

Final Independent External Peer Review Report Forest View, Illinois, Continuing Authorities Program (CAP) Section 205, Small Flood Risk Management Project, Detailed Project Report (DPR)

**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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Executive Summary

PROJECT BACKGROUND AND PURPOSE

The Forest View, Illinois Feasibility Study is investigating alternatives to manage flood risk in the communities of Forest View and Stickney, Illinois. The study is being conducted under the Continuing Authorities Program (CAP), authorized by Section 205 of the Flood Control Act of 1948, as amended. The study has resulted in a Detailed Project Report (DPR) and integrated National Environmental Policy Act (NEPA) Environmental Assessment (EA) documentation of the assessment of environmental impacts of any recommended Federal actions. The preferred decision document format is a DPR, which integrates the environmental documentation required under NEPA and other relevant environmental statutes into the project decision document. The purpose of a DPR is to document the basis for a recommendation to invest Federal and non-Federal resources to address a local water resource problem or opportunity of significance to the Nation.

The Village of Forest View is a small community at the western border of the City of Chicago, about 10 miles from the downtown area. The village is in the Des Plaines River watershed, but is located between the Chicago Sanitary and Ship Canal and the Des Plaines River. The area potentially impacted by flooding also includes a portion of the Village of Stickney, immediately north of Forest View.

Lyons Levee, a historic levee along the Des Plaines River, provides a barrier against overbank flooding for the community. This 4,000-foot-long earthen levee was built over 100 years ago and has not been adequately maintained. Trees, animal burrows, unmaintained concrete structures, and general lack of maintenance have created a significant risk of future failure.

The area at risk of flooding includes homes, businesses, and roadways. There are approximately 800 homes in the estimated inundation area and businesses include large industrial facilities used for storing fuels, a Commonwealth Edison power substation, and wastewater treatment facilities associated with the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Stickney Water Reclamation Plant. Multiple critical facilities are also located within the inundation area including the Forest View Police and Fire Stations, Home Elementary school, Edison School, and the Stickney Fire Department. Flooding of these critical facilities would affect the ability of the community to respond to the emergency and would put numerous lives at risk.

On April 18 and 19, 2013, a large storm event covered the Chicago Area with up to six inches of rain over 24 hours. The storm resulted in major flooding along the Des Plaines River and Salt Creek. The flood

peaked on April 18 at approximately one half foot higher than the previous record. The Des Plaines River overtopped Lyons Levee, resulting in widespread flooding.

The flood affected homes and businesses in the community and also resulted in local power outages when electricity was rerouted from the substation to other facilities in the area. Nearly 200 homes were flooded and approximately 700 residents were evacuated, some in boats. The Forest View Police and Fire Stations were also flooded and had to be evacuated, further increasing life-safety risks to community residents.

Based on the investigations conducted to support the Federal Interest Determination (FID) Report, alternatives to be considered during the Feasibility Phase include rehabilitation and improvement of the existing levee, construction of a new set-back levee, and implementation of non-structural measures. Estimated project costs reported in the FID Report range from \$5 to 10 million. The non-Federal sponsor for the study is MWRDGC.

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 Forest View, Illinois, Continuing Authorities Program (CAP) Section 205, Small Flood Risk Management Project, Detailed Project Report (DPR) (hereinafter: Forest View CAP 205 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 (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate the IEPR of the Forest View CAP 205. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) 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 Forest View CAP 205 review documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: economics/planning, biological resources and environmental law compliance, hydrology and hydraulic engineering, geotechnical engineering, and civil/structural 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 final candidates to confirm that they had no COIs, but Battelle made the final selection of the four-person Panel.

The Panel received electronic versions of the Forest View CAP 205 review documents (418 pages in total), along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2012) and OMB (2014), USACE prepared the charge questions, which were included in the draft and final Work Plans.

The USACE Project Delivery Team briefed the Panel and Battelle during a kick-off meeting held via teleconference prior to 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. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the Forest View CAP 205 documents individually. 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, 13 Final Panel Comments were identified and documented. Of these, two were identified as having medium significance, five had medium/low significance, and six had low significance.

Battelle received public comments from USACE on the Forest View CAP 205 (approximately six meeting transcripts and written comments totaling 57 pages of comments) and provided them 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 Forest View CAP 205 review documents. After completing its review, the Panel confirmed that no new issues or concerns were identified other than those already covered in the Final Panel Comments.

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, 2012; p. D-4) in the Forest View CAP 205 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 Detailed Project Report and the Integrated Environmental Assessment were well-written, well-organized, and easily understood. The Panel believes that the project team expressed a good understanding of the issues and addressed them in appropriate and cost-effective ways. The environmental analysis was deemed thorough and appropriate and the Panel was impressed with the economic structure inventory. Overall, the documents present a cogent description of the project and lay out a clear and logical justification for the alternative. The Panel did identify several elements of the project that should be clarified or revised.

Engineering: One of the Panel’s primary engineering concerns was that there were not enough geotechnical borings taken and analyzed in areas that may hide transition zone defects. The Panel also recommended additional triaxial shear strength and permeability testing of the critical soil strata. While the assumptions used in the geotechnical analyses were suitable for the design phase, the Panel pointed out that assumed shear strength and permeability values can result in a conservative design that is more expensive to construct. In another important finding, the Panel expressed concerns about the impact the project may have on the levee on the west bank of the Des Plaines River during larger-than-design flood events. With the levee on the east bank of the river being repaired under this project, it would no longer provide some degree of relief to the levee on the west bank during extreme conditions. While this issue could increase the risk levels associated with the project, the Panel recommended that USACE model which flow levels could cause levee overtopping on the west bank of the river and evaluate and describe the risk to the areas behind the levee. Other engineering concerns include the possibility that the utility work near the active railroad lines may end up costing significantly more than estimated, that the flows

calculated using the entire flow record may underrepresent future flow conditions, and that the non-zero risk of failure prior to overtopping was not accounted for in the residual risk analysis.

Economics and Planning: The Panel did not believe the Mitigation Planning Appendix provided enough information on the cost estimate for the on-site wetland mitigation and was particularly concerned that there were no details on the costs of engineering and design, long-term monitoring, or contingency funding. In addition, the Panel thought the document would benefit from further explanation on why the on-site mitigation was not selected over the mitigation bank alternative. The Panel also noted that the Economic Appendix does not clearly state whether the Fair Market Value of commercial and industrial facilities in the study area includes the land on which the facilities are sited, which may have resulted in the National Economic Development (NED) benefits being slightly overstated for those properties. Finally, the Panel would like to see the report clearly describe the process by which mitigation alternative B3 was selected instead of B1.

Environmental: The Panel remarked that the wetland delineation reports were missing documentation and raw data, affecting the completeness of the report in describing the project area. The final conclusions appear to be correct, but perhaps only because the wetland versus non-wetland habitats were sufficiently different and because of the robust nature of the wetland delineation method used by the delineators.

Table ES-1. Overview of 13 Final Panel Comments Identified by the IEPR Panel

No.	Final Panel Comment
Significance – Medium	
1	There was a limited number of geotechnical borings collected, samples analyzed, and laboratory tests conducted, particularly in critical stability and seepage areas, which may not identify significant problematic soil conditions.
2	An analysis has not been conducted on the possible increase in the likelihood of overtopping of the levee on the west bank of the Des Plaines River during floods larger than the design event.
Significance – Medium/Low	
3	There was not enough detail provided to understand how the costs for the on-site wetland mitigation project were determined, or why the off-site mitigation bank was chosen over on-site in-kind mitigation.
4	The cost for utility work may be underestimated given the construction requirements for work under active rail lines and the location of the natural gas pipeline.
5	The design flow may be lower than the actual one percent exceedance flow, which would have an effect on the level of protection that can be expected from the project.
6	The sensitivity of project performance to small differences in hydraulic model output is not described as a risk to the project.
7	The analysis and discussion of residual risk does not seem to include the possibility that the levee could fail before overtopping occurs.
Significance – Low	
8	The structure elevation cost estimates do not appear to be consistent with the size of the structure being elevated.
9	The Economic Appendix does not clearly explain whether the Fair Market Value (FMV) for commercial and industrial properties includes the land on which the facility sits, and whether the FMV accounts for depreciation.
10	The benefits of the project may be underestimated because the continued degradation of the levee over time does not appear to have been reflected in Plan 0 - No Action.
11	Several potential benefits do not appear to have been considered during the alternatives analysis, specifically, indirect riverine/riparian ecosystem restoration, off-site flood stage reduction, increased property values, and recreational benefits.
12	The data forms in the wetland delineation reports in Appendix C are missing information, and there are inconsistencies in the evaluation of the raw data.
13	The process by which mitigation alternative B3 was selected is not clearly described.

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LIST OF ACRONYMS

AAHU	Average Annual Habitat Unit
ATR	Agency Technical Review
CAP	Continuing Authorities Program
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
COI	Conflict of Interest
DPR	Detailed Project Report
DrChecks	Design Review and Checking System
DRV	Depreciated Replacement Value
DWP	Detailed Watershed Plan
EA	Environmental Assessment
EC	Engineer Circular
ER	Engineer Regulation
FID	Federal Interest Determination
FMV	Fair Market Value
HEC-SSP	Hydrologic Engineering Center's Statistical Software Package
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
MWRDGC	Metropolitan Water Reclamation District of Greater Chicago
NED	National Economic Development
NEPA	National Environmental Policy Act
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PDT	Project Delivery Team
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

1. INTRODUCTION

The Forest View, Illinois Feasibility Study is investigating alternatives to manage flood risk in the communities of Forest View and Stickney, Illinois. The study is being conducted under the Continuing Authorities Program (CAP), authorized by Section 205 of the Flood Control Act of 1948, as amended. The study has resulted in a Detailed Project Report (DPR) and integrated National Environmental Policy Act (NEPA) Environmental Assessment (EA) documentation of the assessment of environmental impacts of any recommended Federal actions. The preferred decision document format is a DPR, which integrates the environmental documentation required under NEPA and other relevant environmental statutes into the project decision document. The purpose of a DPR is to document the basis for a recommendation to invest Federal and non-Federal resources to address a local water resource problem or opportunity of significance to the Nation.

The Village of Forest View is a small community at the western border of the City of Chicago, about 10 miles from the downtown area. The village is in the Des Plaines River watershed, but is located between the Chicago Sanitary and Ship Canal and the Des Plaines River. The area potentially impacted by flooding also includes a portion of the Village of Stickney, immediately north of Forest View.

