Final Independent External Peer Review Report of the Dredged Material Management Plan for Green Bay, Wisconsin

IDIQ Contract No. W912HQ-11-D-0002 TO 0002

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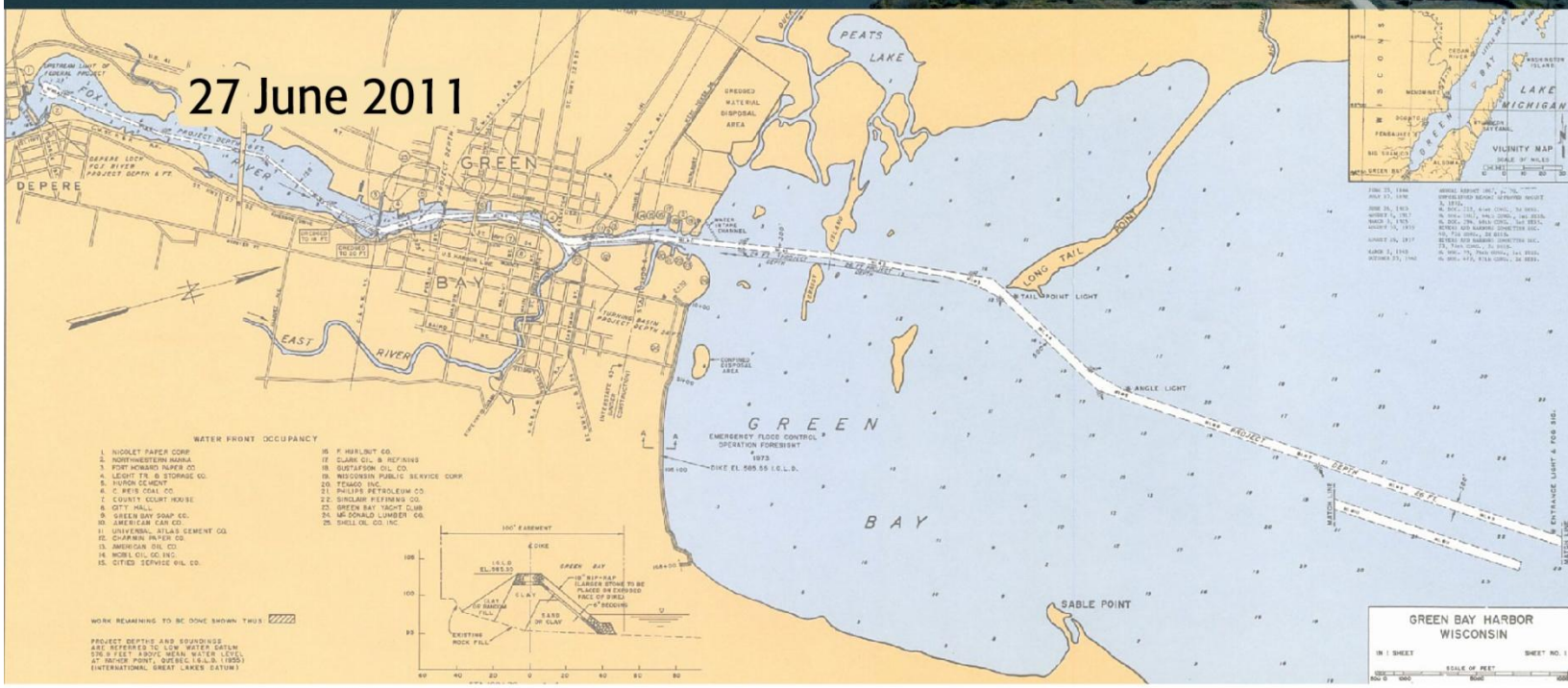

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List of Acronyms

ASCE	American Society of Civil Engineers
BMP	Best Management Practice
CDF	Confined Disposal Facility
COI	conflict of interest
cy	cubic yard(s)
DEP	Department of Environmental Protection
DMDF	Dredged Material Disposal Facility
DMMP	Dredged Material Management Plan
EC	Engineer Circular
ft	foot/feet
gal	gallon(s)
GIS	Geographic Information System
GPS	global positioning system
IEPR	Independent External Peer Review
ISO	International Organization for Standardization
NEPA	National Environmental Policy Act
O&M	operations and maintenance
OMB	Office of Management and Budget
PDT	Project Delivery Team
SOW	Scope of Work
USACE	U.S. Army Corps of Engineers
yr	year

Executive Summary

A Dredged Material Management Plan (DMMP) was initiated in 2008 to identify and evaluate material management alternatives for sediments dredged from the Fox River and Green Bay Navigation Project in Green Bay, Wisconsin. The purpose of the DMMP was to identify placement alternatives for the 215,300 cubic yards (cy) of sediment dredged annually from the Federal Navigation Project. The objective of this Task Order was for Noblis to conduct an Independent External Peer Review (IEPR) of the DMMP for Green Bay in accordance with procedures described in the Department of the Army U.S. Army Corps of Engineers (USACE) Engineer Circular (EC) No. 1165-2-209. The IEPR performed a technical assessment of the adequacy and acceptability of environmental and engineering methods, models, data, and analyses. The review was conducted by a panel of experts with extensive experience in environmental and engineering issues associated with deep draft navigation and development of dredged material disposal alternatives. The panel was "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall report.

Since Noblis has no commercial interests to advance, no vendor alliances to protect, and no sponsors or shareholders to represent, it is fully independent. Noblis provides impartial, conflict of interest (COI)-free, independent assistance to organizations throughout the federal government and has extensive experience with peer review oversight. Noblis and the selected IEPR panel have not been involved in any capacity with the Port of Green Bay or the Green Bay DMMP. In addition, Noblis has not performed or advocated for or against any federal water resources projects. For these reasons, Noblis was suitable for upholding the principles of independence in all aspects of managing the IEPR.

