

Final Independent External Peer Review Report Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Flood Risk Management Planning Center of Expertise
Baltimore District

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Columbus, Ohio 43201

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Executive Summary

PROJECT BACKGROUND AND PURPOSE

The Peckman River Basin drainage area is approximately 9.8 square miles and is one of the major sub-watersheds of the Passaic River. The Peckman River Basin originates in the Town of West Orange, New Jersey, and flows northeasterly through the Borough of Verona, the Township of Cedar Grove, the Township of Little Falls, and the Borough of Woodland Park (formerly West Paterson) to its confluence with the Passaic River. The elevation change along the river is approximately 260 feet, with the majority of the drop occurring within Cedar Grove. Great Notch Brook is a major tributary to the Peckman River Basin, entering the river just downstream of New Jersey State Highway 46. Great Notch Brook is subject to extremely rapid runoff from higher elevations in the eastern side of the watershed. Two other small tributaries enter the river in Cedar Grove.

The downstream portion of the Peckman River Basin in Woodland Park is within close proximity to Dowling Brook, which is also a tributary to the Passaic River. During extreme flooding events, it has been reported that flows from the Peckman River Basin inundate the area of Woodland Park located between the Peckman River Basin and Dowling Brook.

The project's purpose is to manage the risk of flooding from the Peckman River. USACE considered a range of nonstructural and structural measures that could potentially manage flood damages in Woodland Park and Little Falls, the basin's most frequently flooded and densely populated areas. Through an iterative plan formulation process, potential fluvial flood risk management measures were identified, evaluated, and compared.

The Peckman River Basin is a tributary to the Passaic River, which, during certain flood events can cause backwater flooding from the Passaic. However, the event on the Passaic River may occur at a different frequency than a flood event on the Peckman River Basin or there may only be an event on one river. In some cases, the flood events are tied together, but in other cases they may be separate and distinct events.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The U.S. Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study (hereinafter: Peckman River Basin IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2018). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate this IEPR.

The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2018) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the decision documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: plan formulation/economics, environmental law compliance, hydraulic and hydrology (H&H) engineering, and geotechnical/civil engineering. Battelle screened the candidates to identify those most closely meeting the selection criteria and evaluated them for COIs and availability. USACE was given the list of all the final candidates to independently confirm that they had no COIs, and Battelle made the final selection of the four-person Panel from this list.

The Panel received electronic versions of the decision documents (1030 pages in total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2018) and OMB (2004), USACE prepared the charge questions, which were included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference at the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and USACE during the peer review process.

IEPR panel members reviewed the decision documents individually and produced individual comments in response to the charge questions. The panel members then met via teleconference with Battelle to review key technical comments and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment. Overall, 20 Final Panel Comments were identified and documented. Of these, one was identified as having high significance, four were identified as having medium/high significance, four had a medium significance, seven had medium/low significance, and four had low significance.

Battelle received the only public comment USACE received during the Peckman River Basin public comment period (one 2-page letter) and provided it to the IEPR panel members. The panel members were charged with determining if any information or concerns presented in the public comments raised any additional discipline-specific technical concerns with regard to the Peckman River Basin review documents. After completing its review, the Panel confirmed that no new issues or concerns were identified

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2018) in the Peckman River Basin review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the report is concise, provides a good perspective on flooding conditions and damages in the basin, and provides a well-written description of the environmental impacts and plan formulation. However, the Panel identified several elements of the project where additional analyses are warranted and places where clarification of project findings and objectives need to be documented or revised.

Economics: The Panel noted several concerns regarding the economic analysis included in the Draft Integrated Feasibility Report and Environmental Assessment (IFR/EA). Of highest concern is what appears to be an apparent discrepancy in the cost of future overall damages of an average future storm series when compared to the equivalent cost of the three most expensive historic storms. Even though the data are reported in equivalent annual damages, it is unclear why an average annual storm would result in damage that costs more than the three largest historic storms to hit the region. A second concern is that, as currently presented, the tentatively selected plan (TSP) is not the National Economic Development (NED) plan because the lack of a significant difference in net benefits does not justify Alternative 10b to be chosen over Alternative 3. Engineer Regulation (ER) 1105-2-100 (USACE, 2000a; p. G-7) states, "Where two cost-effective plans produce no significantly different levels of net benefits, the less costly plan is to be the NED plan, even though the level of outputs may be less." Alternative 10b costs 50% more than Alternative 3, while only providing an 8% increase in net benefits. Therefore, Alternative 3 should be the NED plan.

Additional concerns regarding the economic analysis include costs associated with the diversion culvert potentially being higher than reported for the non-Federal sponsor, and the use of higher than average contingency values. ER 1105-2-100 (p. E-130[5]) requires covers for flood control channels to be a responsibility of the non-Federal sponsor unless certain criteria are met. Currently the Draft IFR/EA does not adequately document that this project meets those criteria in regard to the diversion culvert included in the project. Therefore, the costs for this covered flood control element may be considered construction costs (a non-Federal sponsor cost), which are not credited as part of the total costs. Additionally, the Draft IFR/EA uses a higher than average individual contingency value of 49% when the largest itemized cost only has an individual contingency value of 34%. Use of this 15% higher contingency value that results in costs deemed higher than normal is not explained.

Engineering: The geotechnical exploration program and related analyses for the flood wall and levee designs are more than adequate to support a feasibility-level evaluation and the Hydrology and Hydraulics (H&H) appendices are well written. Of greatest concern to the Panel regarding the engineering analysis was a lack of information throughout the document on the configuration of the weir, diversion culvert, and stilling basin. The Panel could not find these items described to a level of detail that permitted adequate concept design review or evaluation of the estimated costs. The need for pumping stations and interior drainage facilities is also identified in the Draft IFR/EA, but there is no specific description of the interior drainage features included in the cost estimate. The Panel's experience on other projects suggests that the cost of building these elements and accommodating interior drainage can be a significant part of the overall cost of a flood barrier. The Panel was also concerned that the topography and roughness values input into the H&H model potentially are not accurate. It believes an updated topographic and bathymetric survey for this highly urbanized area is important to improve the accuracy of the model predictions.

Plan Formulation: Although the Panel believes that the Draft IFR/EA presents a good description of the plan formulation, they were extremely surprised that there was no mention of an alternative that would provide structural protection at greater than 50-year protection levels or anything addressing why flood

risk management at the 100-year flood event level or greater was not considered. The Panel understands from discussions with the USACE PDT during the mid-review teleconference that other alternatives were considered and turned down by the non-Federal sponsor. The Panel believes that this should be documented in the Draft IFR/EA so that if there are questions in the future about why the structures were not made to meet these larger storms, there is a clear record of why this project was chosen. In addition, the Panel suggests that the potential loss of life associated with the TSP design or probability of project failure be, at a minimum, quantitatively addressed in the Draft IFR/EA as it is a primary objective and will provide a clearer understanding of what risks remain.

Environmental: In general, the Panel found the level of environmental impact analysis is adequate for a feasibility-level analysis. However, it is concerned about the potential for back flow into the diversion culvert or backwater conditions from the Passaic River at the diversion culvert discharge point. It believes that, once constructed, the diversion culvert could potentially increase damage levels in the Peckman River Basin due to the inlet of water during flood conditions on the Passaic River. The Panel does not see that this was assessed in the document. In addition, inconsistencies were also noted in the depiction of the levee/floodwall alignments that make it unclear which alignment is correct and whether the correct economic, environmental, and engineering aspects of the project were assessed. The Panel believes that the document and appendices need to be checked to ensure the correct project is being relayed and compared throughout. Lastly, the Panel believes that the cost of fish and wildlife mitigation for the TSP is not presented consistently throughout the report, the cost per acre of mitigation is inordinately high, and the mitigation recommendations are not supported by a cost effectiveness/incremental cost analysis as required by ER 1105-2-100, Appendix C, Section C-3.e.(8).

Table ES-1. Overview of 20 Final Panel Comments Identified by the Peckman River Basin IEPR Panel

No.	Final Panel Comment
Significance – High	
1	It is unclear why average annual storm damages under the future without-project conditions cost more than the three historic storm events presented in the Draft IFR/EA when calculated to equivalent annual damages.
Significance – Medium/High	
2	The choice of Alternative 10b as the TSP does not adhere to ER 1105-2-100 criteria for a NED plan.
3	USACE guidance requires covers for flood control channels to be a responsibility of the non-Federal sponsor unless certain criteria are met; however, the Draft IFR/EA does not document that this project meets those criteria.
4	The Draft IFR/EA does not include an alternative that considers structural protection for a greater than 50-year flood event.

Table ES-1. Overview of 20 Final Panel Comments Identified by the Peckman River Basin IEPR Panel (continued)

No.	Final Panel Comment
5	Although referenced throughout the report as key aspects of the TSP, the configuration of the weir, diversion culvert, and stilling basin have not been described to a level of detail that permits adequate concept design review or evaluation of the estimated costs.
Significance – Medium	
6	Loss of life associated with the TSP design or probability of project failure are not quantitatively addressed in the Draft IFR/EA, despite being identified as a primary objective.
7	The accuracy and relevance of the elevation and roughness data used in the H&H analysis may not reflect current conditions and therefore the cost estimates may not be accurate.
8	For the TSP, it is unclear whether modeling was conducted to determine if back flow into the diversion culvert or backwater conditions from the Passaic River at the diversion culvert discharge point would potentially increase damage levels in the Peckman River Basin.
9	Inconsistencies in the levee/floodwall alignments depicted on the right bank of the Peckman River just upstream of the proposed weir/diversion culvert location make it unclear which alignment is correct and whether the correct economic, environmental, and engineering aspects of the project were assessed.
Significance – Medium/Low	
10	The Draft IFR/EA does not provide justification for the use of higher than average individual contingency values that result in costs deemed higher than normal.
11	The configuration and specific costs associated with interior drainage features such as pump stations and gate wells are not included in the Draft IFR/EA.
12	The Draft IFR/EA does not provide justification for construction of a flood wall in the reach section between the Great Notch Brook and industrial parking lots.
13	The configuration and application of the ring walls within this urban setting has not been discussed in the Draft IFR/EA, including its impact on the socioeconomic aspects of the community.
14	The Draft IFR/EA does not address the potential implications of climate change on future conditions in the basin or on the effectiveness of the TSP relative to management of flood risk.

Table ES-1. Overview of 20 Final Panel Comments Identified by the Peckman River Basin IEPR Panel (continued)

No.	Final Panel Comment
15	The overall estimated costs of fish and wildlife mitigation are reported inconsistently throughout the appendices, but in all instances appear to be extremely high for the limited number of acres being replaced.
16	Risks associated with the accumulation of large debris in the channel upstream of the weir and at the entrance to the diversion culvert during a flood event have not been assessed in the Draft IFR/EA.
Significance – Low	
17	Several benefit categories not included in the benefit calculations could affect the correct identification of the NED plan if their effects are not proportionate across all alternatives.
18	The configuration of the levee cross-section analyzed in Appendix C3 does not conform to the guidance provided in EM 1110-2-1913.
19	The main report would benefit from a model output of the flood inundation map for the TSP.
20	It is unclear how the subjective scale of Low-Medium-High used in Tables 12 and 14 was developed and applied to compare how each alternative met project objectives and constraints.

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LIST OF ACRONYMS

ADM	Agency Decision Milestone
COI	Conflict of Interest
DrChecks	Design Review and Checking System
EA	Environmental Assessment
EAD	Equivalent Annual Damage
EC	Engineer Circular
EM	Engineer Manual
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
H&H	Hydrology and Hydraulics
HEC-RAS	Hydrologic Engineering Center River Analysis System
IEPR	Independent External Peer Review
IFR	Integrated Feasibility Report
IWR	Institute for Water Resources
LPP	Locally Preferred Plan
NED	National Economic Development
NEPA	National Environmental Policy Act
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PDT	Project Delivery Team
PED	Pre-construction Engineering and Design
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
TSP	Tentatively Selected Plan

1. INTRODUCTION

The Peckman River Basin drainage area is approximately 9.8 square miles and is one of the major sub-watersheds of the Passaic River. The Peckman River Basin originates in the Town of West Orange, New Jersey, and flows northeasterly through the Borough of Verona, the Township of Cedar Grove, the Township of Little Falls, and the Borough of Woodland Park (formerly West Paterson) to its confluence with the Passaic River. The elevation change along the river is approximately 260 feet, with the majority of the drop occurring within Cedar Grove. Great Notch Brook is a major tributary to the Peckman River Basin, entering the river just downstream of New Jersey State Highway 46. Great Notch Brook is subject to extremely rapid runoff from higher elevations in the eastern side of the watershed. Two other small tributaries enter the river in Cedar Grove.