Lyons Levee, a historic levee along the Des Plaines River, provides a barrier against overbank flooding for the community. This 4,000-foot-long earthen levee was built over 100 years ago and has not been adequately maintained. Trees, animal burrows, unmaintained concrete structures, and general lack of maintenance have created a significant risk of future failure.

The area at risk of flooding includes homes, businesses, and roadways. There are approximately 800 homes in the estimated inundation area and businesses include large industrial facilities used for storing fuels, a Commonwealth Edison power substation, and wastewater treatment facilities associated with the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Stickney Water Reclamation Plant. Multiple critical facilities are also located within the inundation area including the Forest View Police and Fire Stations, Home Elementary school, Edison School, and the Stickney Fire Department. Flooding of these critical facilities would affect the ability of the community to respond to the emergency and would put numerous lives at risk.

On April 18 and 19, 2013, a large storm event covered the Chicago Area with up to six inches of rain over 24 hours. The storm resulted in major flooding along the Des Plaines River and Salt Creek. The flood peaked on April 18 at approximately one half foot higher than the previous record. The Des Plaines River overtopped Lyons Levee, resulting in widespread flooding.

The flood affected homes and businesses in the community and also resulted in local power outages when electricity was rerouted from the substation to other facilities in the area. Nearly 200 homes were flooded and approximately 700 residents were evacuated, some in boats. The Forest View Police and Fire Stations were also flooded and had to be evacuated, further increasing life-safety risks to community residents.

Based on the investigations conducted to support the Federal Interest Determination (FID) Report, alternatives to be considered during the Feasibility Phase include rehabilitation and improvement of the existing levee, construction of a new set-back levee, and implementation of non-structural measures.

Estimated project costs reported in the FID Report range from \$5 to 10 million. The non-Federal sponsor for the study is MWRDGC.

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 Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project, DPR (hereinafter: Forest View CAP 205 IEPR) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE), Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) 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 Forest View CAP 205 IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted. 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 on July 26, 2016. Appendix D presents the organizational conflict of interest form that Battelle completed and submitted to the Institute for Water Resources (IWR) prior to the award of the Forest View CAP 205 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 (ATR), as described in USACE (2012).

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 Forest View CAP 205 was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-214). Battelle, a 501c(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. Table 1 presents the major milestones and deliverables of the Forest View CAP 205 IEPR. Due dates for milestones and deliverables are based on the award/effective date of May 11, 2016. Note that the work items 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 20, 2016. The actual date for contract end will depend on the date that all activities for this IEPR are completed.

Table 1. Major Milestones and Deliverables of the Forest View CAP 205 IEPR

Task	Action	Due Date
1	Award/Effective Date	5/11/2016
	Review documents available	7/20/2016
2	Battelle submits final list of selected panel members	7/14/2016
	USACE confirms the panel members have no COI	7/18/2016
3	Battelle convenes kick-off meeting with USACE	6/2/2016
	Battelle convenes kick-off meeting with USACE and panel members	7/22/2016
4	Panel members complete their individual reviews	8/4/2016
	Panel members provide draft Final Panel Comments to Battelle	8/23/2016
	Battelle sends public comments to panel members for review	8/31/2016
	Panel confirms no additional Final Panel Comment is necessary with regard to the public comments	9/6/2016
5	Battelle submits Final IEPR Report to USACE	9/15/2016
6 ^a	Battelle convenes Comment-Response Teleconference with panel members and USACE	10/12/2016
	Battelle submits pdf printout of DrChecks project file to USACE	10/20/2016
	Contract End/Delivery Date	12/29/2016

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

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: economics/planning, biological resources and environmental law compliance, hydrology and hydraulic engineering, geotechnical engineering, and civil/structural engineering. One selected panel member served as a dual reviewer for both the geotechnical engineering and the civil/structural engineering disciplines. The Panel reviewed the Forest View CAP 205 document and produced 13 Final Panel Comments in response to 17 charge questions provided by USACE for the review. This charge included two overview questions added by Battelle and one question on the public comments. 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 1165-2-214, 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 is followed by the full text of the Final Panel Comments.

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, 2012; p. D-4) in the Forest View CAP 205 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 Detailed Project Report and the Integrated Environmental Assessment were well-written, well-organized, and easily understood. The Panel believes that the project team expressed a good understanding of the issues and addressed them in appropriate and cost-effective ways. The environmental analysis was deemed thorough and appropriate and the Panel was impressed with the economic structure inventory. Overall, the documents present a cogent description of the project and lay out a clear and logical justification for the alternative. The Panel did identify several elements of the project that should be clarified or revised.

Engineering: One of the Panel's primary engineering concerns was that there were not enough geotechnical borings taken and analyzed in areas that may hide transition zone defects. The Panel also recommended that additional triaxial shear strength and permeability testing of the critical soil strata. While the assumptions used in the geotechnical analyses were suitable for the design phase, the Panel pointed out that assumed shear strength and permeability values can result in a conservative design that is more expensive to construct. In another important finding, the Panel expressed concerns about the impact the project may have on the levee on the west bank of the Des Plaines River during larger-than-design flood events. With the levee on the east bank of the river being repaired under this project, it would no longer provide some degree of relief to the levee on the west bank during extreme conditions. While this issue could increase the risk levels associated with the project, the Panel recommended that USACE model which flow levels could cause levee overtopping on the west bank of the river and evaluate and describe the risk to the areas behind the levee. Other engineering concerns include the possibility that the utility work near the active railroad lines may end up costing significantly more than estimated, that the flows calculated using the entire flow record may underrepresent future flow conditions, and that the non-zero risk of failure prior to overtopping was not accounted for in the residual risk analysis.

Economics and Planning: The Panel did not believe the Mitigation Planning Appendix provided enough information on the cost estimate for the on-site wetland mitigation and was particularly concerned that

there were no details on the costs of engineering and design, long-term monitoring, or contingency funding. In addition, the Panel thought the document would benefit from further explanation on why the on-site mitigation was not selected over the mitigation bank alternative. The Panel also noted that the Economic Appendix does not clearly state whether the Fair Market Value of commercial and industrial facilities in the study area includes the land on which the facilities are sited, which may have resulted in the National Economic Development (NED) benefits being slightly overstated for those properties. Finally, the Panel would like to see the report clearly describe the process by which mitigation alternative B3 was selected instead of B1.

Environmental: The Panel remarked that the wetland delineation reports were missing documentation and raw data, affecting the completeness of the report in describing the project area. The final conclusions appear to be correct, but perhaps only because the wetland versus non-wetland habitats were sufficiently different and because of the robust nature of the wetland delineation method used by the delineators.

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

There was a limited number of geotechnical borings collected, samples analyzed, and laboratory tests conducted, particularly in critical stability and seepage areas, which may not identify significant problematic soil conditions.

Basis for Comment

Among the supplemental information provided to the Panel was a document entitled “Lyons Levee Rehabilitation Project Geotechnical Investigations and Analysis – 30% Design Level,” which describes the geotechnical field and laboratory services performed for the subject study. Eleven soil borings were performed for 4,200 linear feet (LF) of levee or, on average, one boring for every 350 LF of levee (200 to 600 ft. spacing shown on boring location diagram). Given that the levee was constructed around the turn of the 20th-century when geotechnical knowledge was less advanced than in the present, the Panel believes the risk of hidden defects in the transition zone between the natural subgrade and the fill placed for the levee is substantially greater than if the levee were constructed more recently. In the soil descriptions included in the boring logs, it was noted that bricks, wood, and organics had been included in the levee fill, which further calls into question the quality and uniformity of the levee structure. In addition, many of the stability and seepage analyses were performed with design parameters based on minimal data (because a borrow area had not been identified for the new engineered fill for enlarging the levee) or no sampling or laboratory data.

The assumed values used in many of the analyses are judged to be reasonable and suitable for preliminary design. However, the Panel believes that additional sampling of these materials (and of the proposed borrow materials) in the field is warranted, as an adequate number of laboratory tests are needed to determine the drained and undrained shear strength properties of the critical soils.

From a cost-benefit perspective, the additional cost of more borings and laboratory tests for final design is typically comparatively small and can often result in construction cost savings by allowing a less conservative design while maintaining an appropriate level of risk. Although it is never possible to completely investigate the conditions of an entire site to the degree that all risk can be mitigated, closer boring spacings would provide for more, perhaps statistically significant, data.

Significance – Medium

The use of assumed shear strength or permeability parameters can have an effect on the cost-benefit analysis because they typically result in a conservative design that is more costly to construct.

Recommendation for Resolution

1. Perform additional soil borings sited halfway between the existing boring locations; the boring spacing should be open to modification based on conditions encountered in the field.
2. Determine the borrow location and sample the borrow material for identification, material properties, and strength and permeability values for remolded samples.
3. Obtain relatively undisturbed 3-inch diameter Shelby Tube samples for triaxial shear strength and permeability testing of each of the critical soil strata encountered. All triaxial tests used to determine drained shear strength parameters should have a minimum of three reliable circles to determine the phi angle and cohesion intercept.

Final Panel Comment 1

4. Sample the ends of the Shelby Tubes for moisture content, strength (Torvane or Hand Penetrometer), and classification and use that combined data along with previous test data to determine which samples should be tested for strength and permeability.
5. Use the new test data along with previously obtained test data to select design shear strengths for the critical materials in the seepage and stability analyses and re-evaluate the factors of safety using the updated information.
6. Adjust the levee design as needed to incorporate the results of the updated analyses.

Final Panel Comment 2

An analysis has not been conducted on the possible increase in the likelihood of overtopping of the levee on the west bank of the Des Plaines River during floods larger than the design event.

Basis for Comment

The statement is made in several places of the Draft Project Report (DPR) that the recommended plan will not induce off-site flooding. For example, “As discussed in Section 3.5.2.2, none of the plans would increase flood stages outside the project area based on the surveys, modeling, and design activities conducted to date.” (DPR p. 38). While flooding impacts have been assessed for flows up to the design event (one percent annual exceedance flow), this statement may not be true for somewhat larger events. Specifically, under the recommended plan, the levee on the west bank of the Des Plaines River might overtop sooner and to a larger degree during extreme flood events because of the reduced overflow resulting from the repairs to the levee on the east bank of the river (Plan 1). Currently, the overtopping of the east bank levee during large events (larger than the one percent annual exceedance flow) would provide some degree of relief to the levee on the west bank of the river, but this relief would no longer occur under the recommended plan. Despite the fact that this loss of relief would only affect conditions at flows in excess of the project design (one percent annual exceedance), should this loss of relief increase flooding during any future flood event, the incremental increase in flood elevations would be attributable to this project.