Noblis performed the requirements of this contract in accordance with its Quality Management System, which is compliant with International Organization for Standardization (ISO) 9000. Specifically, Noblis prepared a Work Plan to define and manage the process for conducting the IEPR, including the screening and selection of peer reviewers, communication and meetings with the USACE project team, project schedule and quality control, and compilation and dissemination of peer reviewers' comments. The USACE required completing the IEPR as efficiently as possible, and Noblis developed an aggressive schedule that would meet this goal. Some aspects of the task were initiated before the task award date at no expense to the USACE, and certain phases of the project were carried out concurrently to enhance the project efficiency and meet the project schedule. Figure ES-1 depicts an overview of the major subtasks for this effort.

Reaching out to its various pools of experts, Noblis initially identified seven potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential COI. Subsequently, Noblis selected three peer reviewers for the IEPR panel covering the three required areas of expertise: environmental, civil/structural engineering, and dredging and dredged material management. The panel represented a well-balanced mix of individuals from academia, large companies and small consulting firms, and individual consultants. In addition, recognizing the importance of site-specific knowledge and expertise related to Green Bay and Fox River, Noblis selected a Technical Advisor to assist the panel and provide input in relevant subject areas.

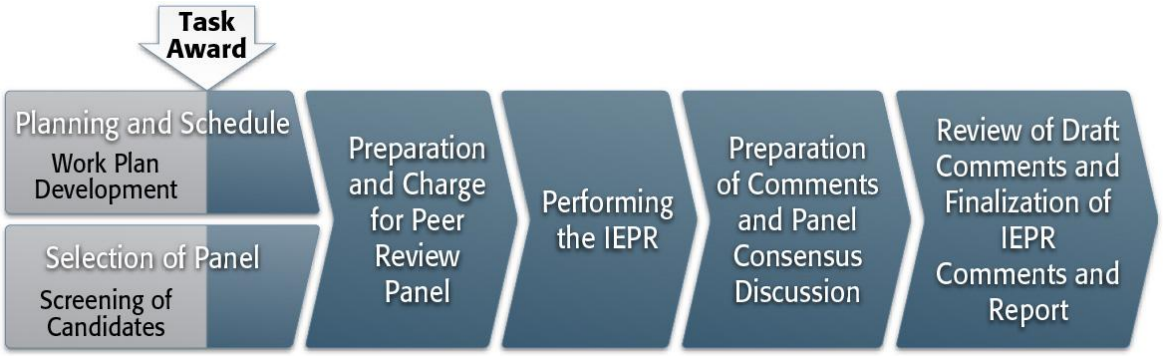

Figure ES-1. Green Bay IEPR Process

Noblis set up a secure online collaboration site to provide IEPR panel members with electronic copies of the charge and the documents to be reviewed. Noblis held a kickoff meeting outlining the steps of the IEPR process and identifying the overall schedule and deadlines. Noblis served as the conduit for information exchange between the panel and USACE in order to ensure a truly independent IEPR. Considering the aggressive schedule for this task, Noblis conducted weekly meetings with the panel members during the IEPR to discuss their progress and current observations/comments. These meetings ensured an exchange of technical information among the panel experts and reflected their diverse scientific backgrounds.

After the IEPR review period ended and comments were developed, Noblis consolidated and collated the panel comments and ensured they were complete and responsive to the charge. Noblis reviewed a draft of the consolidated IEPR panel comments with USACE and the IEPR panel for factual accuracy. Subsequent to this discussion, minor updates were made to the IEPR draft panel comments as necessary resulting in 16 final comments included in this report and entered into the USACE Design Review and Checking System (DrChecks). Of the final 16 comments, three were identified as having high significance, nine were identified as having medium significance, and four comments were identified as having a low level of significance. Editorial comments were also captured and are included in this report but were not submitted into DrChecks.

The final IEPR comments were focused on recommended changes to the DMMP to identify and clarify specific key design parameters and factors that should be considered in the selection of the preferred alternative. The Detroit District Project Delivery Team reviewed the panel members' comments and provided responses in DrChecks. The panel provided the concluding "backcheck" comments to indicate concurrence or non-concurrence on whether the USACE's responses addressed the stated concern. The formal record of USACE responses to comments and the panel's backcheck comments are captured in DrChecks. All issues were subsequently closed out in DrChecks. Table ES-1 summarizes the final comments by level of significance. Details on each comment and response are contained in Appendix A of this report.

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

Significance – High	
1	The DMMP should address the impact of bearing stability, slope stability, and settlement of the islands.
2	The DMMP should include additional information and changes for the cost estimation methodology, approach, and data.
3	The Cat Island design basis and discussion of the overtopping impacts with respect to revetment elevation need to be clarified, and if a longer duration than 20 years is intended, the impact on the cost of Alternative 7 needs to be factored into the DMMP.
Significance – Medium	
4	It is not clear whether the DMMP adequately addresses the cost to import/export these commodities using alternate transportation (rail, trucking, or other ports).
5	There are several issues regarding the storage capacity and configuration of the islands. The DMMP should be updated to adequately address these issues.
6	How the access road was modeled and its response to hydraulic forcing is not clear.
7	There should be a containment berm constructed on the leeward side of the islands, and at minimum, a temporary berm should be used during dredged material placement, especially for hydraulic placement.
8	The conclusion that there is no negative risk associated with the vegetative protective habitat is unsupported.
9	The economics of source reduction measures should be considered in alternatives development in the DMMP.
10	The DMMP should specify whether the 400,000 cy of dried material from Bayport Confined Disposal Facility (CDF) to be used as a cap for Renard Island would be classified as “unrestricted.”
11	Permitting requirements, particularly associated with wetlands impacts, should be addressed in the DMMP.
12	The effects of the inter-island openings during the 20-yr project duration period and the possibility that the openings may never be created should be discussed in the DMMP.
Significance – Low	
13	Appendix A of the DMMP does not clearly present the purpose of the pipeline.
14	The value added by the center berms is not apparent given the cost, and eliminating some or all of the center berms should be considered.
15	Hopper dredges do not necessarily need to moor at a bulkhead to pump out, which is indicated in Appendix C.
16	The design for the width of the crest should be revised.

