.E.	Civil Engineer	x-8065	Kevin.a.whorton@usace.army.mil
Michael Chen, P.E.	Structural Engineer	x-8749	xiaoming.chen@usace.army.mil
Stanley Sedwick, P.E.	Geotechnical Engineer	x-8730	Stanley.s.sedwick@usace.army.mil
Thomas Sessa, P.E.	Electrical Engineer	x-8272	Thomas.e.sessa@usace.army.mil
Anthony Schiano	Cost Engineering	x-8347	Anthony.Schiano@usace.army.mil
Seung Baek	Engineering Technical Manager	x-8226	Sueng.c.baek@usace.army.mil
Andre Chauncey, P.E.	Hydrology	x-8353	andre.t.chauncey@usace.army.mil
Jason Shea	Section Chief, Plan Formulation	x-8727	jason.a.shea@usace.army.mil
Karen Ashton, P.E.	Plan Formulation	x-8607	karen.ashton@usace.army.mil
Naomi Fraenkel	Economics	x-8615	naomi.r.fraenkel@usace.army.mil
Nancy Brighton	Section Chief, Environmental Analysis	x-8703	Nancy.J.Brighton@usace.army.mil
Matthew Voisine	Biology/NEPA	x-8718	matthew.voisine@usace.army.mil
Lynn Rakos	Cultural Resources	x-8629	lynn.rakos@usace.army.mil
David Andersen	Real Estate	x-8450	David.C.Andersen@usace.army.mil
Ellen Simon	Office of Counsel	x-8158	Ellen.b.simon@usace.army.mil
Christopher Gardner	Project Public Relations Specialist	x-8108	Christopher.p.gardner@usace.army.mil

ATR Team

Name	Role	Review District
TBD	ATR Lead/Plan Formulation	TBD
TBD	Civil Design	TBD
TBD	Biology/NEPA	TBD
TBD	Hydrology/Hydraulics	TBD
TBD	Economics	TBD
TBD	Cost-Engineering*	Walla Walla
TBD	Real Estate	TBD
TBD	Cultural Resources	TBD

* The cost engineering team member nomination will be coordinated with the NWW Cost Estimating Center of Expertise as required. NWW will determine if the cost estimate will need to be reviewed by PCX staff. **All resumes will be reviewed and approved by the PCX prior to initiating any ATR.

Vertical Team

Name	Role	Phone Number	Email
Thomas J. Hodson, J.D., pH.D	NAN Plan Formulation Branch Chief	917-790-8602	Thomas.J.Hodson@usace.army.mil
Anthony Ciorra, P.E.	NAN PPMD Civil Works Branch Chief	917-790-8208	Anthony.ciorra@usace.army.mil
Leonard J. Houston	NAN Environmental Analysis Branch Chief	917-790-8702	Leonard.houston@usace.army.mil
Frank Santangelo, P.E.	NAN Civil Resources Branch Chief	917-790-8266	Frank.a.santangelo@usace.army.mil
Cliff Jones	NAD Planning CoP	347-370-4514	clifford.s.jones@usace.army.mil
Joe Forcina	NAD DST Lead	347-370-4584	Joseph.Forcina@usace.army.mil
Pete Luisa	NAD RIT	202-761-5782	Pete.C.Luisa@usace.army.mil
Eric Thaut	FRM PCX Lead	415-503-6852	Eric.w.thaut@usace.army.mil

IEPR Team

Name	Role
TBD	ATR Lead/Plan Formulation
TBD	Civil Design
TBD	Biology/NEPA
TBD	Hydrology/Hydraulics
TBD	Economics
TBD	Cost-Engineering
TBD	Real Estate
TBD	Cultural Resources

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 1165-2-209. 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 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

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
Home District/MSD	The District or MSD 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
IPR	Interim Progress Report	USACE	U.S. Army Corps of Engineers
LRR	Limited Reevaluation Report	WRDA	Water Resources Development Act
MSC	Major Subordinate Command		

ATTACHMENT 5: DISTRICT CHIEF OF ENGINEERING'S STATEMENT OF FINDING