It is important to identify the magnitude and ramifications, if any, of increased flood elevations along the levee on the west bank for flows that exceed the design event. The impact may or may not be minimal, and the presence of conditions such as overtopping at other locations or interior flooding may also reduce the relative severity of increased incidence of overtopping at this location.

Significance – Medium

Depending on the outcome of the analysis of the larger flow events, the likelihood and severity of flood damages may increase the risk level associated with this project.

Recommendation for Resolution

1. Determine what flows could overtop the levee on the west bank of the river for both existing and with-project conditions.
2. Evaluate and describe the risk to areas protected by the levee on the west bank of the river due to increased likelihood of overtopping during events larger than the one percent annual exceedance flow for with-project conditions.

Final Panel Comment 3

There was not enough detail provided to understand how the costs for the on-site wetland mitigation project were determined, or why the off-site mitigation bank was chosen over on-site in-kind mitigation.

Basis for Comment

In the Mitigation Planning Appendix (Appendix C), the cost of engineering and design of the on-site wetland mitigation is estimated at \$200,000 (pp. 11-12), which is “based on similar projects completed in the area.” This statement does not provide sufficient information for the Panel to understand the accuracy of the cost for the design and engineering of a 0.5 to 2 acre wetland restoration project. In addition, the Panel found no cost estimate for long-term monitoring or for contingency funding in the case of on-site mitigation failure. Finally, the Panel found little besides the financial analysis to explain the rationale for selecting the mitigation bank alternative versus on-site mitigation. Engineering and design account for the largest single cost (by a factor of three) of on-site mitigation and so may influence the decision of whether to select on-site in-kind wetland mitigation or to purchase off-site wetland credits.

Significance – Medium/Low

Since the decision to choose on-site mitigation versus purchasing off-site wetland credits may be influenced by the cost of on-site mitigation, the completeness of the report would be improved by providing a detailed justification for how the \$200,000 figure was determined.

Recommendation for Resolution

1. Provide a detailed description in Appendix C of how the \$200,000 engineering and design cost for on-site mitigation was determined.
2. Provide a detailed cost estimate for long-term monitoring of the on-site mitigation alternative.
3. Provide detail for contingency funding in the event of failure of the on-site mitigation implementation.
4. Provide more detail on the rationale for the selection of the mitigation bank alternative.

Final Panel Comment 4

The cost for utility work may be underestimated given the construction requirements for work under active rail lines and the location of the natural gas pipeline.

Basis for Comment

As part of the project's utility work, the plan calls for the replacement of aggregate ballast under three active rail lines with cast-in-place concrete as well as the relocation of a natural gas pipeline, which is also proximate to the railroad. This has been identified in the risk register as a high risk item with an appropriate estimated cost.

In the Panel's experience, performing any construction within, adjacent to, or under a railroad right-of-way (ROW) is typically a slow, costly experience. Railroads have authority over what happens within and adjacent to their ROW, as well as activities in that area that may influence the railroad structures (e.g., road bed, bridges, crossing). The railroads require detailed submittals for review for conformance with their design requirements and they require flagmen and other support personnel to be present on-site when work is being performed, all of which would be at the cost of the parties performing the construction. In addition, the railroads impose limitations on what activities can be performed when a train is operating on a line proximate to the construction site, which, on a busy set of rail lines, can result in hundreds of work stoppages during the day. Based on these conditions, the estimated cost of \$84,000 for utility work in the railroad ROW could be as much as an order of magnitude low.

Significance – Medium/Low

The Panel believes the cost of the utility work could be much higher than estimated, given the often slow and costly process of construction within or near a railroad ROW is required to relocate the affected utilities.

Recommendation for Resolution

1. Contact the railroad operating on the lines in question and determine what their requirements are for work within their ROW and how it impacts the natural gas pipeline.
2. Re-evaluate the cost of the utility work, accounting for the cost of railroad manpower (flagmen, signalmen, etc.) that will be required during the construction activities.

Final Panel Comment 5

The design flow may be lower than the actual one percent exceedance flow, which would have an effect on the level of protection that can be expected from the project.

Basis for Comment

The discussion of flows in Attachment 1 of Appendix E (p. 14) indicates that, for the Des Plaines River at Riverside, the one percent exceedance flow estimated by USACE's Hydrologic Engineering Center's (HEC) Statistical Software Package (HEC-SSP) software using the full period of record (1914-2013) is 9,920 cubic feet per second (cfs). This value was developed by the MWRDGC's consultant and used by the consultant as the design flow. However, when the same analysis was run using the record from 1974-2013, a one percent exceedance flow of 11,500 was generated, or 16 percent higher than the design flow used for the project. Assuming that the flow records are accurate, this suggests that high flows in the river have likely become more frequent in the last 40 years. Since the recent 40-year flow record indicates the potential for higher flows, the uncertainty in the various flow analyses used for this project needs to be addressed.

Appendix E indicates that the design flow is within one percent of the one percent exceedance flow calculated by USACE in an unpublished frequency analysis of the same flow record and represents a reasonable estimate based on best available data. The unpublished frequency analysis, which is not described in detail in the review documents provided, is stated to include "factors for applying urbanization to flows in the past, but it also takes into account the extensive flood storage that has been constructed in the watershed over time, especially in recent decades" (p. 2). Without access to the unpublished analysis, it is not possible for the Panel to comment on the methods used to adjust past data to account for watershed changes and their applicability to extrapolating to extreme events. However, significant adjustments are apparently required for the indicated "non-stationarity" since 1974, which was likely associated with urbanization and possibly changes in rainfall patterns.

If there has been a change in flow-generating conditions such that flows since the 1970s actually are higher than the flows in general since the early 1900s (and not some statistical anomaly), then several items follow:

- In the future there are more likely to be higher flows than shown by the pre-1974 flow record
- The flow record since 1974 is probably more representative of future conditions than the preceding flow record
- Because of climate change and other factors, there may be further shifts in the probability of high flows, with an unknown trajectory.

Given all of this, there is a significant risk that the flows calculated using the entire flow record, even if adjusted to some degree, will under-represent future flow conditions because of elements of "non-stationarity" that are not captured in the frequency analysis. This suggests the possibility that the design flow selected may under-represent the actual one percent annual recurrence flow.

Underestimating the frequency of extreme flows during the project life would underestimate both Without-Project Average Annual Damages and With-Project Average Annual Damages, potentially skewing the expected project benefits. It is not clear whether this would significantly affect the alternative comparison, but the potential exists that the current analysis underestimates the future flow frequency, posing a risk and potential ramifications to the project's expected benefits.

Significance – Medium/Low

Final Panel Comment 5

Uncertainty in the flow could introduce some risk to the project, but is not likely to affect the project's overall design.

Recommendation for Resolution

1. Provide a statement indicating that although the design flows are considered to be the best available estimate, there is a significant possibility that the actual one percent flow will exceed the design flow and that the actual level of protection provided will be less than indicated in the DPR.

Final Panel Comment 6

The sensitivity of project performance to small differences in hydraulic model output is not described as a risk to the project.

Basis for Comment

The hydraulic model used to evaluate project performance is an updated and calibrated version of the HEC-RAS model developed for the Lower Des Plaines River Detailed Watershed Plan (DWP). While there may be confidence that the updated/calibrated hydraulic model provides more accurate results than the DWP model, the DWP model predicted water surface elevations in the vicinity of the project that are one to two feet higher for the one percent annual exceedance flow than those used for the project design. The moderate difference in model performance corresponds to overtopping for the five percent exceedance event for the DWP model instead of not overtopping for the one percent exceedance event using the current model.

Because small differences in modeled water surface levels result in relatively large changes in the expected level of protection, the project performance described in the DPR is very sensitive to the model output, and therefore model input and assumptions. As such, there remains a risk that relatively moderate future refinements in the understanding of river conditions translated into adjusted model representation could significantly change the expected performance of the proposed levee.

Significance – Medium/Low

Acknowledgement of the sensitivity of expected performance to the simulated river water surface profile is necessary for a complete understanding of the risks inherent in the project

Recommendation for Resolution

1. Provide a statement acknowledging the sensitivity of level of protection provided to the hydraulic modeling results and the potential for change over time.

Final Panel Comment 7

The analysis and discussion of residual risk does not seem to include the possibility that the levee could fail before overtopping occurs.

Basis for Comment

The non-zero risk of failure prior to overtopping is an important element of risk that should be communicated for every flood risk management project. As described in the DPR's assessment of existing conditions (p. 23), even if the levee is appropriately maintained, there is always a non-zero risk of failure prior to overtopping. However, it is not clear that the estimated residual risk discussed in the DPR (p. 32) and the analysis results for the with-project condition presented in Table 19 (p. 54) include this potential failure scenario.

Significance – Medium/Low

A discussion of the relative magnitude of this risk should be incorporated into the report for completeness.

Recommendation for Resolution

1. Determine whether the values in Table 19 incorporate consideration of levee failure prior to overtopping. If they do not, revise the analysis to incorporate the possibility of this residual risk and revise the table accordingly.
2. Expand the discussion on page 32 to clarify that there is a potential for levee failure without overtopping and describing the level (qualitative is acceptable) of the risk this poses.

Final Panel Comment 8

The structure elevation cost estimates do not appear to be consistent with the size of the structure being elevated.

Basis for Comment

Table 1 of Appendix B (p. 7) provides the estimated cost for floodproofing and raising various residential and commercial structures 5 feet to reduce flood damage. The residential structures are either wood-framed or masonry and one or two stories tall. The plan area of the residential structures varies from 850 square feet (SF) to 5,000 SF.

There are certain fixed costs associated with this work that are typically lumped into mobilization and demobilization. The marginal costs are driven by the building size (plan area and perimeter foundation length), weight, and number of foundations to replace or extend up to the new structure elevation. The larger the structure, the more load to be carried and the greater the length of the perimeter foundations and number of interior foundations. These increases in the amount of foundation to be raised along with the increase in foundation load increase the cost of raising the larger structures.

As one would expect, the cost for raising masonry structures is consistently higher than for the lighter, less damaged, sensitive wood-framed structures. However, there are some inconsistencies in the cost estimates for raising masonry structures. For example, the cost for raising the 850 SF single story masonry structure (\$159,700) is greater than that of the 1,400 SF single story masonry structure (\$130,230) or the 2,000 SF single story masonry structure (\$130,850). The Panel views the idea that the larger masonry structures would be less expensive to raise than the smaller structures as counterintuitive. The costs for raising the wood-framed structures better reflect what the relationship should be between building size and raising cost, with the 850 SF wood-framed structure having the lowest cost and the 5,000 SF structure having the highest.

Significance – Low

While it is unlikely to affect the study results, the completeness of Appendix B is affected without an explanation for why this seemingly inconsistent relationship exists.