In general, the panel acknowledged that the DMMP assembles all viable alternatives, including consideration of no-action and open-water alternatives for the placement of dredged material from Green Bay Harbor. The DMMP identified the analyses, methods, and models used in evaluating each alternative and determining the selected alternative. However, several assumptions underlying the methods and models were in question or not clearly identified or discussed in the DMMP. For example, design conditions anticipated over the duration of the project and certain factors dependent on the design life of the project were unclear. The panel raised several key cost and technical considerations that could affect the selection of the preferred alternative. These considerations are essential for the DMMP to completely represent all factors in the appropriate selection of the preferred alternative.

Economics. In terms of an economic evaluation, the DMMP did include appropriate analysis for evaluating the cost impacts associated with each alternative being considered. The methodology and approach incorporated into the cost analysis were adequate for properly evaluating and comparing costs. To account for cost analysis uncertainties, the USACE has indicated that the DMMP analysis included a cost contingency allowance. Given that cost is a key factor in the selection of the preferred alternative, the selection could be affected depending on the assumptions and data used in preparing the cost analysis. The panel understands that a more detailed analysis of the selected alternative will be performed as part of the final design, which should provide more detailed and up-to-date cost information.

Engineering. Since the DMMP included detailed drawings and information for the preferred alternative, the panel focused on the design of the Cat Island chain alternative. The engineering principles and methods used in conducting a design analysis and developing the conceptual design were sound. The panel's comments primarily relate to the lack of sufficient data and important considerations needed to improve the analysis. The panel recognizes that this is not the final design and that additional detailed analyses will be performed to address the identified concerns.

Environmental. The DMMP presented specific environmental benefits associated with the preferred alternative. The panel acknowledged that the DMMP recognizes the important consideration of involving different stakeholders including regulatory agencies and local communities as part of the planning process. The panel did identify certain environmental considerations that were not included in the DMMP that pertain to negative environmental impacts that could result from the project. The panel recognizes that permitting aspects and additional measures to mitigate environmental impacts will be addressed in later phases of the project.

1 Introduction

1.1 Report Introduction and Overview

This Independent External Peer Review (IEPR) Report provides a description of the IEPR conducted of the Dredged Material Management Plan (DMMP) for Green Bay, Wisconsin, for the U.S. Army Corps of Engineers (USACE). This report includes a description of the IEPR objectives and process, overview of the DMMP project, summary of the IEPR panel members' expertise, and discussion of observations and comments by the IEPR panel.

Section 1 of the IEPR Report provides a description of the objectives of this effort and general background information on the IEPR, as well as a brief introduction to Noblis, the contractor leading this effort. Section 2 provides an overview of the DMMP project. Section 3 presents the overall process followed in performing the IEPR. Section 4 describes the panel composition and the panel members' expertise. Section 5 discusses the conclusions and observations of the IEPR, including a description of the IEPR comments, and References are listed in Section 6. Appendix A of this Final IEPR Report lists the final IEPR comments, as well as editorial comments provided by the IEPR panel. Appendix B provides a description of the IEPR panel and the panel members' résumés. Appendix C includes the "charge" and list of documents provided to the panel for the IEPR of the DMMP for Green Bay, Wisconsin.

1.2 IEPR Overview

The USACE lifecycle review strategy for Civil Works products provides for a review of all Civil Works projects from initial planning through design, construction, and Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R). It provides procedures for ensuring the quality and credibility of USACE decision, implementation, and operations and maintenance (O&M) documents and work products. 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, the validity of the research design, the quality of data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypotheses being tested, the extent to which the conclusions follow from the analysis, and the strengths and limitations of the overall product.

1.3 IEPR Objective

The objective of the work was to conduct an IEPR of the DMMP for Green Bay, Wisconsin, in accordance with procedures described in the Department of the Army USACE Engineer Circular (EC) No. 1165-2-209, *Civil Works Review Policy*, dated 31 January 2010, and the Office of Management and Budget's (OMB's) *Final Information Quality Bulletin for Peer Review*, released 16 December 2004. The Green Bay IEPR involved conducting an independent technical peer review to analyze the adequacy and acceptability of environmental and engineering methods, models, data, and analyses. The independent review was limited to a technical review of the DMMP and was not involved in policy issues. The peer review was conducted by experts with extensive experience in environmental and engineering issues associated with deep draft navigation and development of dredged material disposal alternatives. The experts were "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the DMMP.

The independent expert reviewers identified, recommended, and commented upon assumptions underlying the analyses as well as evaluated the soundness of models and planning methods. They evaluated data, the use of models, analyses, assumptions, and other scientific and engineering methodologies. The reviewers offered opinions as to whether there are sufficient technical analyses upon which to base the ability to implement the project.

1.4 Noblis is Conflict-Free in Water Resources Projects

Noblis, the contractor leading this effort, is a nationally recognized leader in systems analysis and analytical support to the federal government. As a nonprofit science, technology, and strategy organization, Noblis solves complex systems, process, and infrastructure problems in ways that truly benefit the public. Noblis staff include accomplished engineers, scientists, analysts, researchers, technical specialists, and management experts with extensive multi-disciplinary and multi-sector experience. Since Noblis has no commercial interests to advance, no vendor alliances to protect, and no sponsors or shareholders to represent, it is fully independent. Noblis provides impartial, conflict of interest (COI)-free, independent assistance to organizations throughout the federal government. Noblis has documented experience with peer review oversight. Noblis and the selected IEPR panel have not been involved in any capacity with the Port of Green Bay or the Green Bay DMMP. In addition, Noblis has not performed or advocated for or against any federal water resources projects.

Noblis has been recognized as one of the 2011 World's Most Ethical Companies by the Ethisphere Institute. This award honors companies that demonstrate "real and sustained ethical leadership in their industries." Noblis was one of three companies worldwide to be listed in the Business Services category. The Ethisphere Institute, a think-tank dedicated to the creation, advancement, and sharing of best practices in business ethics, corporate social responsibility, anti-corruption, and sustainability, reviewed nominations from companies in more than 100 countries and 38 industries before naming 110 companies to their 2011 list.