The downstream portion of the Peckman River Basin in Woodland Park is within close proximity to Dowling Brook, which is also a tributary to the Passaic River. During extreme flooding events, it has been reported that flows from the Peckman River Basin inundate the area of Woodland Park located between the Peckman River Basin and Dowling Brook.

The project's purpose is to manage the risk of flooding from the Peckman River. USACE considered a range of nonstructural and structural measures that could potentially manage flood damages in Woodland Park and Little Falls, the basin's most frequently flooded and densely populated areas. Through an iterative plan formulation process, potential fluvial flood risk management measures were identified, evaluated, and compared.

The Peckman River Basin is a tributary to the Passaic River, which, during certain flood events can cause backwater flooding from the Passaic. However, the event on the Passaic River may occur at a different frequency than a flood event on the Peckman River Basin or there may only be an event on one river. In some cases, the flood events are tied together, but in other cases they may be separate and distinct events.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study (hereinafter: Peckman River Basin IEPR) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE), Engineer Circular (EC) *Review Policy for Civil Works* (EC 1165-2-217) (USACE, 2018) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the Peckman River Basin IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted, including the schedule followed in executing the IEPR. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final charge was submitted to USACE in the final Work Plan according to the schedule listed in Table A-1.

Appendix D presents the organizational COI form that Battelle completed and submitted to the Institute for Water Resources (IWR) prior to the award of the Peckman River Basin IEPR.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review, as described in USACE (2018).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the Peckman River Basin was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-217). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. The IEPR was completed in accordance with established due dates for milestones and deliverables as part of the final Work Plan; the due dates are based on the award/effective date and the receipt of review documents.

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: plan formulation/economics, environmental law compliance, hydraulic and hydrology (H&H) engineering, and geotechnical/civil engineering. The Panel reviewed the Peckman River Basin documents and produced 20 Final Panel Comments in response to 17 charge questions provided by USACE for the review. This charge included two overview questions and one public comment question added by Battelle. Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE guidance (EC 1165-2-217, Appendix D), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2018; p. D-4) in the Peckman River Basin IEPR review documents. The following summarizes the Panel's findings.

Based on the Panel's review, the report is concise, provides a good perspective on flooding conditions and damages in the basin, and provides a well-written description of the environmental impacts and plan formulation. However, the Panel identified several elements of the project where additional analyses are warranted and places where clarification of project findings and objectives need to be documented or revised.

Economics: The Panel noted several concerns regarding the economic analysis included in the Draft Integrated Feasibility Report and Environmental Assessment (IFR/EA). Of highest concern is what appears to be an apparent discrepancy in the cost of future overall damages of an average future storm series when compared to the equivalent cost of the three most expensive historic storms. Even though the data are reported in equivalent annual damages, it is unclear why an average annual storm would result in damage that costs more than the three largest historic storms to hit the region. A second concern is that, as currently presented, the tentatively selected plan (TSP) is not the National Economic Development (NED) plan because the lack of a significant difference in net benefits does not justify Alternative 10b to be chosen over Alternative 3. Engineer Regulation (ER) 1105-2-100 (USACE, 2000a; p. G-7) states, "Where two cost-effective plans produce no significantly different levels of net benefits, the less costly plan is to be the NED plan, even though the level of outputs may be less." Alternative 10b costs 50% more than Alternative 3, while only providing an 8% increase in net benefits. Therefore, Alternative 3 should be the NED plan.

Additional concerns regarding the economic analysis include costs associated with the diversion culvert potentially being higher than reported for the non-Federal sponsor, and the use of higher than average contingency values. ER 1105-2-100 (p. E-130[5]) requires covers for flood control channels to be a responsibility of the non-Federal sponsor unless certain criteria are met. Currently the Draft IFR/EA does not adequately document that this project meets those criteria in regard to the diversion culvert included in the project. Therefore, the costs for this covered flood control element may be considered construction costs (a non-Federal sponsor cost), which are not credited as part of the total costs. Additionally, the Draft IFR/EA uses a higher than average individual contingency value of 49% when the largest itemized cost only has an individual contingency value of 34%. Use of this 15% higher contingency value that results in costs deemed higher than normal is not explained.

Engineering: The geotechnical exploration program and related analyses for the flood wall and levee designs are more than adequate to support a feasibility-level evaluation and the Hydrology and Hydraulics (H&H) appendices are well written. Of greatest concern to the Panel regarding the engineering analysis was a lack of information throughout the document on the configuration of the weir, diversion culvert, and stilling basin. The Panel could not find these items described to a level of detail that permitted adequate concept design review or evaluation of the estimated costs. The need for pumping stations and

interior drainage facilities is also identified in the Draft IFR/EA, but there is no specific description of the interior drainage features included in the cost estimate. The Panel's experience on other projects suggests that the cost of building these elements and accommodating interior drainage can be a significant part of the overall cost of a flood barrier. The Panel was also concerned that the topography and roughness values input into the H&H model potentially are not accurate. It believes an updated topographic and bathymetric survey for this highly urbanized area is important to improve the accuracy of the model predictions.

Plan Formulation: Although the Panel believes that the Draft IFR/EA presents a good description of the plan formulation, they were extremely surprised that there was no mention of an alternative that would provide structural protection at greater than 50-year protection levels or anything addressing why flood risk management at the 100-year flood event level or greater was not considered. The Panel understands from discussions with the USACE PDT during the mid-review teleconference that other alternatives were considered and turned down by the non-Federal sponsor. The Panel believes that this should be documented in the Draft IFR/EA so that if there are questions in the future about why the structures were not made to meet these larger storms, there is a clear record of why this project was chosen. In addition, the Panel suggests that the potential loss of life associated with the TSP design or probability of project failure be, at a minimum, quantitatively addressed in the Draft IFR/EA as it is a primary objective and will provide a clearer understanding of what risks remain.

Environmental: In general, the Panel found the level of environmental impact analysis is adequate for a feasibility-level analysis. However, it is concerned about the potential for back flow into the diversion culvert or backwater conditions from the Passaic River at the diversion culvert discharge point. It believes that, once constructed, the diversion culvert could potentially increase damage levels in the Peckman River Basin due to the inlet of water during flood conditions on the Passaic River. The Panel does not see that this was assessed in the document. In addition, inconsistencies were also noted in the depiction of the levee/floodwall alignments that make it unclear which alignment is correct and whether the correct economic, environmental, and engineering aspects of the project were assessed. The Panel believes that the document and appendices need to be checked to ensure the correct project is being relayed and compared throughout. Lastly, the Panel believes that the cost of fish and wildlife mitigation for the TSP is not presented consistently throughout the report, the cost per acre of mitigation is inordinately high, and the mitigation recommendations are not supported by a cost effectiveness/incremental cost analysis as required by ER 1105-2-100, Appendix C, Section C-3.e.(8).

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

It is unclear why average annual storm damages under the future without-project conditions cost more than the three historic storm events presented in the Draft IFR/EA when calculated to equivalent annual damages.

Basis for Comment

The Draft IFR/EA does not explain why the level of damages for three major historic storm events (Doria, \$12 M; 1968 Storm, \$18.6 M; and Floyd, \$ 12.1 M) is lower than the equivalent annual damages (EAD) in the future without-project condition (\$20.6M).

It is reasonable to assume that the three major historic storm events would result in greater damage than future averaged damages from storms that would seldom reach the magnitude of the historic storms. The discrepancy in damages appears to overstate the future without-project condition storm damage.

The Panel is uncertain whether the input to the model is correct or whether the indexing of the historic storms is incorrect.

Significance – High

The discrepancy between major historic damages versus future averaged storm damages has the potential to overstate the potential damages prevented by the alternatives, and could thus jeopardize the feasibility of the project.

Recommendation for Resolution

1. Provide a reason for the apparent discrepancy in damage levels between historic major storms and averaged future storm series.
2. Describe the storm set that constitutes the distribution used in the model.

Final Panel Comment 2

The choice of Alternative 10b as the TSP does not adhere to ER 1105-2-100 criteria for a NED plan.

Basis for Comment

The TSP presented in the Draft IFR/EA is Alternative 10b. It has the highest net benefits, but they are only slightly higher (less than 8%) than those of Alternative 3. In addition, Alternative 10b costs 50% more than Alternative 3. ER 1105-2-100 (USACE, 2000a; p. G-7) states, “Where two cost-effective plans produce no significantly different levels of net benefits, the less costly plan is to be the NED plan, even though the level of outputs may be less.” On this basis, Alternative 3 should be the NED plan.

If Alternative 3 is chosen as the NED plan, then Alternative 10b would be the Locally Preferred Plan (LPP). As such, choosing Alternative 10b (as an LPP) would result in a significant cost increase for the non-Federal sponsor.

USACE policy allows for employing incremental analysis to add separable elements, however, the Draft IFR/EA does not provide enough details to conduct this analysis. This makes it difficult for the Panel to evaluate such a significant increase in average annual costs producing only slightly increased average annual benefits. In addition, these incremental costs and benefits only apply to nonstructural measures, which are voluntary and are not guaranteed to be implemented.

With net benefits between the two alternatives being so close and the cost of Alternate 10b so much higher than Alternative 3, it is plausible that, since this is only the draft feasibility phase, planned future optimization may eliminate Alternative 10b as the TSP.

Significance – Medium/High

Choosing between Alternatives 3 and 10b for the TSP has a significant impact on project cost.

Recommendation for Resolution

1. Indicate how Alternative 10b is compliant with ER 1105-2-100 (p. G-7 quoted above).

Literature Cited:

USACE (2000a). Planning: Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

Final Panel Comment 3

USACE guidance requires covers for flood control channels to be a responsibility of the non-Federal sponsor unless certain criteria are met; however, the Draft IFR/EA does not document that this project meets those criteria.

Basis for Comment

The three alternatives that exhibit the highest net benefits are 3, 10a, and 10b, and each involves a diversionary covered waterway referred to in the text as a culvert. ER 1105-2-100 (USACE, 2000a; p. E-130 [5]) states, “*Covers for Flood Control Channels*. If needed for safety the costs are considered construction costs. Otherwise the costs are non-Federal and are not credited towards total project costs.”

As no cost is provided for an open channel alternative, the Panel is unable to project the difference in cost between that and the proposed culvert. Unless real estate is significant, the Panel speculates that an open channel could provide a significant reduction in construction and maintenance costs.

Significance – Medium/High

Unless safety necessitates a covered waterway, or a culvert is the least-cost conveyance of the targeted flow, the cost of covering the waterway appears to be a non-Federal responsibility. This would change the reported cost share of the project.

Recommendation for Resolution

1. Provide the cost of an open channel and the appropriate cost share or the reasons why an open-channel cannot be considered.

Literature Cited:

USACE (2000a). Planning: Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

Final Panel Comment 4

The Draft IFR/EA does not include an alternative that considers structural protection for a greater than 50-year flood event.

Basis for Comment

Structural features included in the TSP provide a level of performance to protect against a 50-year flood event. The construction of permanent flood protection structures will serve to encourage increased levels of development in the flood-prone areas and less public awareness of the dangers posed by flood events. Statistically, an overtopping event will occur within the lifetime of many of the current residents within the project area. When such an overtopping event occurs, the public inevitably raises the question of why the barriers weren't constructed higher. The Draft IFR/EA does not include an alternative for structural protection for greater than 50-year protection or address why flood risk management at the 100-year flood event level or greater was not considered.

