



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

CENAD-PD-PP

2 Jul 2012

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

SUBJECT: Review Plan Approval for Rahway River Basin, New Jersey Flood Risk Management Feasibility 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

A handwritten signature in black ink, appearing to read "J. Vietri", is written over the printed name.

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

REVIEW PLAN

Rahway River Basin, New Jersey **Flood Risk Management Feasibility Report**

New York District

MSC Approval Date: Last approved October 2007
Last Revision Date: 17 May 2012



**US Army Corps
of Engineers®**

REVIEW PLAN

Rahway River Basin, New Jersey Flood Risk Management Feasibility Report

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1. PURPOSE AND REQUIREMENTS

- a. **Purpose.** This Review Plan defines the scope and level of peer review for the Rahway River Basin, New Jersey Flood Risk Management Feasibility 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 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) Project Management Plan for the Rahway River, NJ Study approved October 2007..
- (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 PCX.

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 for which this review plan has been prepared is the Rahway River Basin, New Jersey, Flood Risk Management Feasibility Study. The purpose of this study is to determine the solution for flooding in the Rahway River Basin, specifically within the Town of Cranford, New Jersey, and the City of Rahway, New Jersey, in accordance with the Study Resolution approved by the House Committee on Transportation and Infrastructure on 24 March 1998. The Feasibility Report requires approval of the Chief of Engineers and will require Congressional authorization. The currently anticipated NEPA document for this study is an Environmental Assessment.

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One area of focus within the basin was identified along the Rahway main stem in the Township of Cranford, New Jersey. Flood damages have occurred in the vicinity of Riverside Drive near Kensington and Venitia Avenues adjacent to the east side of the river, and along Park Drive adjacent to the west side of the river. Cranford has also reported flooding damages along Casino Avenue, off of Riverside Drive, southeast from the major problem area just described. Approximately 300 homes in these areas were affected during Hurricane Floyd (September 1999), with basement flooding and flooding above the first floor elevations. This community is currently protected by the Lenape Park Regional Stormwater Detention Basin and a series of low level levees, which provide less than a 25-year level of protection and are have a high probability of failure. The Township has been actively pursuing a plan to increase the level of flood protection which involves upgrading the existing levees and the local drainage system to increase the level of flood protection. While the local drainage system improvements are unlikely to meet requirements for Federal participation, levee upgrades may meet these requirements. Both structural measures (levee upgrades, dam modifications, etc.) and non-structural measures (raising the structures, buy-outs, wet and/or dry flood-proofing, flood warning systems, etc.) will be investigated during the feasibility study.

The second area of focus in the basin has been identified as the Robinson's Branch of the Rahway River in the City of Rahway, New Jersey. Flood damages have occurred in this area, which is heavily developed, primarily with private homes, low-rise apartment buildings, and commercial establishments. A number of bridges cross the Robinson's Branch as it meanders through the city. Flooding has been identified as stemming from fluvial/riverine flooding, backwater from the Rahway mainstem and tidal flooding. Both structural measures (levee upgrades, dam modifications, etc.) and non-structural measures (raising the structures, buy-outs, wet and/or dry flood-proofing, flood warning systems, etc.) will be investigated during the feasibility study.

- c. **Factors Affecting the Scope and Level of Review.** This study does not contain influential scientific information or assessment, nor is it expected to have significant economic, environmental or social affects to the nation. Interagency interest is limited to the coordination required by federal law.

However, project risks are high and are likely to occur when presenting the study results to the public. 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 highly urbanized watershed, where the agencies need to protect the limited environmental and/or cultural resources in the area.

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 5 December 2011 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.

IEPR will occur following the AFB but prior to public review of the draft feasibility report. Since a plan has not been selected, the risk informed assessment of significant threat to human life may be revisited once the tentatively selected plan is identified and optimized.

- d. **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: None. The non-Federal sponsor does not expect to contribute any in-kind services during the course of this study.

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.** DQC will be documented through the use of Dr Checks and a DQC report, which will be signed by all reviewers.
- b. **Products to Undergo DQC.** Products that will undergo DQC include all interim products/milestone reports, as well as major technical components to the feasibility study (e.g. Levee stability/Geotechnical analysis).
- c. **Required DQC Expertise.** DQC will be performed by Senior Level staff or Subject Matter Experts within the District.