Noblis clients and the public deserve nothing less than work that meets the highest standards of excellence, conducted in an environment where objectivity and integrity are the hallmarks. Noblis achieves this through the development, implementation, maintenance, and continual improvement of its International Organization for Standardization (ISO) 9001:2008 Compliant Quality Management System.

2 Project Description

A DMMP was initiated in 2008 to develop material management alternatives for sediments dredged from the Fox River and Green Bay Navigation Project in Green Bay, Wisconsin. The purpose of the DMMP was to identify placement alternatives for the 215,300 cubic yards (cy) of sediment dredged from the Federal Navigation Project each year.

The DMMP identified upland placement in the Bayport Confined Disposal Facility (CDF) (owned by the non-federal sponsor Brown County, Wisconsin) as the preferred alternative for the material from the Fox River and the lower 3 miles of Green Bay (97,800 cy/year [yr]). For cleaner material from Bay miles 3–11 (117,500 cy/yr), the preferred alternative is to restore portions of the Cat Island chain of islands in Green Bay. Over the 20-yr DMMP period, the USACE and the non-federal sponsor would construct three islands and an access road that would provide a placement site for the cleaner material and incidentally protect and restore the wetlands leeward of the islands. Figure 1 shows the project location, dredge areas, and disposal areas.

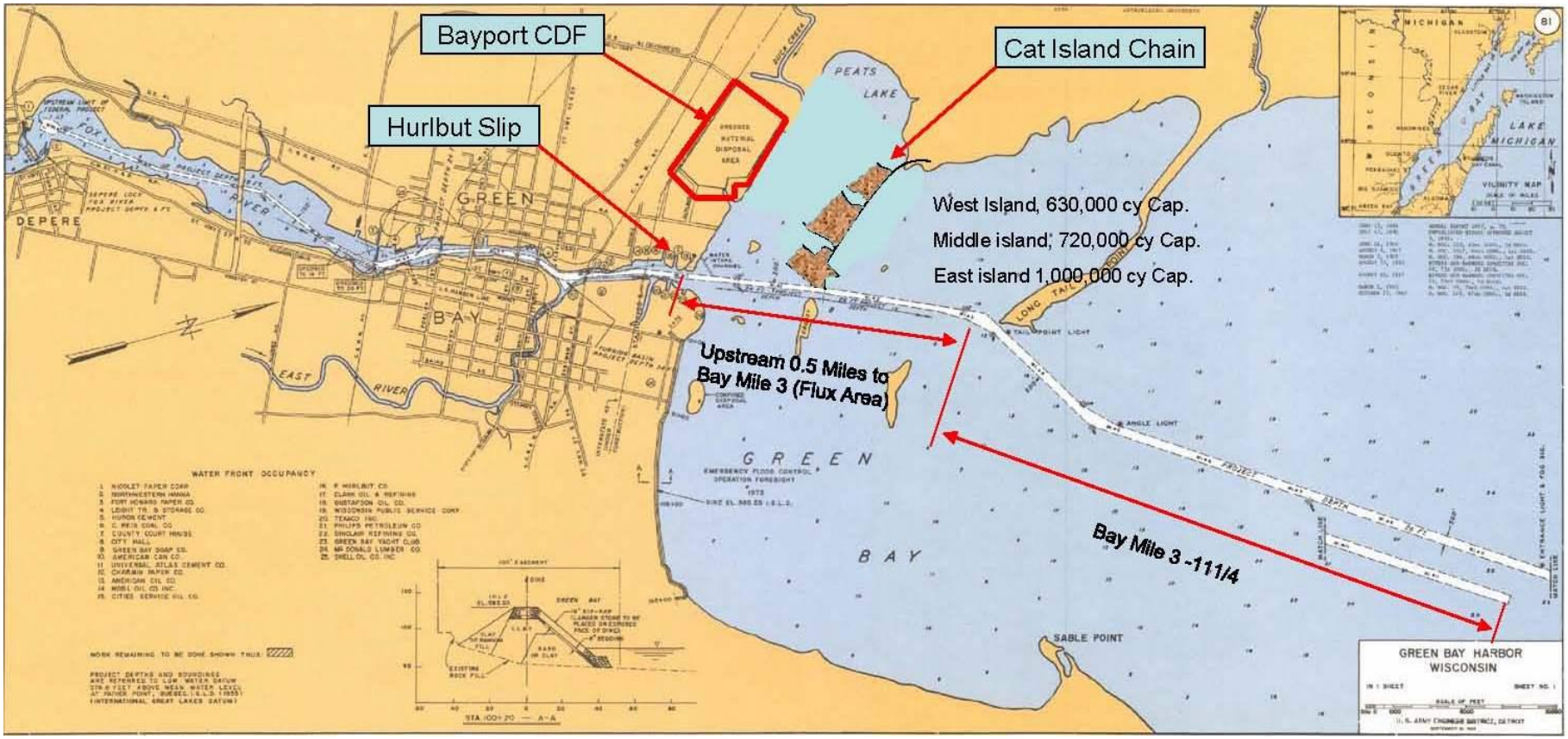

Figure 1. Map of Green Bay Project

3 IEPR Process

3.1 Planning and Schedule

The USACE emphasized the need to complete the IEPR in an expedited manner based on the schedule set forth in the Scope of Work (SOW) (USACE 2011). Therefore, Noblis developed an aggressive schedule that would meet USACE's goal of completing the task as efficiently as possible and proposed a project duration less than what USACE had set forth in the SOW. Certain aspects of the task were initiated before the task award date at no expense to the USACE, and certain phases of the project were carried out concurrently to enhance the project efficiency. Figure 2 shows the overall process highlighting the major activities of the IEPR conducted of the DMMP for Green Bay, Wisconsin.