USACE reported in the mid-review teleconference that the local sponsor would not support protection for a 100-year flood event. If this is the case, this position should be clearly documented in the report. It should also be noted that the current level of flood protection will not remove most of the protected area from requirements for flood insurance.

Significance – Medium/High

Since the Draft IFR/EA does not address alternatives that could protect against larger flood events, USACE could potentially be criticized in the future for not at least considering a 100-year level of flood risk management.

Recommendations for Resolution

1. Evaluate alternative(s) with performance levels greater than a 50-year flood event in the alternatives section of the report.
2. Provide a rationale for adopting the 50-year performance level in lieu of higher levels.
3. Provide and include in the report, documentation of the concurrence of the local sponsor with the adopted performance level.

Final Panel Comment 5

Although referenced throughout the report as key aspects of the TSP, the configuration of the weir, diversion culvert, and stilling basin have not been described to a level of detail that permits adequate concept design review or evaluation of the estimated costs.

Basis for Comment

The key element of the TSP flood protection plan is the diversion of floodwaters upstream of Highway 46. The diversion requires the construction of three separate structures: a weir spanning the Peckman River, a 1500-foot long diversion culvert, and a stilling basin at the downstream end of the culvert. The Draft IFR/EA does not provide sufficient detail for the Panel to evaluate the validity of the design concept or the estimated cost associated with construction of these structures. The Panel has specific concerns with the following:

Diversion Weir

The description of the weir across the Peckman River associated with the diversion culvert is limited throughout the main report and appendices. There are no figures depicting a conceptual design for the weir or a clear discussion in the main report of how the weir would function in conjunction with the diversion culvert, including provisions/design parameters for maintenance of minimum flows in the Peckman River and accommodations for fish passage as USACE committed to the U.S. Fish and Wildlife Service (USFWS). Appendix C-2 (Hydraulics) of the report.

The Draft IFR/EA, (p. 70) describes the weir as 10 feet high and 130 feet long, whereas Section 5.7.1 (p. 97) describes it as "approximately 100 ft. long." The lack of a description of the weir structure raises questions regarding several potential design concerns including foundation support, under seepage concerns, and potential scour downstream of the structure. Available geotechnical information indicates that the structure would likely be founded on pervious, erodible sand deposits that could be subject to seepage concerns. In addition, under high flow conditions the weir would be overtopped, creating the potential for downstream scour and the need for scour protection or a downstream stilling basin.

Given the lack of specific information, the Panel cannot assess whether the estimated cost of the proposed weir structure includes provisions to address these potentially costly design issues.

Diversion Culvert

Figure 37 (p. 83) shows a cross-section of the diversion culvert, which is 35 feet wide by 15 feet high. This cross-section does not give any details on the invert elevation, the depth of cover over the culvert, or any required foundation support. The report provided only the following information (p. 48):

"The survey determined that intact soils are not present along the proposed route of the culvert up to the parking lot on the alignment's western end. Fill material was found to be underlain by till; there is no potential to encounter intact archaeological deposits in this area. The depth of fill ranged from four to five feet, with occasionally areas extending to up to 19 feet."

This is not sufficient for the Panel to evaluate the ability of the foundation material (fill) to support the culvert without additional strengthening or the use of deep foundations.

Final Panel Comment 5

Without completed invert and ground surface elevations for the culvert, the Panel cannot evaluate whether flows under large floods would overtop the top of the culvert and create a flow condition that could scour the cover material over the top of the culvert.

Section 4.4 (p. 86) describes the need for maintenance and removal of sediment within the culvert. However, the lack of information on the invert elevation and the normal water surface within the culvert makes it difficult for the Panel to assess the methods and costs required to remove sediment within the culvert over the project life.

Stilling Basin

The hydraulic analyses indicate that a hydraulic jump will occur at the downstream end of the diversion culvert and that a stilling basin will be required to dissipate energy. The Draft IFR/EA references the stilling basin 12 times in various sections, including an overall general description and potential environmental impacts. There is, however, no detailed description or drawings illustrating the dimensions or configuration of the stilling basin structure. Typically, stilling basin features include concrete walls, baffle blocks, and end-sills, which are far more costly than the “concrete and riprap structure” referenced in Section 5.1.2 (p. 92). The cost breakdown for a stilling basin is not specifically referenced in Appendix D. The lack of a description or figures depicting the configuration of the stilling basin does not allow the Panel to reasonably assess the estimated costs or potential impacts associated with the construction of this structure

Significance – Medium/High

The lack of important detail on the configuration of the weir, diversion culvert, and stilling basin could have a potential impact on project costs.

Recommendations for Resolution

1. Provide a detailed description and figures to describe the proposed stilling basin, including any foundation support requirements
2. Include a detailed cost breakdown for the stilling basin costs in Appendix D.
3. Include in the main report the description in Section 5.7.1 that contains a more complete verbal description of the weir and its function.
4. Provide a conceptual profile of the culvert and stilling basin showing the proposed invert and cover requirements.
5. Address the condition where extremely large flood events could overtop the ground surface along the culvert alignment

Final Panel Comment 6

Loss of life associated with the TSP design or probability of project failure are not quantitatively addressed in the Draft IFR/EA, despite being identified as a primary objective.

Basis for Comment

While economics drives the feasibility of flood and storm damage risk reduction studies, loss of life is a serious consideration. The Draft IFR/EA briefly mentions loss of life, but only qualitatively. With the long history of flooding, examples of loss of life in the existing conditions could easily be quantified. A statistical projection could be presented for both the future without- and the future with-project conditions.

Similarly, the Draft IFR/EA does not describe closure elements for encircling measures (e.g., ring walls around homes). Thus, the Panel cannot comment on whether they could be implemented under various hydrologic events or on their statistical reliability in regard to future loss of life with project conditions.

Significance – Medium

Without a clear understanding of the potential loss of life for both the future with and without project conditions, it is unclear whether the project is meeting this objective and what risks remain to the public.

Recommendation for Resolution

1. Provide statistics of loss of life in the project area from flood events, along with the nature of the causative flood events.
2. Provide a risk-based presentation on the potential for loss of life for both the future without- and future with-project conditions.
3. Describe nonstructural measures in terms of closure elements and their reliability and maintainability.

Final Panel Comment 7

The accuracy and relevance of the elevation and roughness data used in the H&H analysis may not reflect current conditions and therefore the cost estimates may not be accurate.

Basis for Comment

Recent and detailed elevation data (topography and bathymetry) for the existing conditions and the TSP are essential to predict any flooding events. The survey data used in the H&H model are from 2004 (Appendix C2). More detailed cross-sections of the topography/elevation data are needed since the Peckman River Basin is a highly urbanized area and the TSP is a combination of a diversion culvert, levees and floodwalls, channel modifications, ringwalls, and nonstructural measures. To predict the 2-year, 10-year, and 100-year water surface elevations, a +/- 1-foot change in elevation data could affect these solutions and could change the economics.

The main report does not explain the use of Manning's n in a heavily urbanized floodplain, specifically, how the model represents the 'roughness' of buildings, shopping centers, and homes in the floodplain. This is the most sensitive parameter in the Hydrologic Engineering Center River Analysis System (HEC-RAS) model.

Significance – Medium

Given that topography and roughness are the most sensitive inputs into the H&H model, an updated topographic and bathymetric survey for this highly urbanized area is important to improve the accuracy of the model predictions.

Recommendations for Resolution

1. Address the outdated 2004 survey information and update the H&H model to current conditions.
2. Add a description of roughness values to the main report for the existing and future floodplain and channels.

Final Panel Comment 8

For the TSP, it is unclear whether modeling was conducted to determine if back flow into the diversion culvert or backwater conditions from the Passaic River at the diversion culvert discharge point would potentially increase damage levels in the Peckman River Basin.

Basis for Comment

The mid-review teleconference clarified the efforts the Project Delivery Team (PDT) undertook to assess the interrelationship between flooding characteristics and conditions in the Peckman River Basin and those on the Passaic River for existing and historical conditions. The analysis described in Section 1.4 of Appendix C2 describes the larger system aspects and the probability of large storm events and peak discharges occurring in both basins simultaneously and the likelihood of compounding effects. The historical analysis states, “we have concluded that these rivers are practically independent for the purposes of this study” (Appendix C2, p. CII-17). This conclusion on flooding independence is an important component of the alternatives, but it is not clearly discussed in the Draft IFR/EA. From the Panel’s understanding of Appendix C2, the historical analysis was not modeled but rather correlated with existing flow and elevation data.

For the future conditions and TSP, it is not clear how the PDT understands the flooding independence and interrelationship. If the existing conditions of the Peckman were considered independent of the Passaic, the future conditions and interrelationship could change. The Panel considered the potential effects of elevated Passaic River levels at the diversion culvert outfall (about 0.7 miles upstream of the confluence of the Passaic and Peckman Rivers) during even a small to moderate storm event. It was not clear to the Panel whether the PDT has modeled such conditions to determine if there was potential for back flow into the diversion culvert or backwater conditions from the Passaic River at the diversion culvert discharge point such that flooding conditions above US Highway 46 may not be alleviated or could be worsened. The report does not discuss any such modeling for the TSP and interrelationship with the Passaic River, and the PDT stated that this was an important concern that should be addressed.

Significance – Medium

High water levels on the Passaic River at the Peckman diversion culvert outfall (even during moderate storm events) may have a backwater effect in the diversion culvert (TSP) and exacerbate flooding conditions in the Peckman River Basin above US Highway 46.

Recommendations for Resolution

1. Summarize PDT efforts to evaluate the Passaic River Basin and Peckman River Basin flooding interrelationships in the Draft IFR/EA, consistent with information presented by the PDT on the mid-review teleconference and consistent with Section 1.4 in Appendix C2 for historical conditions.
2. Describe the modeling efforts that have been conducted to address the concerns expressed in the 2nd paragraph under Basis for Comment above. If that modeling has been completed, include a summary in the Draft IFR/EA and Appendix C2. If such modeling has not been completed, describe how the PDT will address the Panel’s concerns for the interrelationship of the Passaic River during follow-up efforts to complete the IFR/EA.

Final Panel Comment 9

Inconsistencies in the levee/floodwall alignments depicted on the right bank of the Peckman River just upstream of the proposed weir/diversion culvert location make it unclear which alignment is correct and whether the correct economic, environmental, and engineering aspects of the project were assessed.

Basis for Comment

Figure 34 (Alternative 3) and Figure 36 (TSP or Alternative 10b) in the Draft IFR/EA show the alignment of the levee on the right bank of the Peckman River as follows: it begins at the end of the floodwall just upstream of the proposed weir/diversion culvert entrance, runs in a southerly direction, and ties into high ground at the right field corner of the baseball field behind the Passaic Valley High School. However, Appendix C2, Figure 31, shows the levee (and partial floodwall) alignment for Alternative 3 (which is part of the TSP) running in a southeasterly direction, with a large wooded area and baseball fields/football stadium to the south and parking lots/commercial development to the north.

There are two concerns with these conflicting levee alignments as presented in different figures in the report. The depicted alignments are quite different and have potential ramifications for the economic, environmental, and engineering aspects of the study.

- (1) The correct levee alignment that is, or should be, included in the TSP is not clear.
- (2) If the levee as presented in the Draft IFR/EA main report is correct, it is not clear why that alignment was selected over the alignment presented in Appendix C2, Figure 31. The selected alignment for the TSP would not only reduce flood risk for the urbanized area on the south side of US Hwy 46 east of the Peckman River but would also prevent/reduce flooding of a large area of undeveloped flood plain (wooded area) between the high school property and the Peckman River. The alignment presented in Figure 31 of Appendix C2 would allow that same large wooded area to flood and potentially provide substantial additional flood plain storage during large events.

The project area has limited natural areas and environmental resources. The fact that the TSP would potentially eliminate the natural flood plain functions and flood storage capacity of a large undeveloped and wooded property within the highly urbanized study area is a concern.