Recommendation for Resolution

1. Review the data underlying the cost estimates for raising masonry residential structures and determine why the results conflict with the expected relationship between structure size and cost of raising.

Final Panel Comment 9

The Economic Appendix does not clearly explain whether the Fair Market Value (FMV) for commercial and industrial properties includes the land on which the facility sits, and whether the FMV accounts for depreciation.

Basis for Comment

Table 1 in the Appendix D (p. D-5) indicates that there are 50 industrial facilities and 12 commercial facilities in the study area, which collectively represent about 6% of the Depreciated Replacement Value (DRV). According to text on page D-6, the assessor's FMV was used as a proxy for DRV for commercial and industrial facilities.

It is not clear to the Panel whether the FMV of commercial and industrial properties includes the land the facility sits on, and whether it includes depreciation. On page D-5 it seems that the Cook County Assessor's FMV excludes land values. However, on page D-6 there is no clear statement whether the FMV of commercial and industrial structures excludes land. If the FMV includes the land on which the commercial or industrial facility is sited and does not reflect depreciation, then the FMV will exceed the DRV. If the FMV exceeds DRV for commercial and industrial facilities, then the National Economic Development (NED) benefits will be overstated for these facilities, although not by enough to change the feasibility of the project or the ranking of the alternatives.

Significance – Low

An explicit definition of the relationship between DRV and FMV for commercial and industrial facilities, along with any assumptions, would improve the clarity of the document.

Recommendation for Resolution

1. Add text to Appendix D explaining whether the FMV of commercial and industrial properties includes land values.
2. Clarify in Appendix D whether the FMV reflects the depreciation of commercial and industrial structures.

Final Panel Comment 10

The benefits of the project may be underestimated because the continued degradation of the levee over time does not appear to have been reflected in Plan 0 - No Action.

Basis for Comment

The DPR states that for Plan 2 there would be an “increased area . . . subject to occasional flooding as a result of deterioration of the existing levee” (p. 35). However, Plan 0 - No Action assumes that “the threat of levee failure would remain” (p. 32), but not increase. The Panel believes that the increasing probability of flooding over time due to continued degradation of the levee condition should also apply to the Plan 0 – No Action. If so, this would increase the without-project average annual damages, as shown in Table 7 (p. 32), and therefore increase the benefit/cost ratio of the selected alternative (Plan 1).

Significance – Low

Accounting for the continued deterioration of the levee in Plan 0 - No Action may slightly increase the benefit/cost ratio of the project, but likely would not change the recommendations of the report.

Recommendation for Resolution

1. Account for the continued deterioration of the levee as part of Plan 0 - No Action and recalculate without project average annual damages accordingly.

Final Panel Comment 11

Several potential benefits do not appear to have been considered during the alternatives analysis, specifically, indirect riverine/riparian ecosystem restoration, off-site flood stage reduction, increased property values, and recreational benefits.

Basis for Comment

The following potential benefits do not appear to have been considered in the DPR:

- Indirect riverine/riparian ecosystem restoration – Although the landowner is not interested in pursuing such benefits (DPR, p. 29), auxiliary benefits to riverine/riparian function could occur with the implementation of the setback levees, with or without incorporating vegetation management. For example, as the existing levee becomes less functional, Plan 2 might provide some degree of sediment trapping, nutrient processing, and/or high-flow refugia not provided by other alternatives.
- Off-site flood stage reduction – Alternatives 2 and 3 would “create conditions that could reduce flood stages during an extreme flood event (Plan 2 by allowing for increased floodplain storage and Plan 3 by providing a spillway to divert a portion of flood flows)” (DPR, p. 38.) Plans 2 and 3 might provide some benefits outside the project area due to this flood stage reduction. Such benefits (if they exist) are not described, analyzed, or incorporated into the alternatives analysis.
- Increased property values – Table 18 (DPR, p. 50) indicates that property values are assumed to be unchanged by the selected alternative. The Panel believes that reducing the risk of flooding would increase property values to some degree. Even if this is a local effect (i.e., increases at formerly flood-prone properties are offset by slight relative decreases elsewhere), the Panel sees the overall benefit as still being positive because fewer homes in the region are subject to flooding.
- Recreation – In the Recommended Plan 1, the construction of the levee access road could encourage greater access to and recreational use of this area than acknowledged.

Significance – Low

A discussion of project benefits should be incorporated into the report for completeness, and while it is possible that consideration of these benefits might affect the ranking of the various alternatives, they are not expected to change the overall report recommendations.

Recommendation for Resolution

1. Qualitatively describe auxiliary ecosystem restoration benefits that might be expected from the various alternatives, specifically Plan 2.
2. Evaluate and present the expected flood stage reductions upstream, downstream, and across the river for Plans 2 and 3.
3. Reconsider the assumption that property values remain unchanged; consider whether regional property values would be expected to benefit from the reduced incidence of flooding.
4. Describe whether increased recreational use is expected from any or all of the alternatives.

Final Panel Comment 12

The data forms in the wetland delineation reports in Appendix C are missing information, and there are inconsistencies in the evaluation of the raw data.

Basis for Comment

The environmental surveys and investigations are sufficient for the conceptual design of alternative plans. However, raw data are missing from the wetland delineation reports (Appendix C) and some of the raw data presented may be subject to misinterpretation, especially in the Wetland Delineation Report, dated October 2015, and conducted for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). For instance, none of the data forms identify the specific location where the recorded data were obtained, and frequently omit plant indicator status.

The following is an illustration of how the omission of plant indicator status can affect the wetland delineation report. The data forms for the unnamed sample point (the last set of data forms dated 10/2/15 in the report in the October 2015 Wetland Delineation Report for MWRDGC) indicated the plant community was hydrophytic because of an incorrectly calculated Prevalence Index. In fact, the plant community was hydrophytic, but because it passed the Dominance Test. However, the delineators failed to report that the Dominance Test was passed because plant species indicator status was incompletely documented.

The final conclusions appear to be correct, but perhaps only because the wetland versus non-wetland habitats were sufficiently different and because of the robust nature of the wetland delineation method (using the 1987 USACE Wetland Delineation Manual and the 2010 Midwest Regional Supplement to the Wetland Delineation Manual) followed by the delineators.

Significance – Low

Although the wetland delineation conclusions appear to be correct, the missing documentation affects the completeness of the report.

Recommendation for Resolution

1. Review, complete, and revise the wetland delineation data forms.
2. Ensure future field data recording and wetland delineation data forms document the sampling locations in case field notes and raw data have to be revisited.

Final Panel Comment 13

The process by which mitigation alternative B3 was selected is not clearly described.

Basis for the Comment

In the Mitigation Planning Appendix (Appendix C), cost effectiveness/incremental cost analysis (CE/ICA) data are presented in Table 5 and Figure 2 (p. 13). Mitigation alternatives B1 and B3 are each shown as a “Best Buy.” B1 shows a lower incremental cost than B3, yet mitigation alternative B3 is chosen over B1.

Calculations using the data in Table 5 indicate that B3 costs 3.5 times more than B1, but only provides 3 times the Average Annual Habitat Units (AAHUs) that B1 offers. While it may be environmentally beneficial to provide more AAHUs than less (p. 13), it is not clear to the Panel that it is cost effective to do so.

Significance – Low

The clarity and completeness of the document would be improved by describing in more detail why B3 was selected as the mitigation alternative.

Recommendation for Resolution

1. In Appendix C, Section 4.8.5, provide more information on the rationale for selecting mitigation alternative B3 even though it is less cost effective than B1.

5. REFERENCES

OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12.

USACE (2012). Water Resources Policies and Authorities: Civil Works Review. Engineer Circular (EC) 1165-2-214. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. December 15.

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APPENDIX A

IEPR Process for the Forest View CAP 205 Project

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

Table A-1 presents the schedule followed in executing the Forest View, Illinois, Continuing Authorities Program (CAP) Section 205, Small Flood Risk Management Project, Detailed Project Report (DPR) Independent External Peer Review (hereinafter: Forest View CAP 205 IEPR). Due dates for milestones and deliverables are based on the award/effective date of May 11, 2016. The review documents were provided by U.S. Army Corps of Engineers (USACE) on July 20, 2016. Note that the work items listed under Task 6 occur after the submission of this report.

Battelle will enter the 13 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.

Table A-1. Forest View CAP 205 Complete IEPR Schedule

Task	Action	Due Date
1	Award/Effective Date	5/11/2016
	Review documents available	7/20/2016
	Public comments available	8/29/2016
	Battelle submits draft Work Plan ^a	6/28/2016
	USACE provides comments on draft Work Plan	7/8/2016
	Battelle submits final Work Plan ^a	7/26/2016
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	6/23/2016
	USACE provides comments on COI questionnaire	6/27/2016
	Battelle submits final list of selected panel members ^a	7/14/2016
	USACE confirms the panel members have no COI	7/18/2016
	Battelle completes subcontracts for panel members	7/19/2016
3	Battelle convenes kick-off meeting with USACE	6/2/2016
	Battelle sends review documents to panel members	7/22/2016
	Battelle convenes kick-off meeting with panel members	7/22/2016
	Battelle convenes kick-off meeting with USACE and panel members	7/22/2016
	Battelle convenes Mid-Review Teleconference for panel members to ask clarifying questions of USACE	8/2/2016

Table A-1. Forest View CAP 205 Complete IEPR Schedule, continued

Task	Action	Due Date
4	Panel members complete their individual reviews	8/4/2016
	Battelle provides panel members with talking points for Panel Review Teleconference	8/11/2016
	Battelle convenes Panel Review Teleconference	8/12/2016
	Battelle provides Final Panel Comment templates and instructions to panel members	8/15/2016
	Panel members provide draft Final Panel Comments to Battelle	8/23/2016
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	8/24/2016 – 8/29/2016
	Panel finalizes Final Panel Comments	8/30/2016
	Battelle receives the public comments from USACE	8/30/2016
	Battelle sends public comments to Panel	8/31/2016
	Panel completes their review of the public comments	9/2/2016
	Battelle and Panel review Panel's responses to public comments	9/6/2016
	Panel drafts Final Panel Comment, if necessary	9/8/2016
	Panel finalizes Final Panel Comment regarding public comments, if necessary	9/12/2016
5	Battelle provides Final IEPR Report to panel members for review	9/13/2016
	Panel members provide comments on Final IEPR Report	9/14/2016
	Battelle submits Final IEPR Report to USACE ^a	9/15/2016
6 ^b	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	9/20/2016
	Battelle convenes teleconference with USACE to review the Post-Final Panel Comment Response Process	9/20/2016
	Battelle convenes teleconference with Panel to review the Post-Final Panel Comment Response Process	9/20/2016
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	10/3/2016
	Battelle provides the panel members the draft PDT Evaluator Responses	10/4/2016
	Panel members provide Battelle with draft BackCheck Responses	10/7/2016
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	10/11/2016
	Battelle convenes Comment-Response Teleconference with panel members and USACE	10/12/2016

Table A-1. Forest View CAP 205 Complete IEPR Schedule, continued

Task	Action	Due Date
6	USACE inputs final PDT Evaluator Responses to DrChecks	10/14/2016
	Battelle provides final PDT Evaluator Responses to panel members	10/17/2016
	Panel members provide Battelle with final BackCheck Responses	10/19/2016
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	10/20/2016
	Battelle submits pdf printout of DrChecks project file ^a	10/20/2016
	Contract End/Delivery Date	12/29/2016

^a Deliverable.