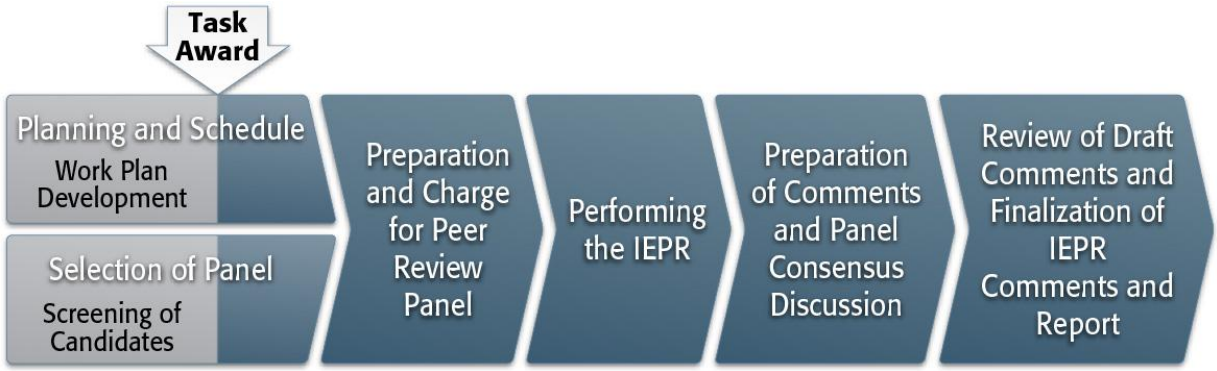

Figure 2. Green Bay IEPR Process

Noblis prepared a Work Plan to define and manage the process for conducting the IEPR, including the screening and selection of peer reviewers, communication and meetings with the USACE project team, project schedule and quality control, and compilation and dissemination of peer reviewers' comments. Upon review of the Draft Work Plan by USACE, the overall schedule was extended by four days at the request of USACE to allow appropriate time for USACE to review the final panel comments and provide responses, which established a project completion date of 15 June 2011, in the Final Work Plan. The schedule was further delayed by two days because of an unexpected power outage at the USACE Detroit District office that delayed USACE's responses to IEPR panel comments, extending the project completion date to 17 June 2011. A summary table showing the final schedule is presented in Table 1.

Noblis provided USACE with Project Status Reports on a biweekly basis to communicate the current status of the project. The Project Status Reports included details of each task and noted any schedule changes. Noblis performed the requirements of this contract in accordance with its Quality Management System, which is compliant with ISO 9000.

Table 1. Green Bay IEPR Project Schedule

Activity and Output	Completion Date
Planning and Schedule *(Task Award Date: 15 April)* Output: Final Work Plan	26 April 2011
Selection of Panel Output: Final Panel Members	26 April 2011
Preparation and Charge for Peer Review Panel Output: Final Charge	6 May 2011
Performing the IEPR Output: Panel Member Comments	20 May 2011
Preparation of Comments and Panel Consensus Discussion Output: Draft IEPR Panel Comments	24 May 2011
Review of Draft Comments and Finalization of IEPR Comments and Report Output: Final IEPR Comments (including responses and concluding "backcheck" comments) and Final IEPR Report	17 June 2011
Total Time to Completion	**46 working days**

3.2 Selection of Panel

Reaching out to its various pools of experts, Noblis identified experts who met and exceeded the technical expertise and requirements of this IEPR. Noblis provided potential candidates with a copy of the SOW, including the required expertise and project schedule, and conducted informal and formal discussions to identify any technical competency concerns or potential COI issues. Consistent with the guidelines of the OMB, the following were considered in the screening of the candidates:

- Expertise: Ensuring the selected reviewer has the knowledge, experience, and skills necessary to perform the review.
- Independence: The reviewer was not involved in producing the documents to be reviewed.
- COI: Any financial or other interest that conflicts with the service of an individual on the review panel because it could impair the individual's objectivity or could create an unfair competitive advantage for a person or organization.
- Availability: Candidates' availability to meet the project schedule.

After screening candidates to exclude those with inadequate expertise or potential COI issues in accordance with the requirements and guidelines of the National Academy of Sciences and OMB, seven candidates were selected for further screening and evaluation to ensure they met or exceeded the requirements of this task. Noblis provided the list of candidates along with their detailed résumés to USACE to identify any outliers who may have a potential COI based on USACE knowledge of the individual's past involvement with the Green Bay project. Also,

USACE acknowledged the proposed panel members' experience relative to the requirements of the IEPR. The list was then narrowed down to identify the most qualified candidates that would be available to serve on the Green Bay IEPR panel. Although a three-member panel would have met the minimum requirements of the SOW, Noblis decided to add a fourth member because of his extensive knowledge of Green Bay and Fox River, which Noblis believed would be important to the quality of this review, especially considering the ambitious project schedule. This panel member was assigned the role of Technical Advisor providing technical expertise and input to the three-member panel. A description of the panel is provided in Section 4.

3.3 Preparation and Charge for Peer Review Panel

USACE made available necessary project documents (listed in Appendix C) to Noblis via the file transfer protocol (ftp) site. Noblis set up a secure online collaboration site to provide IEPR panel members with electronic copies of the charge and the documents to be reviewed. Noblis communicated via email and held a kickoff meeting outlining the steps of the IEPR process, identifying the overall schedule and deadlines, and instructing the IEPR panel members how to access the documentation and undertake the review. Noblis requested all panel members review the DMMP for which USACE had requested comments, as well as additional supporting documents as background material for their reference.

Subsequent to a cursory review of the documents by the panel but prior to the actual detailed IEPR, a meeting was held with USACE via teleconference/WebEx to familiarize the IEPR panel members with the technical aspects of the project and the specific objectives of the review. As part of this meeting, USACE provided a detailed project briefing, reviewed project features and requirements, and provided the opportunity for the exchange of technical information between the panel and USACE technical staff. Noblis met with the panel members following the meeting with USACE to refine roles and responsibilities of the IEPR panel members to ensure proper coverage of all important issues. From this point on, Noblis was the conduit for information exchange between the panel and USACE in order to ensure a truly independent IEPR.