Significance – Medium

The selection of the levee alignment has implications for the engineering, economic, and environmental trade-offs associated with the TSP.

Recommendation for Resolution

1. Add a description in the Draft IFR/EA main report and/or Appendix C2 to identify both levee alignments that were considered upstream of US Highway 46 and explain why one was selected over the other for inclusion in the TSP.

Final Panel Comment 10

The Draft IFR/EA does not provide justification for the use of higher than average individual contingency values that result in costs deemed higher than normal.

Basis for Comment

Other than citing that it came from the USACE Cost Engineering Center of Expertise, the Draft IFR/EA provides no basis for the high contingencies shown in Appendix D, Table D1. Table D1 uses an average for contingencies from Table D2. This skews the cost because the individual contingency for by far the largest itemized cost (account code 19 – buildings, grounds, and utilities) has an individual contingency assigned value of 34% in Table D2, but the account cost is calculated based on the averaged contingency value of 49%, resulting in a significantly higher cost than appears reasonable. An adjustment to the cost presented in account code 19 in Table D1 could result in a 15% drop in cost for that account which, in turn, would reduce the project cost.

Significance – Medium/Low

Application of an additional 15% increase in costs for Account Code 19 could impact the relative feasibility of the alternatives including the TSP.

Recommendation for Resolution

1. Use the individual contingencies provided in Table D2 in Table D1.

Final Panel Comment 11

The configuration and specific costs associated with interior drainage features such as pump stations and gate wells are not included in the Draft IFR/EA.

Basis for Comment

The need for pumping stations and interior drainage facilities is identified in the Draft IFR/EA in Sections 3.6.2 (several times), 3.9 (several times) and 4.1, but there is no specific description of the interior drainage features included in the cost estimate. The Panel's experience on other projects suggests that the cost of accommodating interior drainage can be a significant part of the overall cost of a flood barrier.

Appendix D does not provide any breakdown to indicate that the costs of these type of facilities were included in the overall project cost. Discussions during the mid-review teleconference indicate that a preliminary interior drainage study was conducted to provide the basis for the cost of these facilities, however, this study was not referenced or included in the feasibility report.

Significance – Medium/Low

The report is incomplete since USACE indicated that the cost for the TSP included provisions for interior drainage facilities, but they are not described or documented in the report.

Recommendation for Resolution

1. Describe the interior drainage facilities envisioned for the project and include a separate cost item in the project cost breakdown both in the main report and in Appendix D.

Final Panel Comment 12

The Draft IFR/EA does not provide justification for construction of a flood wall in the reach section between the Great Notch Brook and industrial parking lots.

Basis for Comment

Figure 38 of the Draft IFR/EA shows the alignment of a proposed flood wall that is located adjacent to Great Notch Brook. Air photo coverage of the proposed flood wall alignment, available on the Internet (Google Earth), shows that the area downstream of the alignment consists largely of parking lots for an adjacent industrial facility. The report provides no justification for using a costly flood wall to protect lower value parking lot property. The use of a levee section would be a much less costly alternative.

Another alternative that could be considered would involve placement of a sloping fill in the downstream parking lot at a flat grade, which would both allow use of the area as a parking lot and provide flood protection for downstream areas. Although this could involve significantly more fill, it would likely be much less expensive than a concrete flood wall.

Significance – Medium/Low

Constructing a flood wall is a costly way to protect industrial parking lots, but the preliminary nature of the design and the fact that the design will be optimized in the next phase may eliminate this issue.

Recommendations for Resolution

1. Evaluate the use of levee or fill sections rather than a floodwall during future design stages to provide flood protection along Great Notch Brook.
2. Determine the most appropriate design based upon a comparison of the cost of levees versus a floodwall, including an assessment of real estate costs.
3. Consider constructing a larger earth fill section that would provide both parking and flood control.

Final Panel Comment 13

The configuration and application of the ring walls within this urban setting has not been discussed in the Draft IFR/EA, including its impact on the socioeconomic aspects of the community.

Basis for Comment

The Draft IFR/EA (p. 74) discusses the inclusion of ringwalls for specific structures in Alternative 10a and Alternative 10b (the TSP). Permanent barriers (vs. temporary barriers) were selected as the most appropriate approach to constructing the ringwalls. The TSP (Alternative 10b) includes 47 individual ringwalls in various locations within the upstream portion of the study area. Design details will be developed during optimization.

Per Table 12, Appendix C2 (p. CII-38), permanent ringwalls would be constructed around numerous residential properties (especially multiple houses located closely together on Hopson Avenue and in other smaller clusters) as well as a smaller number of commercial and municipal properties. The report does not describe, even in general terms, how tall these ringwalls would need to be (or the range of heights), whether there would need to be closure structures to facilitate access during non-flood periods, and other pertinent descriptive information of these ringwalls such as provisions for interior drainage. Individual ringwalls around multiple homes in neighborhoods could present numerous challenges and inconveniences for homeowners and could have an adverse effect on community cohesion and the overall desirability of the neighborhood for everyday living. In addition, the potential everyday effects of ringwalls on commercial businesses do not appear to be considered in the report.

The socioeconomic effects of numerous ringwalls on these neighborhoods and businesses are not described in Section 5.3 (pp. 95-96) of the Draft IFR/EA. Section 5.3 focuses only on short-term adverse effects during construction and long-term beneficial effects to the overall community from reduced flooding risk in the study area.

Significance – Medium/Low

Lack of understanding of the scope of the ringwalls and their potential impact on the individual homes and businesses affected by them could later result in significant concerns and opposition from affected neighborhoods and local businesses and adversely affect the implementation of the TSP.

Recommendations for Resolution

1. Describe what a typical ringwall around a residence, commercial business, and affected structures at the high school would look like and how it would function. Since the ringwall for each structure would vary and there are many unknowns at this point, generalized descriptions and figures could be used, and information on heights, widths, and functionality (such as whether closures would be needed or included) could be presented in general terms.
2. Include a brief description of potential impacts of the proposed ringwalls (other than the reduced risk of flooding) on the affected neighborhoods and businesses in Section 5.3 of the report.

Final Panel Comment 14

The Draft IFR/EA does not address the potential implications of climate change on future conditions in the basin or on the effectiveness of the TSP relative to management of flood risk.

Basis for Comment

USACE guidance in ECB 2014-10 (USACE, 2014) and other documents require “consideration of climate change in all current and future studies to reduce vulnerabilities and enhance the resilience of our water-resource infrastructure” (USACE, 2014, paragraph 1).

Section 4.5.5 of the Draft IFR/EA addresses risk and uncertainty as it relates to resilience of the TSP to climate change. However, the text indicates that there were no U.S. Geological Survey (USGS) gages in the basin suitable for analysis by the USACE Climate Hydrology Assessment Tool. Consequently, there was no analysis, even qualitative, conducted by the PDT to address the potential implications of climate change on future conditions in the basin or on the effectiveness of the TSP relative to management of flood risk in the basin. The Draft IFR/EA made no commitment to develop a climate change analysis in the finalization of the IFR/EA or, assuming the project is authorized for construction, during pre-construction engineering and design (PED). Section 4.5.5 (Draft IFR/EA, p. 88) made only a general statement that the PDT “would investigate ways to incorporate features that will make the project redundant, resilient, and robust during feasibility-level design.”

Without enough gage data from within the Peckman River Basin itself, it is unclear why readily available data and information from completed and ongoing studies in the larger, adjacent Passaic River Basin would not be sufficiently applicable to the Peckman River Basin for at least a qualitative assessment of the potential effects of climate change.

Significance – Medium/Low

The absence of a quantitative or, at a minimum, a qualitative climate change assessment in the Draft IFR/EA is an obvious omission of a required element of a feasibility study per USACE guidance that should be addressed prior to completing the study.

Recommendation for Resolution

1. Add more detailed discussion in Section 4.5.5 to describe efforts that will be undertaken during completion of the IFR/EA and/or PED (if authorized) to consider the potential effects of climate change on the watershed and upon the performance and effectiveness of the TSP.

Literature Cited:

USACE (2014). Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects. Engineering and Construction Bulletin (ECB) 2014-10. Department of Defense, U.S. Army Corps of Engineers, Washington, D.C. May 2.

Final Panel Comment 15

The overall estimated costs of fish and wildlife mitigation are reported inconsistently throughout the appendices, but in all instances appear to be extremely high for the limited number of acres being replaced.

Basis for Comment

The estimated cost of fish and wildlife mitigation for the limited resource impacts resulting from the TSP is an integral part of this floor risk management project. According to the Draft IFR/EA, the required mitigation would be accomplished by (1) purchasing credits in a mitigation bank, (2) participating in an in-lieu-fee program, or (3) constructing separable on-site or off-site mitigation features as part of project construction. The mitigation approach will be determined during later stages of the feasibility study.

The mitigation plan outlined in Appendix A.8 states that up to 4 acres of forested wetlands, 2.5 acres of riparian habitat, 1.5 acres of upland forest, and 1,110 linear feet of open water would be affected by the TSP. The mitigation cost for less than 10 acres of habitat is stated to be between \$10.9 and \$11.7 million (p. 7). The mitigation costs in Appendix A.8 are not consistent with the mitigation costs presented in Appendix D (Figure D2), which are \$12.9 million.

In addition to the mitigation cost discrepancies presented in the Draft IFR/EA and appendices, the stated costs for mitigation of loss of relatively marginal and fragmented habitat is well over \$1 million per acre and are considered excessive. According to USACE planning guidance (USACE, 2000a; Appendix C, Section C-3.e.(8)), an incremental cost analysis shall be performed for all recommended mitigation plans. The purpose of incremental cost analysis is to discover and display variation in costs, and to identify and describe the least-cost plan. It does not appear that the PDT performed an incremental cost analysis and identified the least-cost plan per USACE planning guidance.

Significance – Medium/Low

While the fish and wildlife mitigation planning and potential costs are not likely to change the TSP, the per acre costs for mitigation appear to be excessive and the required documentation for mitigation planning is missing from the report.

Recommendations for Resolution

1. Resolve the identified inconsistencies in mitigation costs in the Draft IFR/EA and pertinent appendices.
2. Add text to the Draft IFR/EA main report and Appendix A to discuss the incremental cost analysis and describe how the least cost mitigation plan was determined.

Literature Cited:

USACE (2000a). Planning: Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

Final Panel Comment 16

Risks associated with the accumulation of large debris in the channel upstream of the weir and at the entrance to the diversion culvert during a flood event have not been assessed in the Draft IFR/EA.

Basis for Comment

Since the Peckman River watershed is highly urbanized and subject to flash flooding, it is reasonable to assume that a substantial amount of large debris could accumulate in the Peckman River channel immediately upstream of the approximately 10-foot high by 130-foot wide weir at the entrance to the diversion culvert during a large flood event. Debris may include automobiles, trees and other woody debris, sediment (as indicated in the public comment letter received by the District), and other assorted debris from homes and businesses. It is not clear that the PDT has identified and assessed the potential risk associated with formation of a large debris jam that could accumulate at the weir and impede or block flow into the diversion culvert, adversely affecting the performance of the proposed project and exacerbating upstream flooding conditions.

In addition to considering the potential for debris accumulation and associated effects that may occur during a large storm event, the potential for incremental accumulation of debris and sediment at the mouth of, or inside, the 1,500-foot long covered diversion culvert during more frequent, smaller storm events could prove problematic when a large storm event occurs if the project features have not been adequately and proactively maintained.

In light of the above concerns about the risk of debris accumulation and the potential effects on project function during a large event as well as maintenance requirements, it is not clear whether the PDT considered an open diversion channel to the Passaic River in lieu of the diversion culvert during the plan formulation process.

Significance – Medium/Low

Potential debris accumulation, particularly during a large event, and the associated effects on project performance, as well as anticipated maintenance challenges associated with the diversion culvert (including routine maintenance/debris removal) introduce a potentially important risk and uncertainty consideration that is not addressed in the Draft IFR/EA.