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 products that will undergo ATR include the Levee Stability/Geotechnical Analysis Report, the Feasibility Scoping Meeting (FSM) documentation, Alternative Formulation Briefing (AFB) documentation, Draft Report (including NEPA and supporting documentation), and Final Report (including NEPA and supporting documentation).
- b. **Required ATR Team Expertise.**

ATR Team Members/Disciplines	Expertise Required
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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 flood risk management projects, water resources and watershed planning and have experience relevant to issues to be determined throughout the course of the study.
Economics	Team member will have extensive experience in both urban and agricultural flood risk management projects 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, both of which are present in the study area.
Hydraulic Engineering	Team member should be an expert in the field of urban hydrology and hydraulics, have a thorough understanding of open channel systems, the effects of management practices and low impact development on hydrology, the use of non-structural systems as they apply to flood proofing, warning systems, and evacuation, and the use of HEC computer modeling systems.
Geotechnical Engineering	Team member should be an expert in the field of geotechnical engineering, with experience in levee stability analysis and probability of failure analysis.
Risk Analysis	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.
Civil Engineering	Team member should be an expert in the field of civil engineering, especially in review of flood risk management studies in urban areas.
Structural Engineering	Team member should be an expert in structural analysis of solutions for flood risk management, including levees, floodwalls, diversions, dam outlet modifications, and detention basin expansion/creation.
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 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.
Real Estate	Team member will be have at least 5 years experience with flood risk management studies and be familiar with urban acquisition strategies.

- 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, 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.** It is expected that Type I IEPR will be required for this study, due to anticipated costs of structural flood risk management measures exceeding the thresholds described in Paragraph 11.d.(1) and Appendix D of EC 1165-2-209. This study is not expected to contain influential scientific information or assessments, nor is it expected to have significant economic, environmental or social affects to the nation. Interagency interest is limited to the coordination required by federal law. There is no significant safety issue in relation to this study or expected in relation to any recommended project. There is not currently a recommended alternative for this study, therefore, no project cost can be provided at this time. 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. Environmental Impact Assessment models employed will be those historically used by the Corps of Engineers in partnership with the U.S. Fish and Wildlife Service and are not expected to change prevailing practices for this or future studies. The Type I IEPR will be conducted after the AFB but prior to public and agency review of the Draft Feasibility Report and Draft Environmental Assessment. Type I IEPR will address safety assurance questions defined in EC 1165-2-209, Appendix D, paragraph 2.c.(3). As per the District Chief of Engineering "Based on the selected alternative, a Safety Assurance Review as part of a Type I IEPR is warranted due to the potential for risk to life safety involved in any fluvial study. However, it is too early in the study process to accurately predict the level of risk involved to human life." Therefore, the team will ensure Type I and Type II IEPR is undertaken on this study.

- b. Products to Undergo Type I IEPR.** Products for review will include; Draft Feasibility Report and Draft Environmental Assessment, documentation of all ATR comments and how they were resolved, documentation and guidance resulting from the FSM, and AFB report conferences, documentation of all public and agency review comments to date and how they were resolved, any other documents providing specific direction to the PDT, and a reference list for any other documents used as a foundation for the analyses conducted during the study.

c. Required Type I IEPR Panel Expertise.

IEPR Panel Members/Disciplines	Expertise Required
Economics	The economics panel member should have at least 10 years experience directly related to water resource economic evaluation or review; a comprehensive understanding of regional economic development as well as traditional Corps national economic development benefits; 5 or more years experience working with HEC-FDA; 2 or more years experience reviewing water resource economic documents justifying construction efforts; and a masters degree or higher in economics
Environmental	The environmental panel member should have at least 10 years of demonstrated experience in evaluating and conducting NEPA impact assessments, including cumulative effects analyses for complex, multi-objective public works projects with competing trade-offs. This should include experience determining scope and appropriate methodologies for a variety of projects/programs with high public and interagency interests as well as impacts to adjacent sanative habitats. The panel member should be familiar with the evaluation of complex relationships and dynamics for aquatic and riparian ecosystems and able to assess the consequences of altering environmental conditions. He/she should have a masters degree or higher in a degree related to environmental studies and be active in a related professional society.
Hydraulic Engineering	The engineer should be a registered professional engineer with a) a minimum 10 years experience in hydraulic engineering with