^b Task 6 occurs after the submission of this report

At the beginning of the Period of Performance for the Forest View CAP 205 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., clarify expertise areas needed for panel members). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of 17 charge questions provided by USACE, two overview questions added by Battelle (all questions were included in the draft and final Work Plans), one question on the public comments, 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 within three days of their subcontracts being 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 Forest View CAP 205 review documents and reference materials listed below. The documents and files in bold font were provided for review; the other documents were provided for reference or supplemental information only.

- **Detailed Project Report / Environmental Assessment + Finding of No Significant Impact (FONSI)** (418 pages)
 - **Appendix A: Civil Design**
 - **Appendix B: Cost**
 - **Appendix C: Mitigation, including Wetland Delineation Reports**
 - **Appendix D: Economics**
 - **Appendix E: Hydrology & Hydraulics**
 - **Appendix F: Geotechnical**
 - **Appendix G: HTRW**
 - **Appendix H: Real Estate Plan**
 - **Appendix I: Coordination (National Environmental Policy Act/Permitting/etc.)**
- **Public Comments** (57 pages)

- Lyons Levee Improvement Project Feasibility Report and Plans (226 pages)
- Lyons Levee Rehabilitation Project, Geotechnical Investigation and Analysis – 30 % Design Level (183 pages)
- Lyons Levee Subsurface Investigation (133 pages)
- Lyons Levee (Levee Assessment Report) (94 pages)
- USACE guidance, *Civil Works Review* (EC 1165-2-214), December 15, 2012
- Office of Management and Budget, *Final Information Quality Bulletin for Peer Review*, December 16, 2004.
- USACE Climate Change Adaptation Plan (June 2014)

About halfway through the review of the Forest View CAP 205 documents, a teleconference was held with USACE, the Panel, and Battelle so that USACE could answer any questions the Panel had concerning either the review documents or the project. Prior to this teleconference, Battelle submitted seven panel member questions to USACE. USACE was able to provide responses to all the questions during the teleconference or later that day via email.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response file 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 in a preliminary list of 19 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments file.

A.3 IEPR Panel Teleconference

Battelle facilitated a two-hour 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 prepared 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 Forest View CAP 205 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 the merged individual comments table, a summary 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 member 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:** Describes a fundamental issue with the project that affects the current recommendation or justification of the project, and which will affect its future success, if the project moves forward without the issue being addressed. Comments rated as high indicate that the Panel determined that the current methods, models, and/or analyses contain a “showstopper” issue.
 2. **Medium/High:** Describes a potential fundamental issue with the project, which has not been evaluated at a level appropriate to this stage in the Planning process. Comments rated as medium/high indicate that the Panel analyzed or assessed the methods, models, and/or analyses available at this stage in the Planning process and has determined that if the issue is not addressed, it could lead to a “showstopper” issue.
 3. **Medium:** Describes an issue with the project, which does not align with the currently assessed level of risk assigned at this stage in the Planning process. Comments rated as medium indicate that, based on the information provided, the Panel identified an issue that would raise the risk level if the issue is not appropriately addressed.
 4. **Medium/Low:** Affects the completeness of the report at this time in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium/low indicate that the Panel does not currently have sufficient information to analyze or assess the methods, models, or analyses.

5. **Low:** Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information that was mislabeled or incorrect or that certain data or report section(s) were not clearly described or presented.
- 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, 13 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 Final Panel Comments are presented in the main report.

A.5 Conduct of the Public Comment Review

Battelle received six PDF files containing a total of 57 pages of public comments on the Forest View CAP 205 (approximately six meeting transcripts and written comments) from USACE on August 30, 2016. Battelle sent the public comments to the panel members on August 31, 2016 in addition to the following charge question:

1. **Does information or do concerns raised by the public raise any additional discipline-specific technical concerns with regard to the overall report?**

The Panel produced individual comments in response to the charge question. 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 other than those already covered in the Final Panel Comments.

APPENDIX B

Identification and Selection of IEPR Panel Members
for the Forest View CAP 205 Project

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B.1 Panel Identification

The candidates for the Forest View, Illinois, Continuing Authorities Program (CAP) Section 205, Small Flood Risk Management Project, Detailed Project Report (DPR) (hereinafter: Forest View CAP 205 IEPR) Panel were evaluated based on their technical expertise in the following key areas: economics/planning, biological resources and environmental law compliance, hydrology and hydraulic engineering, geotechnical engineering, and civil/structural engineering. These areas correspond to the technical content of the Forest View CAP 205 IEPR review documents and overall scope of the Forest View CAP 205 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. One selected panel member served as a dual reviewer for both the geotechnical engineering and the civil/structural engineering disciplines. 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.

The candidates were screened for the following potential exclusion criteria or COIs.¹ These COI questions serve as a means of disclosure and to better characterize a candidate's employment history and background. 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.

1. Previous and/or current involvement by you or your firm² in the Forest View, Illinois, Continuing Authorities Program (CAP) Section 205, Small Flood Risk Management Project.
2. Previous and/or current involvement by you or your firm² in flood risk management studies or projects in the Chicago, Illinois area.
3. Previous and/or current involvement by you or your firm² in projects related to the Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project.

¹ Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. See OMB (2004, p. 18), "...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."

² Includes any joint ventures in which your firm is involved and if your firm serves as a prime or as a subcontractor to a prime. Please clarify which relationship exists in the rows above.

4. Previous and/or current involvement by you or your firm² in the conceptual or actual design, construction, or operation and maintenance (O&M) of any projects related to the Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project.
5. Current employment by the U.S. Army Corps of Engineers (USACE).
6. Previous and/or current involvement with paid or unpaid expert testimony related to the Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project.
7. Previous and/or current employment or affiliation with the non-Federal sponsor (the Metropolitan Water Reclamation District of Greater Chicago [MWRDGC]) (for pay or pro bono).
8. Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to the Village of Forest View, Illinois or the Village of Stickney, Illinois.
9. 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 Chicago District.
10. Previous or current involvement with the development or testing of models that will be used for, or in support of the Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project, including HEC-FDA 1.4, Floristic Quality Index (FQI), HEC-RAS 4.0, HEC-HMS 4.1, and/or MII.
11. Current firm² involvement with other USACE projects, specifically those projects/contracts that are with the Chicago 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 Chicago District. Please explain.
12. Any previous employment by USACE as a direct employee, notably if employment was with the Chicago District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
13. Any previous employment by USACE as a contractor (either as an individual or through your firm²) within the last 10 years, notably if those projects/contracts are with the Chicago District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
14. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning flood risk management and include the client/agency and duration of review (approximate dates).
15. Pending, current, or future financial interests in contracts or awards from USACE related to the Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project.
16. Significant portion of your personal or office's revenues within the last three years came from USACE contracts.

17. Significant portion of your personal or office's revenues within the last three years came from MWRDGC contracts.

18. Any publicly documented statement (including, for example, advocating for or discouraging against) related to Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project.

19. Participation in relevant prior and/or current Federal studies relevant to this project and/or Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project.

20. Previous and/or current participation in prior non-Federal studies relevant to this project and/or Forest View, Illinois, CAP Section 205, Small Flood Risk Management Project.

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:

Other considerations:

- Participation in previous USACE technical review panels
- Other technical review panel experience.

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. The four final reviewers were either affiliated with consulting companies or were independent consultants. 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 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 regarding each panel member and his area of technical expertise is given below.

Table B-1. Forest View CAP 205 IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Loomis	Newling	Bird (Dual)	Schwar
Economics/Planning				
Minimum of 15 years of demonstrated experience in economics and planning	X			
Minimum M.S. degree or higher in economics	X			
Expertise in flood risk management evaluations and conducting complex multi-objective flood risk management public works projects with high public and interagency interest	X			
Familiarity with the flood risk management analysis, economic benefit calculations, and expertise in economic analysis for flood risk management, specifically with acceptable methodologies for estimating damages, and the use of models similar to the Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA)	X			
Water resource planning experience in flood risk management plan formulation	X			
Familiarity with Continuing Authorities Program Section 205	X			
Membership and active participation in related professional organizations and societies is encouraged	X			
Biological Resources and Environmental Law Compliance				
Minimum of 15 years of experience directly related to water resources environmental evaluation or review and the National Environmental Policy Act (NEPA) compliance		X		
Minimum M.S. degree or higher in a related field		X		
Familiarity with the habitat and the fish and wildlife species that may be affected by the project alternative in the study area and region		X		
Familiarity and experience with United States Fish and Wildlife Service Habitat Evaluation Procedures (HEP) (USFWS, 1980), Clean Water Act (CWA), Endangered Species Act (ESA), and essential fish habitat (EFH) procedures		X		
Membership and active participation in related professional organizations and societies		X		
Civil/Structural Engineering				
Registered professional engineer with a minimum of 15 years of experience in civil and structural engineering			X	
Experience in large flood risk management public works projects and thorough understanding of design and performance of levees within an urban setting			X	
Familiarity with civil and structural levee design considerations, geotechnical considerations, and related non-structural flood risk management measures used in flood risk management			X	

Table B-1. Forest View CAP 205 IEPR Panel: Technical Criteria and Areas of Expertise, continued

Technical Criterion	Loomis	Newling	Bird (Dual)	Schwar
Geotechnical Engineering				
Registered professional engineer with a minimum of 15 years of experience in geotechnical engineering			X	
Minimum M.S. degree or higher in engineering			X	
Demonstrated experience in performing geotechnical evaluation and geo-civil design for all phases of flood risk management projects			X	
Experience in levee design and construction, and application of non-structural flood risk management measures			X	
Knowledge of levee stability, vegetation variance for levees, levee design, construction and modification of existing levees			X	
Familiarity with and demonstrated experience related to geotechnical practices associated with levee construction and soil engineering			X	
Experience in geotechnical risk and fragility analysis			X	
Active participation in related professional engineering and scientific societies			X	
Ability to address life safety assurance review (SAR) aspects and questions of the project			X	
Hydrology and Hydraulic Engineering				
Registered professional engineer with a minimum of 15 years of experience in hydrologic and hydraulic engineering				X
Experience in open channel one-dimensional unsteady flow hydraulic models such as HEC-RAS, experience with HEC-HMS or other 2-D hydrologic models used to produce into hydrographs				X
Experience in open channel systems, and assessment of levee impacts on river stages				X
Experience in flood risk management public works projects and have a thorough understanding of design of levee and flood control structures				X
Ability to address life safety assurance review (SAR) aspects and questions of the project				X

John Loomis, Ph.D.**Role:** Economics/Planning**Affiliation:** Colorado State University

Dr. Loomis is a professor of economics in the Department of Agricultural and Resource Economics at Colorado State University (CSU). He earned his Ph.D. in economics from CSU in 1983. He has taught courses in economics at the University of California-Davis and CSU for more than 30 years and has conducted economic water resource evaluations during this period. He has experience in flood risk management analysis and benefits calculation, has taught graduate-level courses in water resource economics (including estimating the benefits of reducing flood risk and flood damages), and has evaluated several major USACE flood control projects for recent IEPRs. He also is co-author of a book titled *Determining the Economic Value of Water*, one chapter of which is devoted to measuring the economic benefits of reducing flood risk.