During the USACE kickoff meeting, discussions took place regarding the extent to which the economics and cost aspects would be reviewed considering the fact that the SOW did not require the panel to include a member with that specific expertise. Consequently, the final charge (see Appendix C) included one additional statement in the General Charge Guidance section (item #6), which states "The panel will evaluate the cost/economic aspects to the extent practical since, consistent with the requirements of the Statement of Work, the panel does not include an expert in the area of cost estimating expert/economist." The final Charge Questions developed and approved by USACE established the general boundaries for the IEPR and are summarized in Table 2.

Table 2. Green Bay IEPR Charge Questions

Green Bay IEPR Charge Questions
1. Were all reasonable nonstructural and structural management measures to address the problem identified and adequately considered?
2. Please comment on the scope and definition of the listed management measures.

3. Do the management measures provide a comprehensive set of features to help address the plan objectives?
4. Based on your knowledge, is the decision not to carry all the management measures forward (e.g., landfill cover, open-lake placement, etc.) to the detailed planning phase well-justified?
5. Does the proposed alternative meet the stated needs and objectives of the project to develop an implementable plan that is engineering, economically and environmentally sound?
6. Does the proposed alternative meet the stated purpose and need of the project at the least cost while minimizing environmental impacts and ensuring navigation safety?

3.4 Performing the IEPR

After the panel was oriented with the general scope and background information of the project, the panel initiated a detailed review of the DMMP and supporting documentation. The Green Bay IEPR involved conducting an independent technical peer review to analyze the adequacy and acceptability of environmental and engineering methods, models, data, and analyses presented in the DMMP. The review was limited to a technical review and was not involved with policy issues. The IEPR panel identified, recommended, and commented on the information presented in the DMMP relative to the charge.

Noblis conducted weekly meetings with the panel members during the IEPR to discuss progress and current observations/comments. These meetings ensured an exchange of technical information among the panel experts and reflected their diverse scientific backgrounds. This information exchange provided additional context to the reviewers, ensured that the scope of the review remained responsive to the charge, and was crucial in the development of the comprehensive peer review report. Schedule details were also discussed and panel members were made aware of upcoming activities and deadlines. Any identified information or documents that the panel required to support its review were noted. Noblis facilitated discussions between the panel and USACE in order for the group to agree on reasonable solutions to address the major technical issues raised during the course of the effort.

Noblis used internal tools to track comments, issues, and information requests by the panel members during the evaluation process. This enabled Noblis to request additional information and documentation from USACE that closed out some of the comments during the review process to the satisfaction of the panel commenter(s).

3.5 Preparation of Comments and Panel Consensus Discussion

After the IEPR review period ended and comments were submitted, Noblis collated the panel comments and ensured they were complete and responsive to the charge. Noblis ensured the panel focused on performing a technical review of the documents and avoided commenting on policy-related issues. Noblis convened a group consensus meeting via teleconference with the panel members to discuss the panel's comments. This meeting provided a forum for reviewers to reach consensus on the comments and to resolve any contradictions. Further refinement and consolidation of the comments occurred following the meeting via email exchange. The panel discussion resulted in draft comments that were sent to USACE for discussion.

Noblis identified overall themes that were presented by multiple peer reviewers or repeated by one reviewer, comments that indicated conflicting peer review opinions, and other noteworthy comments. Each comment was formatted into four parts: (1) a clear statement of the concern, (2) the basis for the concern, (3) the significance of the concern (the importance of the concern with regard to project implementability), and (4) the recommended actions necessary to resolve the concern to include a description of any additional research that would appreciably influence the conclusions.

3.6 Review of Draft Comments and Finalization of IEPR Comments and Report

Noblis provided a draft of the consolidated IEPR panel comments to USACE and held a teleconference with USACE and the IEPR panel to review the draft comments. The teleconference provided the forum to assess the factual accuracy of the panel comments, seek any needed clarification, and discuss specific technical positions. Based on verbal discussions with USACE, some comments were withdrawn once USACE provided clarification and additional information regarding the factual accuracy of a few topics. Subsequent to this discussion with USACE, updates were made to the IEPR draft panel comments as necessary resulting in 16 final comments included in this report and entered into the USACE Design Review and Checking System (DrChecks), the USACE central repository of information for all IEPRs. The final IEPR panel comments are presented in Appendix A.

Noblis used DrChecks to track the final comments of the IEPR panel, the development of USACE responses to those comments, and the panel's concluding "backcheck" comments. All responses provided by USACE and panel are labeled as "concurrence" or "non-concurrence" to indicate agreement or non-agreement, respectively, on whether the concerns identified by the panel needed to be addressed in the body of the DMMP. The formal record of the USACE's responses to comments and panel's backcheck comments are captured in DrChecks.

In developing the responses to the IEPR panel comments, the Detroit District Project Delivery Team (PDT) reviewed the panel comments and then met to discuss each comment. Individual PDT members were assigned to respond to each of the comments. They were asked to discuss the merit of the comment and the level of response necessary. The PDT members, as well as Division and Headquarters representatives, reviewed the comments and responses and determined the significance of the issue.

After the USACE submitted the responses to the IEPR comments, Noblis met with the panel to discuss the responses and the approach for preparing the concluding backcheck comments, which were to provide concurrence or non-concurrence with the USACE responses on whether the identified concerns were adequately addressed. After Noblis input the panel backcheck comments to the USACE responses to comments, the issue was closed out. Once all issues were closed out, Noblis provided USACE with a Portable Document Format (PDF) printout of the project file.

Minor editorial changes were not included in the final set of comments unless they affected the technical understanding of the documents. A listing of the editorial comments is included in Table A-2 of Appendix A.

4 Panel Organization

Noblis assembled a panel of experts to conduct the IEPR, responsible for reviewing and providing comments on the DMMP for the Green Bay, Wisconsin project. Noblis guided communications between the panel and USACE to complete the IEPR project.

4.1 Panel Description

Noblis selected three panel members providing expertise in the areas of environmental, civil/structural engineering, and dredging and dredged material management. All panel members met and exceeded the minimum requirements for each of the specified areas of expertise. The panel represented a well-balanced mix of individuals from academia, large companies and small consulting firms, and individual consultants.