Recommendations for Resolution

1. Describe potential risks to project performance associated with significant debris accumulation during a large event in Section 4.5 of the Draft IFR/EA.
2. Describe the challenges and cost issues associated with debris and sediment removal at the weir and entrance to the diversion culvert, as well as with debris and sediment removal within the 1,500-foot long covered culvert.
3. Add a discussion to the plan formulation section of the report (in Section 3.6.2 or other appropriate subsection) regarding whether an open diversion channel measure was considered and why it was not selected for detailed evaluation (including any trade-offs that may have been considered, such as safety, real estate, construction cost, channel maintenance, sponsor's preferences, etc.).

Final Panel Comment 17

Several benefit categories not included in the benefit calculations could affect the correct identification of the NED plan if their effects are not proportionate across all alternatives.

Basis for Comment

The Draft IFR/EA does not include various benefit categories in the benefit calculations. This means that the net benefits of the alternatives are not as high as they could be. This could have some impact on the identification of the NED plan if these benefit categories are not proportionate to each alternative.

For example, there are no benefits for traffic disruption risk reduction in the Draft IFR/EA (p. 97). During the clarification teleconference, the PDT confirmed this and admitted to not including other benefit categories as well. There is no indication of the magnitude of these benefits or if they would apply equally to the various alternatives. Because the report provides only preliminary analysis, project costs could rise and extra benefits might be needed to maintain net benefits.

Significance – Low

Alternatives 3 and 10b have almost identical net benefits but vastly different costs. If some of the benefit categories were added to the analysis, they might have had an impact on the ranking of the alternatives.

Recommendation for Resolution

1. Discuss the impact of the unclaimed benefits in terms of impact on the relative order of alternatives.

Final Panel Comment 18

The configuration of the levee cross-section analyzed in Appendix C3 does not conform to the guidance provided in EM 1110-2-1913.

Basis for Comment

Figures 1 and 2 in Appendix C3 show a zoned cross-section, including a central impervious core flanked by more pervious sections upstream and downstream. EM 1110-2-1913 (USACE, 2000b; paragraph 7.2) states that levees should generally be configured with a homogeneous cross-section. This guidance is provided based upon the fact that zoned cross-sections are extremely difficult to construct, particularly in smaller earth embankments.

The cross-section in Figures 1 and 2 also does not include an inspection trench as required by EM 1110-2-1913. This guidance requires that levees have an inspection trench to a depth of 6 feet or to the height of the levee below the levee section.

Significance – Low

Although the configuration of the levee cross-section does not conform to USACE guidance, future design stages will allow for modifications to be made to comply with appropriate guidance.

Recommendation for Resolution

1. Follow guidance provided in EM 1110-2-1913 to develop levee cross-sections during future design development stages.

Literature Cited:

USACE (2000b). Engineering and Design: Design and Construction of Levees. Engineer Manual (EM) 1110-2-1913. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 30.

Final Panel Comment 19

The main report would benefit from a model output of the flood inundation map for the TSP.

Basis for Comment

Since Alternative 10b was selected as the TSP, it would be helpful to have the flood inundation or water surface profiles for both Alternatives 10a and 10b (displaying floodplains) showing with and without the project. (The other alternatives have model outputs in Appendix C2.) It is important to show the TSP for the 50- and 100-year event to illustrate how the structural and non-structural features work in concert with each other.

Significance – Low

Additional output and graphics for the TSP will provide greater clarity in the results.

Recommendation for Resolution

1. Add model output and flood inundation graphics for the TSP in the main report.

Final Panel Comment 20

It is unclear how the subjective scale of Low-Medium-High used in Tables 12 and 14 was developed and applied to compare how each alternative met project objectives and constraints.

Basis for Comment

Each alternative was rated on a Low-Medium-High scale to determine how it met project objectives and constraints. However, the main report does not discuss how this criterion scale was developed and applied to each alternative, which is important since the relative comparison analyses ultimately led to the selection of the TSP.

Table 12 (p. 76) compares the alternatives relative to established planning objectives and constraints using a Low-Medium-High ranking scale and a corresponding, but confusing, color scheme. There is no explanation or narrative in the report to describe or define the metrics or thresholds (either quantitative or qualitative) that differentiate Low-Medium-High rankings.

Similarly, Table 14 (p. 78), which compares contributions of the alternatives relative to the four accounts established in the Principles and Guidelines for Water Resource Planning (P&G; USACE, 2009), fails to explain how the Low-Medium-High ranking scale was applied or the basis for the rankings.

Table 13 (p.78), which compares the alternatives based upon the P&G criteria of completeness, effectiveness, efficiency, and acceptability, is accompanied by a narrative that provides a reasonable description of the basis for the Low-Medium-High rankings for that table.

Significance – Low

The more comprehensive explanation of the ranking criteria will help the reader follow the comparisons of each alternative to the planning objectives noted in the P&G (1983) requirements.

Recommendation for Resolution

1. Add a description of the metric criteria (Low-Medium-High) developed and identified for each alternative need, specifically for Tables 12 and 14.

Literature Cited:

USACE (2009). Principles and Guidelines for Evaluating Federal Water Projects: U.S. Army Corps of Engineers Planning and the Use of Benefit Cost Analysis, A Report for the Congressional Research Service, Final Report. August 2009.

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APPENDIX A

IEPR Process for the Peckman River Basin Project

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A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the major milestones and deliverables of the Peckman River Basin IEPR. Due dates for milestones and deliverables are based on the award/effective date listed in Table A-1. The review documents were provided by U.S. Army Corps of Engineers (USACE) on June 11, 2018. Note that the actions listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the pdf printout of the USACE's Design Review and Checking System (DrChecks) project file (the final deliverable) on October 15, 2018. The actual date for contract end will depend on the date that all activities for this IEPR are conducted and subsequently completed.

Table A-1. Major Milestones and Deliverables of the Peckman River Basin IPER

Task	Action	Due Date
1	Award/Effective Date	6/11/2018
	Review documents available	6/11/2018
	Public comments available	6/21/2018
	Battelle submits draft Work Plan ^a	6/15/2018
	USACE provides comments on draft Work Plan	6/20/2018
	Battelle submits final Work Plan ^a	6/25/2018
2	Battelle submits list of selected panel members ^a	6/22/2018
	USACE confirms the panel members have no COI	6/26/2018
3	Battelle convenes kick-off meeting with USACE	6/21/2018
	Battelle convenes kick-off meeting with panel members	7/5/2018
	Battelle convenes kick-off meeting with USACE and panel members	7/10/2018
4	Panel members complete their individual reviews	7/26/2018
	Panel members provide draft Final Panel Comments to Battelle	8/3/2018
	Battelle sends public comments to panel members for review	7/30/2018
	Panel confirms no additional Final Panel Comment is necessary with regard to the public comments	7/30/2018
	Panel finalizes Final Panel Comments	8/9/2018
5	Battelle submits Final IEPR Report to USACE ^a	8/14/2018
6 ^b	Battelle convenes Comment Response Teleconference with panel members and USACE	9/25/2018
	Battelle submits pdf printout of DrChecks project file ^a	10/15/2018
	Agency Decision Milestone (ADM) meeting ^c	10/2018
	Post-ADM Senior Leader Meeting (SLM) ^c	TBD
	Contract End/Delivery Date	7/30/2019

^a Deliverable.

^b Task 6 occurs after the submission of this report.

^c The ADM and SLM meetings were listed in the Performance Work Statement under Task 3 but were relocated in this schedule to reflect the chronological order of activities.

At the beginning of the Period of Performance for the Peckman River Basin IEPR, Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., terminology to use, access to DrChecks, etc.). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of seventeen charge questions provided by USACE, two overview questions and one public comment question added by Battelle (all questions were included in the draft and final Work Plans), and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and after their subcontracts were finalized, all the members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the review documents and reference/supplemental materials listed in Table A-2.

Table A-2. Documents to Be Reviewed and Provided as Reference/Supplemental Information

Review Documents	Page Count
Draft Integrated Feasibility Report/ Environmental Assessment	148
Appendix A: Environmental Resources	258
Appendix B: Economics	21
Appendix CI: Hydrology	43
Appendix CII: Hydraulics	78
Appendix CIII: Geotechnical	407
Appendix D: Cost	19
Appendix E: Real Estate Plan	37
Appendix F: Letters of Support	4
Appendix G: Project Area Photographs	12
Public Review Comments	3
Total Number of Review Pages	1030

In addition to the materials provided in Table A-2, the panel members were provided the following USACE guidance documents.

- Review Policy for Civil Works (EC 1165-2-217, February 20, 2018)
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004)
- Foundations of SMART Planning
- SMART Planning Bulletin (PB 2013-03, July 15, 2013)
- SMART – Planning Overview
- Planning Modernization Fact Sheet.

About halfway through the review, a teleconference was held with USACE, Battelle, and the Panel so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted 48 panel member questions to USACE. USACE was able to provide responses to most of the questions during the teleconference, and provided written responses to all the questions prior to the end of the review.

In addition, throughout the review period, USACE provided documents at the request of panel members. These documents were provided to Battelle and then sent to the Panel as additional information only and were not part of the official review. A list of these additional documents requested by the Panel is provided below.

- Peckman River NED_Option 2-04-23-2018.xlsx
- Peckman River NED_Option 1_04-26-2018.xlsx
- Peckman River ARA_04-26-2018.xlsx
- Appendix D_Cost Appendix Draft.pdf.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response form provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments into a preliminary list of overall comments and discussion points. Each panel member's individual comments were shared with the full Panel.

A.3 IEPR Panel Teleconference

Battelle facilitated a teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member should serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

A.4 Preparation of Final Panel Comments

Following the teleconference, Battelle distributed a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the Peckman River Basin IEPR:

- **Lead Responsibility:** For each Final Panel Comment, one panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed a summary email detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.
- **Directive to the Lead:** Each lead was encouraged to communicate directly with the other panel members as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.
- **Format for Final Panel Comments:** Each Final Panel Comment was presented as part of a four-part structure:
 1. Comment Statement (succinct summary statement of concern)
 2. Basis for Comment (details regarding the concern)
 3. Significance (high, medium/high, medium, medium/low, and low; see description below)
 4. Recommendation(s) for Resolution (see description below).
- **Criteria for Significance:** The following were used as criteria for assigning a significance level to each Final Panel Comment:
 1. **High:** There is a fundamental issue within study documents or data that will influence the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
 2. **Medium/High:** There is a fundamental issue within study documents or data that has a strong probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
 3. **Medium:** There is a fundamental issue within study documents or data that has a low probability of influencing the technical or scientific basis for selection of, justification of, or ability to implement the recommended plan.
 4. **Medium/Low:** There is missing, incomplete, or inconsistent technical or scientific information that affects the clarity, understanding, or completeness of the study documents, and there is uncertainty whether the missing information will affect the selection of, justification of, or ability to implement the recommended plan.

5. **Low:** There is a minor technical or scientific discrepancy or inconsistency that affects the clarity, understanding, or completeness of the study documents but does not influence the selection of, justification of, or ability to implement the recommended plan.
- Guidelines for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. At the end of this process, 20 Final Panel Comments were prepared and assembled. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The full text of the Final Panel Comments is presented in Section 4.2 of the main report.

A.5 Conduct of the Public Comment Review

Following the schedule in Table A-1, Battelle received a Word file containing two pages of public comments on the Peckman River Basin (one letter) from USACE. Battelle then sent the public comments to the panel members in addition to the following charge question:

1. **Do the public comments raise any additional discipline-specific technical concerns with regard to the overall report?**

The Panel produced individual comments in response to the charge question. Each panel member's individual comments for the public comment review were shared with the full Panel. Battelle reviewed the comments to identify any new technical concerns that had not been previously identified during the initial IEPR. Upon review, Battelle determined, and the Panel confirmed, that no new issues or concerns were identified.

A.6 Final IEPR Report

After concluding the review and preparation of the Final Panel Comments, Battelle prepared a final IEPR report (this document) on the overall IEPR process and the IEPR panel members' findings. Each panel member and Battelle technical and editorial reviewers reviewed the IEPR report prior to submission to USACE for acceptance.