	emphasis on large public works projects, or b) a professor from academia with 15 or more years in hydraulic theory and practice. The engineer should be familiar with USACE application of risk and uncertainty analyses in flood risk management studies and with standard USACE hydrologic and hydraulic computer models. The engineer should have a masters degree or higher in engineering and actively participate in professional engineering societies/organizations to ensure he/she is capable of evaluating the Safety Assurance Review aspects of projects.
Structural Engineering	The Structural IEPR Team member should be a registered professional engineer with a minimum of 10 years of experience in structural engineering with an emphasis on fluvial flood risk management structural projects. The engineer should have a masters degree or higher in engineering and actively participate in professional engineering societies/organizations to ensure he/she is capable of evaluating the Safety Assurance Review aspects of projects.
Plan Formulation	The plan formulation panel member should have 10 or more years of planning experience with at least 5 of those working with or for USACE on civil works projects so that he/she is familiar with USACE civil works planning policies, methodologies and procedures. The panel member should have a masters degree or higher in a planning related field of study.

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.

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 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.

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: The PDT plans to utilize the certified version of HEC-FDA for economic damage assessment, as well as a spreadsheet based model for environmental impact analysis as described below.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEC-FDA 1.2.4 (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	Certified

	<p>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 Rahway River and its tributaries to aid in the selection of a recommended plan to manage flood risk.</p>	
Stream Impact Assessment - spreadsheet model	<p>Given the variety of alternatives formulated for this project, the urbanized nature of the Project Area and the lack of significant natural resources identified, 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 outlines mitigation requirements; • 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>The alternative selected for further evaluation involves river channelization and the creation of a diversion culvert. 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. Therefore, the PDT will create a series of worksheets modeled after those developed and implemented by the Regulatory Divisions at the USACE Kansas City, Little Rock, Omaha and Rock Island Districts that quantifies the adverse impacts caused by the proposed activity and establishes the appropriate level and type of mitigation required to compensate for the impacts.</p> <p>A stream assessment and fish and macroinvertebrate studies utilizing the Environmental Protection Agency Rapid Bioassessment Protocols (EPA RBP) method were conducted</p>	<p>Not certified; will initiate approval process in 4th quarter FY12.</p>

	as part of the Feasibility Study. The PDT will use the data obtained from the EPA RBP studies in conjunction with New Jersey State environmental regulations to assist in developing the worksheets. The worksheets will then be applied to each variation of the alternative created during the optimization process to compare the level of environmental impacts and mitigation requirements.	
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- b. Engineering Models.** The following engineering models are anticipated to be used in the development of the decision document: The engineering model to be used is the HEC-RAS 4.0 and HEC-HMS.

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 flow analysis to evaluate the future without- and with-project conditions along the Rahway River and its tributaries.	HH&C CoP Preferred Model
HEC-HMS	This model will be used to define the watersheds' physical features; describe the meteorological conditions; estimate parameters; analyze simulations; and obtain GIS connectivity	HH&C CoP Preferred Model

10. REVIEW SCHEDULES AND COSTS

- a. ATR Schedule and Cost.** The schedule for ATR reviews is as follows: Levee Stability and Geotechnical Analysis (\$5K) May 2011; Feasibility Scoping Meeting Read-Ahead Materials (\$35K); July 2013; Alternative Formulation Briefing (\$45K) April 2015; Draft Feasibility Report and Environmental Assessment (\$35K) August 2015; Final Feasibility Report and Environmental Assessment (\$25K) October 2015.
- b. Type I IEPR Schedule and Cost.** Type 1 IEPR will be conducted on the draft Feasibility Report and Environmental Assessment, starting in April 2015 at an estimated cost of \$150K.
- c. Model Certification/Approval Schedule and Cost.** As the study develops, the PDT will coordinate with the Ecosystem Restoration PCX to assist in the development of the scope for the potential impact assessment model certification.

11. PUBLIC PARTICIPATION

Members of the public have opportunities to comment on the development of this study throughout the study. There are frequent Cranford Flood Commission meetings, which are open to all and the District will typically provide an update on the study in general. Also, as significant changes or

developments in the feasibility study occur, the District presents this information to the Commission. Any significant comments or concerns raised at these flood commission meetings will be brought to the attention of the ATR and IEPR panels. In addition, at the end of the Feasibility 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 municipality, the flood commission 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.