In addition, recognizing the importance of site-specific knowledge and expertise related to Green Bay and Fox River, Noblis selected a Technical Advisor to assist the panel and provide input in relevant subject areas. The selected advisor is familiar with Section 404 and Section 10 regulations for federal permits and the state requirements for Michigan, Illinois, and Wisconsin. The Technical Advisor had also been working with the Wisconsin Department of Natural Resources on the environmental clean-up of Fox River offering extensive expertise and current knowledge of activities related to dredging and disposal of Fox River sediments. The Technical Advisor was not included as a formal member of the panel to avoid any perceived COI issues. The IEPR Panel considered input and comments from the Technical Advisor as it formulated its formal comments and recommendations.

Figure 3 outlines the members of the IEPR Team. Table 3 presents the list of IEPR panel members and Technical Advisor and associated qualifications to participate in this IEPR. Panel member résumés are included in Appendix B.

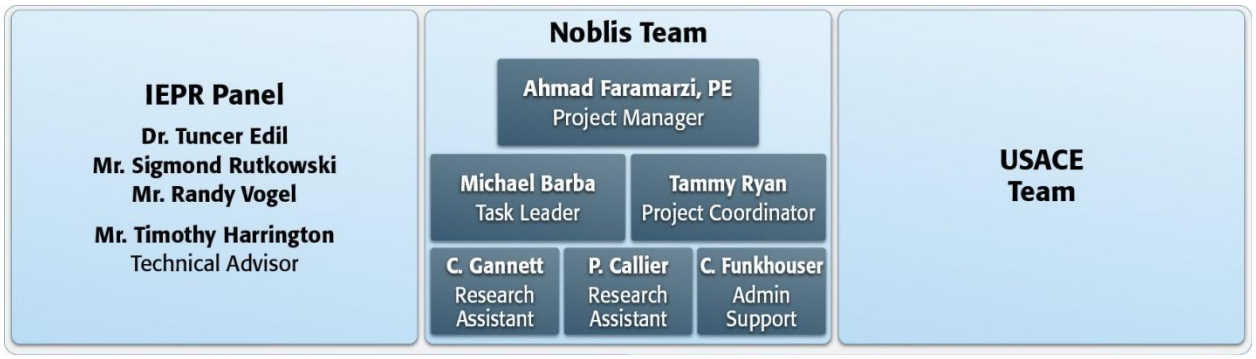

Figure 3. IEPR Team

4.2 IEPR Panel Members

Dr. Tuncer Edil, PH.D., P.E., D. GE, Fellow, American Society of Civil Engineers (ASCE)
Dr. Edil received his B.S. and M.S. degrees from Robert College in Istanbul, Turkey, and his Ph.D. from Northwestern University, all in civil engineering. He is a member of the Academy of Geo-Professionals and a licensed Professional Engineer in Wisconsin. Dr. Edil has been an active researcher and educator for nearly 40 years at the University of Wisconsin-Madison, and is currently serving as Research Director of the new Recycled Materials Resource Center sponsored by the Federal Highway Administration. His research interests are in the areas of

geotechnical and geoenvironmental engineering including soft materials engineering and improvement, use of geosynthetics, coastal erosion and landslides, use of recycled materials and sustainable construction, and landfill liners and chemical transport. He has published over 350 papers in the field of geotechnical and geoenvironmental engineering. Dr. Edil is a former Editor-in-Chief of the ASCE's *Journal of Geotechnical Engineering* and current Editor-in-Chief of the journal *Geotechnical and Geological Engineering*. He served as President of the U.S. Universities Council on Geotechnical Engineering & Research and President of the ASCE Wisconsin Section. Dr. Edil is recipient of numerous personal and team/project awards from ASCE, American Society for Testing and Materials, and other organizations.

Mr. Sonny Rutkowski Mr. Rutkowski has extensive involvement with regional dredging and beneficial use projects including both state and federal permitting and engineering design. With an M.S. degree in ocean engineering, Mr. Rutkowski has more than 16 years of experience in design, coordination, and management of marine engineering, water resources engineering, port, and dredging projects. He is a regional expert in the National Environmental Policy Act (NEPA) process for coastal development projects coordinating habitat evaluations and aquatic toxicology analysis, and is responsible for successfully obtaining over 20 Water Quality Certificates, Chapter 105 permits, and Section 10 permits from the Pennsylvania Department of Environmental Protection (DEP), New Jersey DEP, Delaware Department of Natural Resources and Environmental Control, and the USACE for dredging and marine construction projects on the Delaware River. Mr. Rutkowski is experienced in design and permitting of marine structures including revetments, bulkheads, and breakwaters, with expertise in a variety of shore protection, beach nourishment, navigation channel, and land reclamation projects. He has evaluated sediment transport budgets for the design of beachfills, with over five years of field experience in hydrographic surveying and the use of global positioning system (GPS) and real time kinematic (RTK) GPS vessel positioning, computerized navigation, and data logging including single, dual frequency, and multi-beam sweep depth sounding.

Mr. Randy Vogel Mr. Vogel has over 25 years of professional experience in natural resource planning, impact analysis, and habitat restoration. With an M.S. degree in botany from Eastern Illinois University, Charleston, his educational training was as a plant taxonomist and ecologist and his experience includes mine reclamation, natural resource inventories, urban forestry, stream restoration, stormwater treatment, wetland development and restoration, and mitigation banking. As a Principal/Senior Ecologist with AES, he directs numerous complex ecological and planning projects nationwide.

Previously, Mr. Vogel worked in a state regulatory capacity. He served as Manager of the Mining Program for the Illinois Department of Conservation where he supervised review of surface mining permits and development of environmentally and ecologically sound reclamation methodologies. He was also employed in the not-for-profit sector where he was actively involved in issues related to urban forestry, invasive plants (including development of protocols for quarantine and testing of new ornamental plant introductions), and accidental exotic insect introductions. Mr. Vogel has supervised numerous projects related to watershed planning and natural resource inventories. He also has been actively involved in the design and construction of stormwater Best Management Practices (BMPs) in the watershed and in overall ecological restoration of disturbed lands. Mr. Vogel is currently directing AES's involvement in the update of the Illinois Natural Areas Inventory including field operations and geographic information system (GIS) data management. He also directs AES's involvement in wetland mitigation

banking activities, directing planning, construction, monitoring, and maintenance activities for five wetland mitigation banks.