A.7 Comment Response Process

As part of Task 6, Battelle will enter the 20 Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

APPENDIX B

Identification and Selection of IEPR Panel Members for the Peckman River Basin Project

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B.1 Panel Identification

The candidates for the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study (hereinafter: Peckman River Basin IEPR) Panel were evaluated based on their technical expertise in the following key areas: plan formulation/economics, environmental law compliance, hydraulic and hydrology (H&H) engineering, and geotechnical/civil engineering. These areas correspond to the technical content of the review documents and overall scope of the Peckman River Basin project.

To identify candidate panel members, Battelle reviewed the credentials of the experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle evaluated these candidate panel members in terms of their technical expertise and potential conflicts of interest (COIs). Of these candidates, Battelle chose the most qualified individuals, confirmed their interest and availability, and ultimately selected four experts for the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COIs, or lack of the precise technical expertise required.

Candidates were screened for the following potential exclusion criteria or conflicts of interest (COIs). These COI questions were intended to serve as a means of disclosure in order to better characterize a candidate's employment history and background. Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. Guidance in OMB (2004, p. 18) states,

"...when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study

1. Previous and/or current involvement by you or your firm in the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study and related projects.
2. Previous and/or current involvement by you or your firm in flood control projects in New Jersey's Cedar Grove Township, Little Falls Township, Verona Township, West Orange Township, and Woodland Park Borough.
3. Previous and/or current involvement by you or your firm in the conceptual or actual design, construction, or operation and maintenance (O&M) of any projects in the Peckman River Basin.
4. Current employment by the U.S. Army Corps of Engineers (USACE).

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study

5. Previous and/or current involvement with paid or unpaid expert testimony related to the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study.
6. Previous and/or current employment or affiliation with members of the non-Federal sponsor or any of the following cooperating Federal, State, County, local, and regional agencies, environmental organizations, and interested groups (*for pay or pro bono*):
 - New Jersey Department of Environmental Protection (NJDEP)
 - Township of Little Falls
 - Borough of Woodland Park
 - Passaic Valley Regional Flood Control Commission.
7. Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to New Jersey's Cedar Grove Township, Little Falls Township, Verona Township, West Orange Township, and Woodland Park Borough.
8. Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the New York District.
9. Previous or current involvement with the development or testing of models that will be used for, or in support of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study project.

Models mentioned in the document include but are not limited to HEC-FDA, HEC-HMS, HEC-SSP, HEC-RAS, Evaluation of Planned Wetlands (EPW), Habitat Suitability Index, NJ HGMI and NNJFIBI models, and Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA420-P-04-005
10. Current firm involvement with other USACE projects, specifically those projects/contracts that are with the New York District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the New York District. Please explain.
11. Any previous employment by USACE as a direct employee, notably if employment was with the New York District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
12. Any previous employment by USACE as a contractor (either as an individual or through your firm) within the last 10 years, notably if those projects/contracts are with the New York District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study

13. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning flood management) and include the client/agency and duration of review (approximate dates).
14. Pending, current, or future financial interests in Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study related contracts/awards from USACE.
15. Significant portion of your personal or office's revenues within the last three years came from USACE contracts.
16. Significant portion of your personal or office's revenues within the last three years came from NJDEP contracts.
17. Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study.
18. Participation in relevant prior and/or current Federal studies relevant to the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study.
19. Previous and/or current participation in prior non-Federal studies relevant to the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study.
20. Has your research or analysis been evaluated as part of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study?
21. Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit. The term "firm" in a screening question referred to any joint venture in which a firm was involved. It applied to whether that firm serves as a prime or as a subcontractor to a prime. Candidates were asked to clarify the relationship in the screening questions.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Table B-1 provides information on each panel member’s affiliation, location, education, and overall years of experience. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

Table B-1. Peckman River Basin IEPR Panel: Summary of Panel Members

Name	Affiliation	Location	Education	P.E.	Exp. (yrs)
Plan Formulator / Economist					
David Bastian	Independent consultant	Annapolis, MD	M.S., River Engineering	Yes	36
Environmental Law Compliance Specialist					
Dennis Barnett	Tetra Tech	Atlanta, GA	M.S., Water Resources Planning	Yes	43
Geotechnical/Civil Engineering					
Doug Spaulding	Spaulding Consultants, Inc.	Golden Valley, MN	M.S., Geotechnical Engineering	Yes	50
H&H Engineering					
Steven Davie	GHD	Atlanta, GA	M.E., Civil Engineering	Yes	23

Table B-2 presents an overview of the credentials of the final four members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information on the panel members and their areas of technical expertise is given in Section B.3.

Table B-2. Peckman River Basin IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Bastian	Barnett	Spaulding	Davie
Plan Formulator/Economist				
Minimum of 15 years of demonstrated experience in economics and planning	X			
M.S. degree or higher in economics	W ¹			
At least 10 years of experience directly related to water resource economic evaluation	X			
A comprehensive understanding of regional economic development as well as traditional USACE national economic development benefits	X			
Familiarity with USACE plan formulation processes, procedures, and standards as it relates to flood risk management projects	X			
Minimum of five years of directly dealing with the USACE six-step planning process and policies which are governed by ER 1105-2-100, Planning Guidance Notebook	X			
Environmental Law Compliance Specialist				
Minimum of 15 years of experience directly related to water resources environmental evaluation or review		X		
M.S. degree or higher in related field		X		
Minimum 10 years of experience in evaluating and conducting National Environmental Policy Act (NEPA), impact assessments, including cumulative effects analyses for complex, multi- objective public works projects with competing trade-offs and environmental mitigation needs		X		
Familiarity with fish and wildlife habitat and species, socioeconomic factors, and cultural resources that may be affected by the project alternative in the study area and region		X		
Experience determining scope and appropriate methodologies for a variety of projects/programs with high public and interagency interests		X		
Familiarity with the evaluation of impacts in urban settings and stream/riparian corridor impacts		X		
Familiarity and experience with United States Fish and Wildlife Service Habitat Evaluation Procedures (HEP), Clean Water Act, Endangered Species Act (ESA), National Historic Preservation Act, and state and Federal laws/executive orders pertaining to American Indian Tribes		X		
Geotechnical/Civil Engineer				
Registered professional engineer			X	
Minimum of 15 years of experience in engineering			X	
Minimum of 10 years of experience in engineering with an emphasis on fluvial flood risk management projects			X	

Table B-2. Peckman River Basin IEPR Panel: Technical Criteria and Areas of Expertise (continued)

Technical Criterion	Bastian	Barnett	Spaulding	Davie
Experience in levees, culverts, channel stability, design, and construction, bridge design and construction,			X	
Experience in design and construction for detention\retention basins, utility relocations, positive closure requirements, interior drainage requirements, and application of non-structural flood risk management measures			X	
Familiarity with and have demonstrated knowledge related to Corps of Engineers geotechnical practices associated with flood management channels, construction, and soil engineering			X	
Experience in geotechnical risk and fragility analysis			X	
Safety Assurance Review (SAR)			X	
H&H Engineering				
Registered professional engineer				X
Minimum of 15 years of experience in hydrologic and hydraulic engineering				X
Experienced with all aspects of hydrology and hydraulic engineering with an emphasis on flood risk management projects				X
Familiarity with floodplain mapping, hydrologic statistics, sediment transport analysis, channel stability analysis, and risk and uncertainty analysis				X
Proficient with USACE or equivalent type of models including the Hydraulic Engineering Center River Analysis System (HEC-RAS), Hydrologic Modeling System (HEC-HMS), and HEC-GeoRAS				X

W¹ - As noted in Table 2 above, the performance work statement states that the plan formulator/economist has “a minimum MS degree or higher in economics.” Mr. Bastian has conducted economic analyses for USACE Headquarters and Districts for many years. Although he doesn’t hold a MS in economics, we believe his hands-on experience over the past 38 years is more than sufficient to provide him with the expertise to conduct this review. Battelle is confident that Mr. Bastian is a qualified expert for this panel position.

B.3 Panel Member Qualifications

Detailed biographical information on each panel members’ credentials and qualifications and areas of technical expertise are summarized in the following paragraphs.

Name	David Bastian, P.E.
Role	Plan Formulator/Economist
Affiliation	Independent Consultant

Mr. Bastian is an independent consultant and P.E. for David Bastian Consulting in Annapolis, Maryland, specializing in USACE compliance and policy review, plan formulation and incremental cost analysis, flood risk reduction, and hydraulic and river engineering. He earned his B.S. in civil engineering from the Georgia Institute of Technology and an M.S. in river engineering from Delft University, Holland.

Mr. Bastian has over 35 years of experience with USACE and as contractor/consultant on USACE projects involving feasibility studies and public works planning, all based on the USACE six-step planning process. As a reviewer at USACE, Headquarters, he became familiar with, and has direct experience with, Engineer Regulation (ER) 1105-2-100 as well as other USACE engineering regulations, manuals, and pamphlets. He co-authored the USACE Planner’s Workshop Manual. His project history demonstrates that he has reviewed and collaborated on more than 100 USACE reports evaluating and comparing alternative plans.

Mr. Bastian has 20 years of experience in flood risk evaluation and has worked directly to identify and evaluate flood risk. For nine years he was involved in the coastal economic evaluation for coastal Louisiana restoration, the greater New Orleans hurricane and storm damage risk reduction system, and four other study areas along the Louisiana and Texas coasts. His extensive review experience includes the Delaware River Basin Comprehensive Flood Risk Management Interim Feasibility Study and Integrated Environmental Assessment for New Jersey (2016), Souris River Basin Integrated Feasibility Report/Environmental Assessment (2017), Upper Turkey Creek, Johnson & Wyandotte Counties, Kansas, Flood Risk Management Project; and Kansas Citys Local Flood Protection Project (2005-2006); He helped author the report, provided technical and policy guidance, and supervised District staff in revising feasibility report concerning major metropolitan levee system upgrade for Kansas City, Kansas and Kansas City, Missouri. On the Topeka Local Flood Damage Reduction Project (2006-2007), he provided technical, policy, and writing guidance to the District for design deficiency, levee system upgrade, flood risk reduction study. For the Mississippi River Levee System (Units L-455 & R471-460), St. Joseph, Missouri/Elwood, Kansas (2006-2007) study, he provided technical and policy compliance for a flood risk reduction study involving a portion of the levee system.

He is familiar with large, complex Civil Works projects with high public and interagency interests through his extensive involvement with the Louisiana Coastal Study area pre- and post-Hurricane Katrina. Mr. Bastian is familiar with USACE flood risk and hurricane/coastal damage risk reduction analysis and economic benefit calculations, including the use of standard USACE computer programs such as the Hydrologic Engineering Center’s (HEC’s) Flood Impact Analysis (HEC-FIA) modeling program. He has reviewed HEC-FIA and other model applications and their outputs for several flood risk reduction projects for technical economic justification.

During his career, he has developed economic input databases for deep-draft navigation studies at the Institute for Water Resources (IWR) (1980-1987); evaluated deep draft economic feasibility for enlarging the Panama Canal (1987-1993); reviewed feasibility studies for economic justification (1993-1998) at USACE-Headquarters (HQ USACE); and reviewed and/or authored planning and economic analyses for various USACE projects (2001-present), including hurricane and storm damage risk reduction analyses for the New Orleans District, its architectural/engineering firms, and non-Federal sponsors (2006-2011).

Since 1993, Mr. Bastian has reviewed USACE studies with a focus on evaluating and comparing alternative plans for compliance with plan formulation processes, procedures, and standards. Since 2001, he has participated in the preparation of the Kansas Citys, Turkey Creek, Texas City, and Boardman flood risk management and post-Hurricane Katrina and Texas City hurricane and storm damage risk reduction studies and has reviewed the Blanchard environmental restoration study, and various dam safety studies regarding plan formulation compliance and economic justification.