Dr. Loomis has direct experience working with USACE and is familiar with USACE planning process, guidance, and economic evaluation techniques. From 1980 to 1985, he served as a lead economics trainer for the U.S. Fish and Wildlife Service (USFWS). During that time, he collaborated with USACE Waterways Experiment Station (WES) economists to teach a course on U.S. Water Resources Council (USWRC) *Principles and Guidelines* that focused on National Economic Development (NED) benefit-cost procedures. As a subcontracting economist to USACE's Walla Walla District on the Lower Snake River dam removal feasibility study and environmental impact statement (EIS) (1998-2001), he collected data and performed economic analyses that contributed to the NED analysis. In addition, he has served on several USACE IEPRs with high public and interagency interest, including the Cache la Poudre at Greeley, Colorado General Investigation Feasibility Study, which was later converted into a Continuing Authorities Program (CAP). As a result of how this IEPR concluded, Dr. Loomis familiarized himself with CAP Section 205.

Dr. Loomis also has experience with USACE plan formulation processes, procedures, and standards as they relate to flood risk management. Specifically, his book discusses how to calculate the benefits of reducing flood risk and provides an overview of USACE procedures for flood risk management. His recent experience on IEPRs for USACE projects in the New Orleans area demonstrates his familiarity with USACE standards for formulating plans that employ both structural and non-structural techniques. His familiarity includes Specific, Measurable, Attainable, Risk Informed, Timely (SMART) plan formulation involving screening of alternatives to arrive at the Tentatively Selected Plan (TSP).

Since 2008, Dr. Loomis has worked on IEPRs directly dealing with USACE's six-step planning process. Those planning steps must be consistent with the USWRC *Principles and Guidelines* planning process, which Dr. Loomis taught in his water resource economics course from 1993 to 2000. In addition, because the USACE six-step planning process is in some ways similar to the National Environmental Policy Act (NEPA) analysis process, his experience with EIS preparation (as a USFWS employee, as a consultant to USACE on the Lower Snake River feasibility report, and as a contributor to several other EISs with the Bureau of Land Management, Bureau of Reclamation, and USFWS) demonstrates his longstanding familiarity with planning principles that ultimately support USACE's six-step planning process.

Dr. Loomis has more than five years of experience using the Hydrologic Engineering Center-Flood Damage Reduction Analysis (HEC-FDA) model for several IEPRs dealing with flood risk reduction. With the HEC-FDA model, he reviewed details of depth-damage relationships, calculated resulting damages to structures, and developed contents-to-structure value ratios (CSVs) and depreciated replacement costs

for structures, contents, and vehicles. He is familiar with the principles for incorporating uncertainty into this model by using standard deviations or distributions of damages, then applying Monte Carlo analysis. He is also familiar with the Institute for Water Resources (IWR) Planning Suite that includes cost effectiveness/incremental cost analysis (CE/ICA), which is particularly relevant for selecting “best buy” restoration plans under National Ecosystem Restoration (NER) planning principles. The chapter in the book *Determining the Economic Value of Water* has a chapter that discusses how to calculate the economic benefits of flood damage reduction.

Dr. Loomis has 30 years of experience evaluating socioeconomic issues on numerous EISs for a variety of government agencies. In addition, he was the lead author for an article in *Ecological Economics* on the economic benefits of restoring a section of the South Platte River in northern Colorado, not far from its confluence with the Poudre River near Greeley. He is familiar with the Executive Order requiring environmental justice analysis and has conducted research on the development of quantitative methods for assessing whether low-income and minority groups would be disproportionately affected by proposed government projects. He also has published two journal articles and one book chapter on evaluating environmental justice issues.

Dr. Loomis has been an officer in the Association of Environmental and Resource Economists, first as a Board Member in 1993-1995, and then as a Vice President in 2000-2001. In 2013, he was elected a Fellow of this association. He is a member of other professional societies such as the Western Agricultural Economics Association (where he is a Distinguished Scholar) and the Agricultural and Applied Economics Association, where he was recently named a Fellow. He regularly presents papers at these associations’ annual conferences and has published over 250 journal articles in scientific journals.

Charles Newling, PWS, CWB, CWD	
Role: Biological Resources and Environmental Law Compliance	Affiliation: Wetland Science Applications, Inc.

Mr. Newling is senior wetland regulatory scientist and senior vice president of Wetland Science Applications, Inc., and the Wetland Training Institute, Inc. He earned his M.S. in zoology (wildlife ecology) from Southern Illinois University in 1975. His 41-year career has focused on environmental evaluation of water resources in both the public and private sectors for compliance with the Clean Water Act (CWA) and NEPA. Mr. Newling has specialized knowledge of a broad array of environmental laws, with a strong focus on the requirements of the CWA, NEPA, the Rivers and Harbors Act, the Fish and Wildlife Coordination Act, and the Endangered Species Act.

He is familiar with the habitat and the fish and wildlife species that may be affected by the project alternative in the study area and region, notably the Upper Midwest. Mr. Newling has worked on projects in the Great Lakes and Illinois River eco-region; his consulting work spans the ecology of the Upper Midwest including the Central Corn Belt spanning as far back as 1975 when he authored the following studies used by the St. Louis District in its EIS for the replacement of Lock and Dam 26 on the Mississippi River: *Newling, C. J. 1975. Preliminary report on the floodplain animals of the Upper Mississippi River and the Illinois Waterway including some probable impacts of increased commercial traffic. U.S. Army Engineer District, St. Louis. 214 pp.* and *Newling, C. J. 1975. Threatened vertebrate species occurring or*

believed to occur in the floodplains of the Mississippi River between Cairo, Illinois, and Minneapolis, Minnesota, and the Illinois Waterway between Grafton, Illinois, and Chicago, Illinois. U.S. Army Engineer District, St. Louis. 131 pp.

Mr. Newling has experience calculating average annual habitat units (AAHUs) and applying the calculations to determine mitigation or restoration needs (or to determine whether those needs have been satisfied). He is familiar with the development and use of habitat suitability indices (HSIs) and with various assessment models, including habitat evaluation procedures (HEPs) for riparian and wetland habitats, Hydrogeomorphic (HGM) Approach, Wetland Evaluation Technique (WET), and other assessment methods. He was trained in HEP from its inception, has worked with the team that developed some of the Habitat Suitability Indices, and is familiar with the concepts and application of Index of Biotic Integrity (IBI) and Floristic Quality Assessment (FQA). He also has taught some of these methods and was contracted by the State of Washington Department of Ecology to teach the State Wetland Rating System. In addition, he contributed to the development of the USACE Wetland Delineation Manual and supported efforts to develop and standardize evaluation of wetlands and related habitat. He also has familiarity with essential fish habitat (EFH) procedures.

His expertise includes evaluating ecosystem restoration technologies for mitigation of potential impacts from proposed projects. He has a strong knowledge of the ecology of wetlands, wet prairies, streams, and interconnected habitat, having conducted functional analyses of these environments since 1975.

Mr. Newling has more than 14 years of experience working for the USACE New England Division Regulatory Branch and the U.S. Army Engineer (USAE) Waterways Experiment Station (WES) Environmental Laboratory. His USAEWES work involved evaluation and long-term monitoring of habitat development projects. From 1981 to 1989, he was the technical coordinator for USACE wetland training, including evaluation of wetland functions and values, and he has organized, conducted, and served as primary instructor in hundreds of wetland-related training courses. His consulting expertise has focused on wetland delineation, wetland construction and restoration, the assessment of wetland functions and values, mitigation monitoring, and wetland mitigation banking. He has also provided rapid response assistance to USACE District offices nationwide on technical matters of wetland delineation and restoration.

He is familiar with cultural resource review requirements, which have applied to virtually all of the permits on which he has worked, and is aware of the need to comply with applicable regulations. Several recent projects have involved National Ecosystem Restoration (NER) plan identification, and virtually all of the Federal projects on which he has worked (e.g., USACE planning projects, private sector applications for Federal permits, etc.) have required interaction with the U.S. Fish and Wildlife Service under requirements of the Fish and Wildlife Coordination Act. He also has used the Institute for Water Resources (IWR) Planning Suite on several recent projects. Mr. Newling's field work has been conducted throughout the United States, including the Upper Midwest. Specifically, he has worked on projects throughout the Upper Midwest and taught field-oriented courses in Illinois, Wisconsin, and Minnesota. He also has gained knowledge of USACE documentation associated with flood risk management while working on several recent projects serving on IEPR panels for the Upper Des Plaines River and Tributaries, Illinois and Wisconsin, Feasibility Study (2013-2014); Cedar River, Cedar Rapids, Iowa, Flood Risk Management Project, Feasibility Study Report with Integrated Environmental Assessment (2010); Upper Turkey Creek Flood Risk Management Feasibility Study, The City of Merriam, Johnson and

Wyandotte Counties, Kansas (2012-2013); and Blanchard River Watershed, Ohio, Feasibility Study and Environmental Impact Statement (2015).

Mr. Newling is a member of the Society of Wetland Scientists, The Wildlife Society, Association of State Wetland Managers, Society of Ecological Restoration, and Wisconsin Wetlands Association and has served on the Board of Directors for the Society of Wetland Scientists as Liaison to its National Certification Program. He is a Professional Wetland Scientist (PWS), Certified Wildlife Biologist (CWB), and Certified Wetland Delineator (CWD).