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. 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:

- Jodi McDonald, Chief, FRM and ECO Section, 917-790-8720
- Clifford Jones, Team Leader, NAD Planning and Policy CoP, 347-370-4514
- Eric Thaut, Leader, Flood Risk Management Planning Center of Expertise, 415-503-6852

ATTACHMENT 1: TEAM ROSTERS

PDT

Name	Role	Phone Number	
Alicia Gould	Project Manager	917-790-8327	Alicia.Gould@usace.army.mil
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Nancy Brighton	Section Chief, Environmental Analysis	x-8703	Nancy.J.Brighton@usace.army.mil
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Carissa Scarpa	Cultural Resources	x-8612	Carissa.A.Scarpa@usace.army.mil
Andre Chauncey	Hydraulics	x-8353	Andre.T.Chauncey@usace.army.mil
Dan Liu	EN Technical Manager	x-8345	Dan.H.Liu@usace.army.mil
David Andersen	Real Estate	x-8450	David.C.Andersen@usace.army.mil
William Barth	Hydrology	x-8352	William.R.Barth@usace.army.mil

ATR Team

Name	Role	Review District
TBD	ATR Lead/Plan Formulation	TBD
TBD	Civil Design	TBD
Ronald Smith	Geotechnical Engineering	MVN
TBD	Biology/NEPA	TBD
TBD	Hydrology/Hydraulics	TBD
TBD	Economics	TBD
TBD	Cost-Engineering*	TBD
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	NAN Plan Formulation Branch Chief	917-790-8602	Thomas.J.Hodson@usace.army.mil
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	Works Branch Chief		
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IEPR Team

Name	Discipline
TBD	Plan Formulation
TBD	Biology/NEPA
TBD	Hydrology/Hydraulics
TBD	Economics

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/MS	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

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

MEMORANDUM FOR RECORD

SUBJECT: Cranford, Rahway: Rahway River Basin Flood Damage Reduction Feasibility Study
– Risk Informed Assessment of Significant Threat to Human Life

1. Project Information. The Rahway River Basin is located in northeastern New Jersey. It lies within the metropolitan area of Greater New York and occupies approximately 15 percent of Essex County, 35 percent of Union County, and 10 percent of Middlesex County. The basin is 83.3 square miles (53,300 acres) in area and is roughly crescent-shaped. Its greatest width is approximately 10 miles in the east-west direction, from the City of Linden to the City of Plainfield. Its greatest length is approximately 18 miles in a north-south direction, from West Orange to Metuchen.

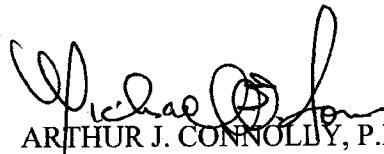
The existing flood hazard and associated flood damages constitute the most serious water resources problem in the Rahway River Basin. Rapid development of the area is the principle cause of flooding in the area, which has resulted in a large increase in storm water runoff. This increased runoff coupled with inadequate channel capacities and inadequate culvert openings, accounts for most of the flooding problems. Flooding causes physical damage to property and loss of commercial, industrial, and public activity, with consequential loss of business and wages. The recurring nature of the flooding problems presents a threat to the health and safety of those who live and work in the flood prone areas.

2. Project Description. One area of focus within the basin was identified along the Rahway main stem in the Township of Cranford, New Jersey. Flood damages have occurred in the vicinity of Riverside Drive near Kensington and Venitia Avenues adjacent to the east side of the river, and along Park Drive adjacent to the west side of the river. Cranford has also reported flooding damages along Casino Avenue, off of Riverside Drive, southeast from the major problem area just described. Approximately 300 homes in these areas were affected during Hurricane Floyd (September 1999), with basement flooding and flooding above the first floor elevations. This community is currently protected by the Lenape Park Regional Stormwater Detention Basin and a series of low level levees. The Township has been actively pursuing a plan to increase the level of flood protection which involves upgrading the existing levees and the local drainage system to increase the level of flood protection. While the local drainage system improvements are unlikely to meet requirements for Federal participation, levee upgrades may meet the requirements. Both structural measures (levee upgrades, dam modifications, etc.) and non-structural measures (raising the structures, buy-outs, wet and/or dry flood-proofing, flood warning systems, etc.) will be investigated during the feasibility study.

3. Risk Informed Assessment. Based on the selected alternative, a Safety Assurance Review as part of a Type I IEPR is 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.

4. **Determination.** Since a plan has not been selected, the risk informed assessment of significant threat to human life may be revisited once the tentatively selected plan is identified and optimized.


ARTHUR J. CONNOLLY, P.E.
C, Engineering Division