Mr. Bastian’s experience at HQ USACE and as a contractor/consultant on USACE projects includes applying ER 1105-2-100 (Principles and Guidelines) to projects subject to Civil Works project evaluations, all of which involved the six-step planning process. During his career, he has reviewed and collaborated on more than 100 USACE reports evaluating and comparing alternative plans. He also has had direct experience with other USACE engineer regulations, manuals, and pamphlets and was the co-author of the USACE Planner’s Workshop Manual.

Mr. Bastian has evaluated and conducted National Economic Development (NED) analysis procedures as they relate to flood risk management and to hurricane and coastal storm damage risk reduction. Specifically, for the Kansas Citys, Turkey Creek, Texas City, and Boardman studies, he evaluated traditional NED plan benefits associated with flood risk management and evaluated application of HEC-Flood Damage Reduction Analysis (HEC-FDA) software.

Mr. Bastian’s previous employment at USACE included positions as Deputy Chief of Staff for Support, Office Chief of Engineers; Assistant Director of Civil Works, Office Chief of Engineers; technical and policy compliance review expert, Washington Level Review Center; and navigation research, USACE Institute for Water Resources. He has served as a USACE Washington-level technical and policy compliance review expert and managed interdisciplinary reviews of over 70 feasibility reports. Mr. Bastian’s participation in professional societies includes the American Society of Civil Engineers, the American Association of Port Authorities, the Permanent International Association of Navigation Congresses, and the Western Dredging Association.

Name	Dennis Barnett, P.E.
Role	Environmental Law Compliance Specialist
Affiliation	Tetra Tech

Mr. Barnett is a civil engineer with 43 years of experience in water resource and environmental planning. Prior to joining Tetra Tech in 2009, he had a 34-year career with USACE as a water resource and environmental planner covering both the South Atlantic Division and the Mobile District. Mr. Barnett has extensive experience applying planning principles and procedures to address water resource problems and opportunities, including plan formulation, public involvement, trade-off analysis, and environmental impact assessment. He is a recognized expert in developing and coordinating environmental assessments and impact statements in accordance with the National Environmental Policy Act (NEPA). His experience includes addressing substantive and procedural requirements of relevant environmental laws and regulations and working collaboratively with local, state, and Federal agencies, environmental organizations, and other interest groups on complex and controversial water resource projects. He was responsible for successful quality assurance related to implementation of NEPA for USACE studies and projects in the South Atlantic region, as well as compliance with applicable environmental laws, regulations, policies, and executive orders. He is knowledgeable of USACE regulations and policies

governing the presence of hazardous, toxic, and/or radioactive wastes (HTRW) on Civil Works projects and has effectively applied that knowledge to ensure compliance with HTRW requirements for Civil Works projects in the successful completion of numerous planning and post-authorization reports, or in the review of these reports.

As a senior USACE environmental planner for 25 years, Mr. Barnett performed, or provided oversight for, planning and environmental activities in support of large- and small-scale water resource projects across the southeastern United States, Puerto Rico, and Virgin Islands. He facilitated the resolution of complex and controversial planning and environmental issues necessary to the successful completion of numerous large and small water resource studies and projects addressing deep- and shallow-draft navigation channel improvements, coastal storm damage reduction, flood risk management, and ecosystem restoration. He participated in the development and evolution of policies and procedures for Civil Works reviews, including agency technical reviews and independent external peer reviews, and facilitated the implementation of those reviews in the USACE South Atlantic region.

Following his career with USACE, Mr. Barnett has continued to be involved with USACE Civil Works projects as a consultant with Tetra Tech, including such activities as lead planner for a watershed study for the Detroit District; a principal author of a major EIS for a controversial update of the master water control manual for several reservoirs in the Mobile District; and team leader for completion of cultural resource, wetlands, and endangered species surveys and the assessment of potential impacts on these resources in support of the engineering and design for two significant environmental mitigation features for the Savannah Harbor Expansion Project. In a recent project to develop a stream restoration and trail plan in the highly urbanized downtown Louisville, Kentucky, area, Mr. Barnett completed an inventory of potential HTRW sites within the stream corridor and identified specific areas for detailed analysis in subsequent phases of the project. He has worked with various habitat-based models and procedures to evaluate and select cost-effective ecosystem restoration plans and has led coordination, consultation, and compliance activities to meet the requirements of the Endangered Species Act, Fish and Wildlife Coordination Act, Clean Water Act, and Magnuson-Steven Fisheries Conservation and Management Act (essential fish habitat) for numerous Civil Works projects, both during his USACE career and as a consultant.

Name	Douglas Spaulding, P.E.
Role	Geotechnical/Civil Engineer
Affiliation	Spaulding Consultants, Inc.

Mr. Spaulding is a Principal and geotechnical engineer with Spaulding Consultants, LLC, responsible for dam, levee, and floodwall design and inspection. He earned his M.S. in geotechnical engineering from Purdue University, and is a registered professional engineer in Wisconsin, Minnesota, and Michigan. He has 50 years of experience in the design, evaluation, and inspection of water-retaining structures.

During his long career, he has provided geotechnical design and evaluation services for flood control levees, embankments, and hydroelectric projects in a 23-state area including New Jersey. His experience includes 10 years with USACE, where he served as Chief of the Levee and Channel Design Section for the St. Paul District. In that capacity, he managed the development of the Pembina levee project in North Dakota and provided geotechnical design services for over \$200 million worth of local flood protection projects in Wisconsin, Minnesota and North Dakota. The Pembina project and the Mankato and Winona flood control projects in Minnesota all included extensive sections of floodwall (both I-wall and T-wall

configurations). In addition, for the Winona project, Mr. Spaulding supervised the evaluation of underseepage using a drainage trench. He also served as the Program Manager for the National Dam Safety Program in Wisconsin and Minnesota. He has experience with lock structures in Minnesota and Michigan and served on the design team for the rehabilitation of Lock and Dams No.1 and No.2 on the Mississippi River and managed the design of several hydroelectric projects at dams on the Mississippi and Red Rivers.

Mr. Spaulding's geotechnical background includes evaluating the stability of levee sections founded on soft clay foundations. His experience also encompasses geotechnical design of bridge foundations, cellular sheet pile structures, sheet pile tieback walls, conventional gravity walls, and pump stations founded on sand and soft clay deposits. He has provided design services for embankments using preload fills to strengthen underlying foundation deposits. He recently served as a consultant to evaluate the instability caused by a sanitary landfill founded on over 100 feet of soft lacustrine clay. All of the local flood control projects for which Mr. Spaulding has provided design services have involved at least several gatewells to accommodate gravity drainage.

As part of his experience, he applied USACE risk-informed approaches to the evaluation of safety issues at USACE navigation, flood control, and hydroelectric projects. Mr. Spaulding also provided dam safety training for USACE operations personnel at navigation and flood control projects from 1988 to 2010. Over the last 10 years, Mr. Spaulding has participated in more than 75 Potential Failure Mode Analysis (PFMA) evaluations of dams and hydroelectric projects. As a facilitator of PFMA evaluations authorized by the Federal Energy Regulatory Commission, Mr. Spaulding has directed more than 50 evaluations for embankment dams, concrete gravity structures, and arch dam structures.

Mr. Spaulding has served on IEPR review panels dealing with local flood protection projects such as levees, channels and floodwalls, dam remediation, dam replacement, and seepage control system upgrades. This experience has provided extensive background in USACE's Safety Assurance Review (SAR) requirements. Mr. Spaulding has provided peer review services on two reaches of hurricane protection projects in the New Orleans area. In 2008, he peer-reviewed the geotechnical design of the New Orleans Group 1 to Group 3 pump stations. In 2010, Mr. Spaulding also served on the IEPR team reviewing the Olmsted Lock and Dam structure on the Ohio River. In 2014 he served on the IEPR evaluation team for the Pine Creek dam remediation in Oklahoma, assessing proposed methods to control internal embankment seepage around an existing conduit that had created large internal voids in the 50-year-old dam. In addition, Mr. Spaulding currently serves on two FERC-appointed Boards of Consultants reviewing the design of two major hydroelectric projects and was appointed to the Department of Energy (DOE) Peer Review panel to evaluate ongoing DOE-sponsored research related to dams and hydroelectric generation. He recently served on a Bureau of Reclamation review panel for the Folsom Dam spillway addition.

Mr. Spaulding is a lifetime member of the American Society of Civil Engineers. He also is a member of the Minnesota Geotechnical Society, the National Hydropower Association, and the Construction Panel for the Minneapolis section of the American Arbitration Association.

Name	Steven Davie, D.CE., P.E.
Role	H&H Engineer
Affiliation	GHD

Mr. Davie is a civil engineer with over 23 years of experience working on river, tidal, and coastal-related projects involving hydrodynamic modeling, coastal engineering, mitigation, engineering design, feasibility studies, EIS development, and data collection. He received an M.E. in civil engineering, with an emphasis on coastal engineering, from the University of Florida in 1997. He is a registered professional engineer in Georgia and has specialized in coastal/riverine hydraulics with more than 40 applications to estuaries, ports, and navigation channels. Mr. Davie has managed multidisciplinary projects drawing on his leadership and mentorship capabilities. He has managed and served as a technical leader on several large projects such as the Savannah Harbor Expansion Project, Post 45 Charleston Harbor Deepening, Panama Canal Third Set of Locks, Port Qasim in Pakistan, Choctaw Point Terminal in Alabama, and the Calcasieu Ship Channel in Louisiana.

As an expert in the field of urban hydrology and hydraulics (H&H), Mr. Davie has worked on numerous H&H projects in locations such as the City of Atlanta (Chattahoochee River), the City of Memphis (Lick Creek), and the Tittabawassee, Mobile, Kalamazoo, and Fox Rivers. Most recently, Mr. Davie is leading the Hurricane Irma Recovery Support for the St. Marys River waterfront project. He was the lead coastal engineer to support a construction and engineering team to rebuild the waterfront for the City of St Marys in southeast Georgia.

Mr. Davie has a thorough understanding of open-channel systems and tidally influenced riverine systems. He was lead hydraulic engineer on the 2011 Hurricane Plan for the Inner Harbor Navigation Channel (IHNC), Lake Borgne Surge Barrier design-build project. The purpose of the hydraulic study was to determine the operations scenario for the Bayou Bienvenue Lift Gate during the 2011 hurricane season. The hydraulic calculations assisted the team on the velocities expected through the gate and scour protection for the structure and adjacent wetlands.

Additionally, in 2014, on the Savannah Harbor Expansion Project, Mr. Davie was Principal-in-Charge for the design of two mitigation projects to offset the effects of deepening the navigation channel. First, the flow diversion project in the upper estuary was developed to divert freshwater from the Savannah River to the sensitive parts of the middle estuary, on the Middle and Little Back Rivers. Second, the New Savannah Bluff Lock and Dam Fish Passage was developed to allow sturgeon and other fish to pass around the lock and dam to upstream spawning grounds near Augusta, Georgia.

Mr. Davie has a thorough understanding of the HEC's River Analysis System (HEC-RAS) model. His master's thesis was titled "Determination of Roughness Coefficients in Heavily Vegetated Flood Plains and Their Use in the HEC-RAS model." Working with Dr. Bent A. Christensen at the University of Florida, Mr. Davie analyzed several flood events in Florida, on the Mississippi River, and on the Red River for HEC-RAS results and the validity of the Manning equation in heavily vegetated floodplains.

Mr. Davie was selected as a Diplomat in Coastal Engineering (D.CE) in 2014 by the Academy of Coastal, Ocean, Port and Navigation Engineers. He is a member of the Coasts, Oceans, Ports, and Rivers Institute (COPRI), the American Society of Civil Engineers (ASCE), the Society of American Military Engineers, the American Association of Port Authorities, the Waterways Infrastructure Subcommittee (ASCE/COPRI) in 2015-17, and the ASCE Ports & Harbors Technical Committee.

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APPENDIX C

Final Charge for the Peckman River Basin IEPR

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Charge Questions and Guidance to the Panel Members for the Independent External Peer Review (IEPR) of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study

This is the final Charge to the Panel for the Peckman River Basin IEPR. This final Charge was submitted to USACE as part of the final Work Plan, originally submitted on June 25, 2018.