David Bird, P.E.

Role: Civil/Structural Engineer & Geotechnical Engineer (Dual)

Affiliation: Independent Consultant

Mr. Bird is an engineer and independent consultant specializing in civil/structural/geotechnical/geo-structural engineering, including investigations, geotechnical explorations, analysis, expert witness testimony, forensic engineering, bid preparation, and cost estimating.

He is a registered Professional Engineer in Illinois, Indiana, Kentucky, Michigan, Virginia, and Wisconsin. He earned his M.S. in civil engineering (soil mechanics and foundation engineering) from the University of Illinois in 1979. For 42 years, he has provided geotechnical and geo-structural consulting expertise in the Midwest on the geotechnical analysis and design aspects of foundations for bridges and vertical construction, earth retention systems (MSE walls, stabilized slopes, soil nail walls, etc.), cofferdams, tunnels, shafts, embankment slope stability, erosion protection, dams and levees.

Mr. Bird has experience in large flood risk management public works projects and has a thorough understanding of design and performance of levees within an urban setting, but also related non-structural flood risk management measures used in flood risk management. He has a working knowledge of the development and implementation of fragility curves and their use in assessing risk of levee failure. He is also knowledgeable in the reasons and rationale for vegetation management on levee crowns and side slopes, as well as the circumstances considered by USACE for providing variances to the vegetation limits.

Mr. Bird's areas of expertise include geotechnical explorations, analysis and design, and geo-structural engineering and design. Most recently, he has specialized in the review of geotechnical-related design and construction projects, and geotechnical consulting in the area of high capacity foundations and earth retention system design and construction. Mr. Bird has consulted on numerous projects related to groundwater issues, control, and dewatering for both permanent and temporary conditions. He has performed analyses for flood control levees and walls including stability, slope stability, underseepage, rapid drawdown, and design and remediation of failed slopes throughout the Midwest.

Mr. Bird is experienced in performing cost engineering/construction management for all phases of flood risk management related projects, particularly construction of levees, dams, and flood control structures. He is also experienced in the design and construction of bridges and large control structures in cold climates, including the geotechnical and structural design of a railroad bridge anchorage system in Hamilton County, Ohio; the design and preparation of construction plans for all excavations associated with a pump station installation in Detroit, Michigan; and the evaluation of water seepage under a

concrete spillway and the related design of an inverted filter seepage water collection system at a dam in Nashville, Indiana. He has consulted on numerous geotechnical investigations for bridges over waterways. Mr. Bird is experienced and familiar with the geotechnical practices associated with concrete floodwalls and earthen levee foundations and dams. He is familiar with the USACE SAR aspect of projects and is able to assess the adequacy, appropriateness, and acceptability of design and construction activities for the purpose of assuring public health, safety, and welfare. Mr. Bird is familiar with identifying and explaining underlying assumptions for a study's engineering analyses, as well as evaluating the soundness of models, surveys, investigations and methods applicable to the geotechnical aspects of a project. Mr. Bird has previous experience with an IEPR in this area, serving on the Upper Des Plaines River and Tributaries, Phase II, Illinois and Wisconsin Multi-Purpose Feasibility Study.

Mr. Bird is author of publications and has given technical talks on such topics as the use of drainage for slope stabilization and practical considerations in earth-retaining structure design. Most recently, he published "Stabilization of a Cellular Cofferdam in the Ohio River" at the 7th ASCE Case History Symposium honoring Ralph Peck and Clyde Baker. He is an active member of the American Society of Civil Engineers.

Michael Schwar, Ph.D., P.E.

Role: Hydrology and Hydraulic Engineering

Affiliation: Stony Point Hydrology, LLC

Dr. Schwar, Principal Water Resources Engineer with Stony Point Hydrology LLC in Mukwonago, Wisconsin, has more than 25 years of professional and academic experience focusing on the hydrology and hydraulics of surface water systems, with special emphasis on the restoration of streams, rivers, lakes, and wetlands. He earned an M.S. in Environmental Engineering and Sciences from the University of Washington in 1991 and a Ph.D. in Civil and Environmental Engineering from the University of Wisconsin – Madison in 2002. He has worked on more than 140 surface water projects in 20 states, Canada, and Puerto Rico. He is a registered P.E. in six states, including Washington, Wisconsin, and Illinois; is a Certified Floodplain Manager (CFM); and has been recognized as a Diplomate, Water Resources Engineer (D.WRE) by the American Academy of Water Resources Engineers. While a hydraulic engineer with the USACE Rock Island District, he worked primarily on various CAP projects and other ecosystem restoration projects.

Throughout his career, Dr. Schwar has incorporated hydrologic design in flood risk reduction, ecosystem restoration, and stormwater management projects, particularly in the northern United States. His experience includes evaluating the effects of hurricane-level events on flood risk management projects, specifically structures within the Inner Harbor Navigation Canal in New Orleans. He has analyzed urban hydrology for more than 50 projects, using models such as the HEC Hydrologic Modeling System (HEC-HMS), Storm Water Management Model, Hydrological Simulation Program—Fortran, and FLO-2D; he has also evaluated potential flooding and water quality risks and developed mitigation practices. He is familiar with the design of interior drainage systems and has evaluated system functionality for flood risk reduction projects along the Mississippi, Illinois, and Trinity Rivers.

Dr. Schwar has extensive experience in riverine hydraulics, specifically the modeling of flood hydraulics and flow routing. He has led or conducted river modeling in support of USACE projects in five states and Puerto Rico and has supported other projects in another four states. He has nearly 15 years of experience developing and reviewing one-dimensional unsteady flow models, including both UNET and

HEC-RAS, and has used this technique to analyze riverine flooding conditions in several states, including northern Illinois and southern Wisconsin.

Dr. Schwar is trained in the advanced analysis and design of open-channel systems. He has analyzed and designed channel modifications for flood risk reduction, stabilization, sediment transport, and ecosystem restoration. Projects include Boneyard Creek Restoration (Urbana, Illinois), Blue River Grade Control (USACE Kansas City), Menomonee River-Western Milwaukee (Milwaukee Metropolitan Sewerage District [MSD], Wisconsin), Tres Rios Phase 3A (USACE Los Angeles), and Ebner Coulee Creek (La Crosse, Wisconsin). He has specifically analyzed the effects of levees and other floodplain obstructions on river stages along rivers in Wisconsin, Illinois, Iowa, Minnesota and Missouri, and his analyses have been accepted by FEMA and other floodplain regulators to determine local regulatory flood elevations. He also led the evaluation of the hydraulic impacts of levees along the Rio de la Plata in Puerto Rico under contract with the Jacksonville District.

Dr. Schwar is familiar with the implementation of interior drainage system BMPs and low-impact development on the flow and pollution export conditions in urban areas. He is currently working with the Village of Mukwonago and the City of La Crosse to evaluate the potential stormwater and flood reduction benefits from implementing low-impact development and the related green infrastructure practices. The La Crosse project involves the use of a 2-D surface model combined with a 1-D model of the drainage system to evaluate potential system performance benefits. Previously, he led an analysis of water quality benefits from such practices in Bismarck, North Dakota.

Dr. Schwar has managed, analyzed, and/or designed several large flood management projects incorporating levees, flood storage, channel reconfiguration, and/or pump stations. He led two major efforts involving earthen levees and floodwalls: the design of a system along the Menomonee River in Wisconsin, and the evaluation of designs for 14 USACE flood risk reduction systems along the Mississippi and Illinois Rivers in Iowa, Illinois, and Missouri. He also conducted hydrologic and hydraulic analyses for the condition evaluation and recommendations for improvement of the Trinity Levees in Dallas, Texas.

As a CFM, Dr. Schwar has demonstrated a comprehensive understanding of floodplain management and risk reduction techniques, including non-structural approaches such as flood-proofing, warning systems, and evacuation planning. He has incorporated these strategies into projects such as the Western Milwaukee Flood Management Project (Milwaukee MSD) and has developed emergency action plans for the Milwaukee County Grounds (Milwaukee MSD) and Lockport Dam (USACE) projects.

Dr. Schwar has received advanced training in several HEC software packages and has applied that training to various projects for more than 15 years. The training includes the HEC River Analysis System (HEC-RAS) and subjects from both USACE and ASCE courses. He has applied HEC-RAS to develop more than 25 project designs incorporating aspects such as floodplain management, dam break analysis, unsteady flow routing, levee design, and sediment transport analysis. He is also familiar with the application of the HEC-FDA software to conduct economic analysis of flood risk reduction projects, and has applied HEC-HMS to generate design hydrographs for flood risk reduction, bank stabilization, and ecosystem restoration projects in Illinois, Wisconsin, and Ohio. He has used both event-based and continuous (soil moisture accounting) applications as appropriate.

Dr. Schwar has extensive experience in the development of data and modeling required to support the design of flood risk reduction projects. He has led the evaluation and design of numerous medium- to

large-sized municipal flood risk reduction projects and has evaluated USACE designs in Dallas, Kansas City, New Orleans, and areas along the Mississippi, Illinois, and Blue Rivers. Specifically, he has evaluated data and modeling requirements and developed protocols for conducting levee safety analyses for the Modeling Mapping and Consequences Center at the USACE Vicksburg District. He also is familiar with the application of risk and uncertainty concepts to the evaluation of project designs. For the Delaware River IEPR, he conducted the SAR assessment of the features relevant to the hydrologic and hydraulic analyses.

Dr. Schwar's professional affiliations include the ASCE, the Environmental and Water Resources Institute (EWRI) River Restoration Task Committee (past chair), the Association of State Floodplain Managers, and the Society of American Military Engineers (SAME).

APPENDIX C

Final Charge to the IEPR Panel as Submitted to USACE
on July 26, 2016 for the Forest View CAP 205 Project

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Charge Guidance and Questions to the Panel Members for the IEPR of the Forest View, Illinois, Continuing Authorities Program (CAP) Section 205, Small Flood Risk Management Project, Detailed Project Report (DPR)

BACKGROUND

The Forest View, Illinois Feasibility Study will investigate alternatives to manage flood risk in the communities of Forest View and Stickney, Illinois. The study is being conducted under the CAP, authorized by Section 205 of the Flood Control Act of 1948, as amended. The study will result in a DPR and integrated National Environmental Policy Act (NEPA) Environmental Assessment (EA) documentation of the assessment of environmental impacts of any recommended Federal actions.