BACKGROUND

The Peckman River Basin drainage area is approximately 9.8 square miles and is one of the major sub-watersheds of the Passaic River. The Peckman River Basin originates in the Town of West Orange, New Jersey, and flows northeasterly through the Borough of Verona, the Township of Cedar Grove, the Township of Little Falls, and the Borough of Woodland Park (formerly West Paterson) to its confluence with the Passaic River. The elevation change along the river is approximately 260 feet, with the majority of the drop occurring within Cedar Grove. Great Notch Brook is a major tributary to the Peckman River Basin, entering the river just downstream of New Jersey State Highway 46. Great Notch Brook is subject to extremely rapid runoff from higher elevations in the eastern side of the watershed. Two other small tributaries enter the river in Cedar Grove.

The downstream portion of the Peckman River Basin in Woodland Park is within close proximity to Dowling Brook, which is also a tributary to the Passaic River. During extreme flooding events, it has been reported that flows from the Peckman River Basin inundate the area of Woodland Park located between the Peckman River Basin and Dowling Brook.

The Peckman River Basin is a tributary to the Passaic River, which, during certain flood events can cause backwater flooding from the Passaic. However, the event on the Passaic River may occur at a different frequency than a flood event on the Peckman River Basin or there may only be an event on one river. In some cases, the flood events are tied together, but in other cases they may be separate and distinct events.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study (hereinafter: Peckman River Basin IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Review Policy for Civil Works* (Engineer Circular [EC] 1165-2-217, dated February 20, 2018), and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004). Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to “assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in evaluation of economic or environmental impacts, and any biological opinions” (EC 1165-

2-217; p. 39) for the decision documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) who meet the technical criteria and areas of expertise required for and relevant to the project.

The Panel will be “charged” with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-217 (p.41), review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review. The review assignments per panel member may vary slightly according to discipline.

Review Documents	Subject Experts				
	No. of Review Pages	Planner Formulation/ Economics	Environmental Law Compliance Specialist	Geotechnical/ Civil Engineer	Hydrology & Hydraulic Engineer
Draft Integrated Feasibility Report/ Environmental Assessment	148	148	148	148	148
Appendix A: Environmental Resources	258	258	258		
Appendix B: Economics	21	21			
Appendix CI: Hydrology	43				43
Appendix CII: Hydraulics	78				78
Appendix CIII: Geotechnical	407			407	
Appendix D: Cost	19	19			19
Appendix E: Real Estate Plan	37		37		
Appendix F: Letters of Support	4	4	4		
Appendix G: Project Area Photographs	12	12	12	12	12
Public Review Comments	3	3	3	3	3
Total Number of Review Pages	1030	465	462	570	303

* Page count for public comments is approximate. USACE will submit public comments to Battelle, who will in turn submit the comments to the IEPR Panel.

Documents for Reference

- Review Policy for Civil Works (EC 1165-2-217, February 20, 2018)
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004)
- Foundations of SMART Planning
- SMART Planning Bulletin (PB 2013-03, July 15, 2013)
- SMART – Planning Overview
- Planning Modernization Fact Sheet

SCHEDULE & DELIVERABLES

This schedule is based on the date all panel members are under subcontract, if earlier than anticipated, these dates could change. This schedule may also change due to circumstances out of Battelle’s control such as changes to USACE’s project schedule and unforeseen changes to panel member and USACE availability. As part of each task, the panel member will prepare deliverables by the dates indicated in the table (or as directed by Battelle). All deliverables will be submitted in an electronic format compatible with MS Word (Office 2003).

Task	Action	Due Date
3	Subcontractors complete mandatory Operations Security (OPSEC) training	8/2/2018
	Battelle sends review documents to panel members	7/5/2018
	Battelle convenes kick-off meeting with panel members	7/5/2018
	Battelle convenes kick-off meeting with USACE and panel members	7/5/2018
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	7/16/2018
4	Panel members complete their individual reviews	7/26/2018
	Battelle provides talking points for Panel Review Teleconference to panel members	7/27/2018
	Battelle convenes Panel Review Teleconference	7/30/2018
	Battelle provides Final Panel Comment templates and instructions to panel members	7/30/2018
	Panel members provide draft Final Panel Comments to Battelle	8/3/2018
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	8/04/2018 - 8/08/2018
	Panel finalizes Final Panel Comments	8/9/2018
4**	Battelle receives public comments from USACE	7/1/2018
	Battelle sends public comments to Panel	7/30/2018
	Panel completes its review of public comments	8/1/2018

Task	Action	Due Date
	Battelle and Panel review the Panel's responses to the charge question regarding the public comments	8/2/2018
	Panel drafts Final Panel Comment for public comments, if necessary	8/7/2018
	Panel finalizes Final Panel Comment regarding public comments, if necessary	8/8/2018
5	Battelle provides Final IEPR Report to panel members for review	8/10/2018
	Panel members provide comments on Final IEPR Report	8/13/2018
	*Battelle submits Final IEPR Report to USACE	8/14/2018
6	Battelle inputs Final Panel Comments to Design Review and Checking System (DrChecks) and provides Final Panel Comment response template to USACE	8/21/2018
	Battelle convenes teleconference with Panel to review the Comment Response process	8/23/2018
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review	8/23/2018
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	8/23/2018
	USACE PCX provides draft PDT Evaluator Responses to Battelle	9/7/2018
	Battelle provides draft PDT Evaluator Responses to panel members	9/13/2018
	Panel members provide draft BackCheck Responses to Battelle	9/14/2018
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	9/18/2018
	Battelle convenes Comment Response Teleconference with panel members and USACE	9/21/2018
	USACE inputs final PDT Evaluator Responses to DrChecks	9/24/2018
	Battelle provides final PDT Evaluator Responses to panel members	9/25/2018
	Panel members provide final BackCheck Responses to Battelle	10/2/2018
	Battelle inputs panel members' final BackCheck Responses to DrChecks	10/3/2018
	*Battelle submits pdf printout of DrChecks project file	10/9/2018
The two meetings below will be attended by the Lead Panel Member only. That person will be determined based on the issues identified.		
SLM 1	Senior Leader Meeting (SLM) 1 - Agency Decision Milestone (ADM) Meeting	10/2018
SLM 2	Senior Leader Meeting 2 – Post-ADM	TBD

* Deliverables

** Battelle will provide public comments to the Panel after they have completed their individual reviews of the project documents to ensure that the public comment review does not bias the Panel's review of the project documents.

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the decision documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and properly documented; satisfies established quality requirements; and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the decision documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-217).

1. Your response to the charge questions should not be limited to a “yes” or “no.” Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also, please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review (ATR).
2. Please contact the Battelle Project Manager and Program Manager, Lynn McLeod; mcleod@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Lynn McLeod (mcleod@battelle.org) immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report but will remain anonymous.

Please submit your comments in electronic form to the Project Manager, no later than 10 pm ET by the date listed in the schedule above.

Independent External Peer Review of the Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study

Charge Questions and Relevant Sections as Supplied by USACE

The following Charge to Reviewers outlines the objective of the Independent External Peer Review (IEPR) for the subject study and the specific advice sought from the IEPR panel.

The objective of the IEPR is to obtain an independent evaluation of whether the interpretations of analysis and conclusions based on analysis are reasonable for the subject study. The IEPR panel is requested to offer a broad evaluation of the overall study decision document in addition to addressing the specific technical and scientific questions included in the charge. The panel has the flexibility to bring important issues to the attention of decision makers, including positive feedback or issues outside those specific areas outlined in the charge.

The panel review is to focus on scientific and technical matters, leaving policy determinations for USACE and the Army. The panel should not make recommendations on whether a particular alternative should be implemented or present findings that become “directives” in that they call for modifications or additional studies or suggest new conclusions and recommendations. In such circumstances the panel may have assumed the role of advisors as well as reviewers, thus introducing bias and potential conflict in their ability to provide objective review.

Panel review comments are to be structured to fully communicate the panel's intent by including the comment, why it is important, any potential consequences of failure to address, and suggestions on how to address the comment.

Broad Evaluation Charge Questions

1. Is the need for and intent of the decision document clearly stated?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical information?

Given the need for and intent of the decision document, assess the adequacy and acceptability of the following:

3. Project evaluation data used in the study analyses
4. Economic, environmental, and engineering assumptions that underlie the study analyses
5. Economic, environmental, and engineering methodologies, analyses, and projections
6. Models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives
7. Methods for integrating risk and uncertainty
8. Formulation of alternative plans and the range of alternative plans considered

9. Quality and quantity of the surveys, investigations, and engineering sufficient for conceptual design of alternative plans
10. Overall assessment of significant environmental impacts and any biological analyses
11. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable
12. Assess the considered and tentatively selected alternatives from the perspective of systems, including systemic aspects being considered from a temporal perspective, including the potential effects of climate change.

For the tentatively selected plan, assess whether:

13. The models used to assess life safety hazards are appropriate
14. The assumptions made for the life safety hazards are appropriate
15. The quality and quantity of the surveys, investigations, and engineering are sufficient for a concept design considering the life safety hazards and to support the models and assumptions made for determining the hazards
16. The analysis adequately addresses the uncertainty and residual risk given the consequences associated with the potential for loss of life for this type of project.
17. From a public safety perspective, the proposed alternative is reasonably appropriate or are there other alternatives that should be considered?

Battelle Summary Charge Questions to the Panel Members¹

Summary Questions

18. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.
19. Please provide positive feedback on the project and/or review documents.

Public Comment Questions

20. Do the public comments raise any additional discipline-specific technical concerns with regard to the overall report?

¹ Questions 18 through 20 are Battelle-supplied questions and should not be construed or considered part of the list of USACE-supplied questions. These questions were delineated in a separate appendix in the final Work Plan submitted to USACE.

APPENDIX D

Conflict of Interest Form

David Kaplan
USACE, Institute for Water Resources
May 29, 2018
C-2

Conflicts of Interest Questionnaire
Independent External Peer Review
Peckman River Basin, New Jersey, Flood Risk Management Feasibility Study

The purpose of this document is to help the U.S. Army Corps of Engineers identify potential organizational conflicts of interest on a task order basis as early in the acquisition process as possible. Complete the questionnaire with background information and fully disclose relevant potential conflicts of interest. Substantial details are not necessary; USACE will examine additional information if appropriate. Affirmative answers will not disqualify your firm from this or future procurements.

NAME OF FIRM: **Battelle Memorial Institute Corporate Operations**
REPRESENTATIVE'S NAME: **Jason Jenkins**
TELEPHONE: **614-424-4873**
ADDRESS: **505 King Avenue, Columbus, Ohio 43201**
EMAIL ADDRESS: **jenkinsj@battelle.org**

I. INDEPENDENCE FROM WORK PRODUCT. Has your firm been involved in any aspect of the preparation of the subject study report and associated analyses (field studies, report writing, supporting research etc.) **No** Yes (if yes, briefly describe):

II. INTEREST IN STUDY AREA OR OUTCOME. Does your firm have any interests or holdings in the study area, or any stake in the outcome or recommendations of the study, or any affiliation with the local sponsor? **No** Yes (if yes, briefly describe):

III. REVIEWERS. Do you anticipate that all expert reviewers on this task order will be selected from outside your firm? **No** **Yes** (if no, briefly describe the difficulty in identifying outside reviewers):

IV. AFFILIATION WITH PARTIES THAT MAY BE INVOLVED WITH PROJECT IMPLEMENTATION. Do you anticipate that your firm will have any association with parties that may be involved with or benefit from future activities associated with this study, such as project construction? **No** Yes (if yes, briefly describe):

V. ADDITIONAL INFORMATION. Report relevant aspects of your firm's background or present circumstances not addressed above that might reasonably be construed by others as affecting your firm's judgment. Please include any information that may reasonably: impair your firm's objectivity; skew the competition in favor of your firm; or allow your firm unequal access to nonpublic information.

No additional information to report.



Jason Jenkins

5/29/2018

Date

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal

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BATTELLE

It can be done