The preferred decision document format is contained in the DPR template in the Great Lakes and Ohio River Division (LRD) CAP Program Management Plan/Standard Operating Procedures, which integrates the environmental documentation required under NEPA and other relevant environmental statutes into the project decision document. The purpose of a DPR is to document the basis for a recommendation to invest Federal and non-Federal resources to address a local water resource problem or opportunity of significance to the Nation. The approval level of the decision document is the LRD Commander.

The Village of Forest View is a small community at the western border of the City of Chicago, about 10 miles from the downtown area. The village is in the Des Plaines River watershed, but is located between the Chicago Sanitary and Ship Canal and the Des Plaines River. The area potentially impacted by flooding also includes a portion of the Village of Stickney, immediately north of Forest View.

Lyons Levee, a historic levee along the Des Plaines River, provides a barrier against overbank flooding for the community. This 4,000 foot long earthen levee was built over 100 years ago and has not been adequately maintained. Trees, animal burrows, unmaintained concrete structures, and general lack of maintenance have created a significant risk of future failure.

The area at risk of flooding includes homes, businesses, and roadways. There are approximately 800 homes in the estimated inundation area and businesses include large industrial facilities used for storing fuels, a Commonwealth Edison power substation, and wastewater treatment facilities associated with the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Stickney Water Reclamation Plant. Multiple critical facilities are also located within the inundation area including: the Forest View Police and Fire Stations, Home Elementary school, Edison School, and the Stickney Fire Department. Flooding of these critical facilities would impact the ability of the community to respond to the emergency and would put numerous lives at risk.

On April 18 and 19, 2013, a large storm event covered the Chicago Area with up to six inches of rain over 24 hours. The storm resulted in major flooding along the Des Plaines River and Salt Creek. The flood peaked on April 18 at approximately one half foot higher than the previous record. The Des Plaines River overtopped Lyons Levee, resulting in widespread flooding.

The flood impacted homes and businesses in the community and also resulted in local power outages when electricity was rerouted from the substation to other facilities in the area. Nearly 200 homes were flooded and approximately 700 residents were evacuated, some in boats. The Forest View Police and Fire Stations were also flooded and had to be evacuated, further increasing life-safety risks to community residents.

Based on the investigations conducted to support the Federal Interest Determination (FID) Report, alternatives to be considered during the Feasibility Phase include rehabilitation and improvement of the existing levee, construction of a new set-back levee, and implementation of non-structural measures. Estimated project costs reported in the FID Report range from \$5-10 million. The non-Federal sponsor for the study is MWRDGC.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Forest View, Illinois, Continuing Authorities Program (CAP) Section 205, Small Flood Risk Management Project, Detailed Project Report (DPR) (hereinafter: Forest View CAP IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Civil Works Review* (Engineer Circular [EC] 1165-2-214, dated December 15, 2012), 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, engineering, and environmental methods, models, and analyses used" (EC 1165-2-214; p. D-4) for the Forest View CAP 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) with extensive experience in economics/planning, biological resources and environmental law compliance, civil/ structural engineering, geotechnical engineering, and hydrology and hydraulic engineering issues relevant to the project. They will also have experience applying their subject matter expertise to flood risk management.

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 1165-2-214, Appendix D, 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.

Documents for Review

The following documents are to be reviewed by designated discipline:

Title	No. of Pages	Required Disciplines
Detailed Project Report / Environmental Assessment + Finding of No Significant Impact (FONSI)	76	All Disciplines
Appendix A: Civil Design	41	All Engineering Disciplines
Appendix B: Cost	29	Economics/Planning All Engineering Disciplines
Appendix C: Mitigation, including Wetland Delineation Reports	104	Economics/Planning Bio. Resources
Appendix D: Economics	22	Economics/Planning
Appendix E: Hydrology & Hydraulics	48	Hydrology and Hydraulics Engineering
Appendix F: Geotechnical	27	Geotechnical Engineering
Appendix G: HTRW	16	Bio. Resources
Appendix H: Real Estate Plan	13	Economics/Planning
Appendix I: Coordination (National Environmental Policy Act/Permitting/etc.)	42	Bio. Resources
Public Comments	100*	All Disciplines
Total Page Count	518	

*Page count for public comments is approximate. Public comments will be provided after the review of the main documents is complete.

Supporting Information

The supporting documents listed below are not for Panel review and should be used as information sources only. They are not included in the total page count.

- Lyons Levee Improvement Project Feasibility Report and Plans (226 pages)
- Lyons Levee Rehabilitation Project, Geotechnical Investigation and Analysis – 30 % Design Level (183 pages)
- Lyons Levee Subsurface Investigation (133 pages)
- Lyons Levee (Levee Assessment Report) (94 pages)

Documents for Reference

- USACE guidance *Civil Works Review*, (EC 1165-2-214, December 15, 2012)

- Office of Management and Budget’s *Final Information Quality Bulletin for Peer Review* (December 16, 2004)
- USACE Climate Change Adaptation Plan (June 2014)

SCHEDULE

The review schedule is based on the July 20, 2016, receipt of final review documents and will be formalized upon their receipt. Note that dates presented in the schedule below could change due to panel member and USACE availability.

Task	Action	Due Date
Conduct Peer Review	Subcontractors must complete OPSEC training	8/10/2016
	Battelle sends review documents to panel members	7/21/2016
	Battelle convenes kick-off meeting with panel members	7/22/2016
	Battelle convenes kick-off meeting with USACE and panel members	7/22/2016
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	7/28/2016
	Panel members complete their individual reviews	8/4/2016
Public Comment Review	Battelle receives the public comments from USACE	8/29/2016
	Battelle sends public comments to Panel	8/30/2016
	Panel completes their review of the public comments	9/1/2016
	Battelle and Panel review Panel's responses to public comments	9/2/2016
	Panel drafts Final Panel Comment, if necessary	9/7/2016
	Panel finalizes Final Panel Comment regarding public comments	9/9/2016
Prepare Final Panel Comments and Final IEPR Report	Battelle provides panel members with Panel Review Teleconference agenda	8/8/2016
	Battelle convenes Panel Review Teleconference	8/11/2016
	Battelle provides Final Panel Comment templates and instructions to panel members	8/11/2016
	Panel members provide draft Final Panel Comments to Battelle	8/18/2016
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	8/19/2016 - 8/24/2016
	Panel finalizes Final Panel Comments	8/25/2016
	Battelle provides Final IEPR Report to panel members for review	9/12/2016
	Panel members provide comments on Final IEPR Report	9/14/2016
	Battelle submits Final IEPR Report to USACE*	9/15/2016
	USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance	9/19/2016
Comment/Response Process	Battelle inputs Final Panel Comments to the Design Review and Checking System (DrChecks) and provides Final Panel Comment response template to USACE	9/20/2016
	Battelle convenes teleconference with Panel to review the Comment Response Process	9/20/2016

Task	Action	Due Date
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review	9/28/2016
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	9/30/2016
	USACE PCX provides draft PDT Evaluator Responses to Battelle	10/3/2016
	Battelle provides draft PDT Evaluator Responses to panel members	10/4/2016
	Panel members provide draft BackCheck Responses to Battelle	10/7/2016
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	10/11/2016
	Battelle convenes Comment Response Teleconference with panel members and USACE	10/12/2016
	USACE inputs final PDT Evaluator Responses to DrChecks	10/14/2016
	Battelle provides final PDT Evaluator Responses to panel members	10/17/2016
	Panel members provide final BackCheck Responses to Battelle	10/19/2016
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	10/20/2016
	Battelle submits pdf printout of DrChecks project file*	10/20/2016

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the Forest View CAP 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 Forest View CAP 205 DPR. 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 the following guidance. Note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-214; Appendix D).

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 (Corey Wisneski, wisneskic@battelle.org) or Program Manager (Rachel Sell; sellr@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle Program Manager, Rachel Sell (sellr@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 Corey Wisneski, wisneskic@battelle.org, no later than August 4, 2016, 10 pm ET.

**Independent External Peer Review
of the Forest View, Illinois, Continuing Authorities Program (CAP) Section 205,
Small Flood Risk Management Project, Detailed Project Report (DPR)**

Charge Questions and Relevant Sections as Supplied by USACE

BROAD EVALUATION REVIEW CHARGE QUESTIONS, AS SUPPLIED BY USACE

1. Is the need for and intent of the decision document clearly described?
2. Does the decision document adequately address the stated need and intent?
3. Given the need for and intent of the decision document, assess the adequacy and acceptability of the project evaluation data used in the study analyses.
4. Given the need for and intent of the decision document, assess the adequacy and acceptability of the economic, environmental, and engineering assumptions that underlie the study analyses.
5. Given the need for and intent of the decision document, assess the adequacy and acceptability of the economic, environmental, and engineering methodologies, analyses, and projections.
6. Given the need for and intent of the decision document, assess the adequacy and acceptability of the models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives.
7. Given the need for and intent of the decision document, assess the adequacy and acceptability of the methods for integrating risk and uncertainty.
8. Given the need for and intent of the decision document, assess the adequacy and acceptability of the formulation of alternative plans and the range of alternative plans considered.
9. Given the need for and intent of the decision document, assess the adequacy and acceptability of the quality and quantity of the surveys, investigations, and engineering sufficient for conceptual design of alternative plans.
10. Given the need for and intent of the decision document, assess the adequacy and acceptability of the 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.
13. For the tentatively selected plan, assess whether the models used to assess life safety hazards are appropriate. **(PANEL: please note that this question does not apply to your review, as there were no models used. No response is necessary)**
14. For the tentatively selected plan, assess whether the assumptions made for the life safety hazards are appropriate.
15. For the tentatively selected plan, assess whether 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. For the tentatively selected plan, assess whether the analysis adequately address the uncertainty and residual risk given the consequences associated with the potential for loss of life for this type of project.
17. For the tentatively selected plan, assess whether, 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 MEMBERS

These questions are provided for Battelle's use in identifying the Panel's key technical issues.

Summary Question

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.

Positive Feedback

19. Please provide positive feedback on the project and/or review documents. This information will aid in the development of the Executive Summary. (1-2 sentences is sufficient)

Public Comment Question

(to be answered only during the review of the public comments)

20. Does information or do concerns raised by the public raise any additional discipline-specific technical concerns with regard to the overall report?

APPENDIX D

Conflict of Interest Form

Conflicts of Interest Questionnaire **Independent External Peer Review**

Forest View, Illinois, Flood Risk Management Project Detailed Project Report IEPR

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 Corporation Operations**

REPRESENTATIVE'S NAME: **Jason M. Jenkins**

TELEPHONE: **614-424-4873**

ADDRESS: **505 King Avenue, Columbus, OH 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.



4/26/2016

YOUR SIGNATURE

DATE