Mr. Timothy J. Harrington, P.E. (Technical Advisor to the IEPR panel) Mr. Harrington was born and grew up in Plainwell, Michigan. He graduated from Michigan State University with a B.S. degree in civil engineering and an M.S. degree in geotechnical and structural engineering. After graduation, he worked for six years for D'Appolonia Engineers in Pittsburgh, Pennsylvania, and Albuquerque, New Mexico. He worked on nuclear power projects in the areas of soil dynamics, soil-structure interaction, and numerical analysis, as well as on the Waste Isolation Pilot Plant project on the time-dependent closure of salt beds storing nuclear waste.

In 1981, Mr. Harrington joined the Canonie Companies of South Haven, Michigan, working in the environmental services division. He rose from project engineer to vice president of Canonie Environmental. The Canonie company was the largest specialty earthmoving contractor in the United States in the late-1970s and had a marine contracting division that operated on the Great Lakes. Mr. Harrington supported conventional marine work and directed design/construct work for the environmental division through 1995. In 1996, Mr. Harrington started Harrington Engineering & Construction, consulting for marine contractors and industry on projects throughout the United States and overseas. In 2006, Mr. Harrington merged the operation of Harrington Engineering & Construction into the predecessor of Aether DBS. Mr. Harrington has continued to perform work in environmental dredging and has worked on many environmental dredging projects within the United States. Mr. Harrington is registered to practice engineering in ten states including Wisconsin, and lives near Valparaiso, Indiana, near the south end of Lake Michigan.

Table 3. Green Bay IEPR Panel

		Dr. Tuncer Edil	Mr. Sigmond Rutkowski	Mr. Randy Vogel	Mr. Timothy Harrington
	Highest Degree	Ph.D.	M.S.	M.S.	M.S.
	Years of Experience	40	16	25	35
	Past Experience with USACE Projects	●	●	●	●
	Affiliation (e.g., academia, consulting firm, government, etc)	Academia	Consulting	Consulting	Consulting
Environmental Specialist	Expertise in aquatic ecology		●	●	
	≥10 years experience directly related to water resources evaluation or review		●	●	
	Particularly knowledgeable of Great Lakes coastal and wetland ecosystems		●	●	●
	≥5 years experience directly working for or with USACE is highly recommended		●	●	●
Civil/ Structural Engineer	≥10 years experience in academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with demonstrated experience in the design and construction of navigation structures		●		
	Licensed Professional Engineer		●		●
	≥5 years experience with the development of large civil works navigation projects		●		
	Particular knowledge of the Great Lakes, with particular experience in the design and construction of structures on the Great Lakes		●		●
Dredging and Dredged Material Management Specialist	Experience in dredging operations, transport, and dredged material placement	●			●
	≥10 years demonstrated experience in planning, design, and construction of dredging projects, particularly those in the Great Lakes	●			●
	Familiar with all applicable USACE regulations pertaining to dredged material placement	●			●

4.3 Noblis Team

The Noblis Project Management Team (as outlined in Figure 3) included the following members:

Mr. Ahmad Faramarzi, PE, Project Manager, supervised project personnel and communicated policies, procedures, and goals to these employees, and maintained regular contact with the USACE. Mr. Faramarzi was responsible for the overall project plan, project performance, and client satisfaction on project tasks.

Mr. Michael Barba, Task Leader, developed the Work Plan and provided technical leadership in managing the IEPR activities.

Ms. Tammy Ryan, Project Coordinator, supported the Project Manager on all IEPR tasks, including the identification and recruitment of candidates for the expert panel. Ms. Ryan also supported Mr. Barba in coordinating Green Bay IEPR activities.

Ms. M.R. "Peaches" Callier and Ms. Christina Gannett served as Research Assistants and supported the IEPR activities on an as-needed basis.

Ms. Carolina Funkhouser provided Administrative Support for the project.

5 Conclusions and Observations

The Green Bay IEPR resulted in several comments on the adequacy of the information presented in the DMMP, as well as the information that was not found and recommended to be included. In general, the comments identify shortcomings and offer considerations that would improve the technical adequacy and overall quality of the DMMP. The comments also include a number of issues that should be addressed so the DMMP can be comprehensive in its representation of all factors that should be considered in determining the preferred alternative.

The general themes of the technical comments cover issues that are instrumental in being able to fully understand the technical information and rationale for the selected alternatives discussed in the DMMP. There are also a few comments regarding the overall design and approach of the preferred alternative that were not identified in the DMMP. Other comments include proposed measures to improve the design, operations, and maintenance that reduce costs and enhance the life of project resources. Many of the comments relate to the clarifications of cost and engineering factors that were considered in the evaluation of alternatives. Some issues presented in the IEPR comments pertain to modifying the construction/configuration of the islands to optimize both cost and storage, identifying and addressing issues involved in the maintenance of the islands, and the need to address issues regarding the design of the wave barrier and access road. Comments were rated as "high," "medium," or "low" to indicate the general significance the comment has to the sufficiency of the DMMP.

In general, the panel acknowledged that the DMMP assembles all viable alternatives, including consideration of no-action and open-water alternatives for the placement of dredged material from Green Bay Harbor. The DMMP identified the analyses, methods, and models used in evaluating each alternative and determining the selected alternative. However, several assumptions underlying the methods and models were in question or not clearly identified or discussed in the DMMP. For example, design conditions anticipated over the duration of the project and certain factors dependent on the design life of the project were unclear. The panel raised several key cost and technical considerations that could affect the selection of the preferred alternative. These considerations are essential for the DMMP to completely represent all factors in the appropriate selection of the preferred alternative.

Economics. In terms of an economic evaluation, the DMMP did include appropriate analysis for evaluating the cost impacts associated with each alternative being considered. The methodology and approach incorporated into the cost analysis were adequate for properly evaluating and comparing costs. To account for cost analysis uncertainties, the USACE has indicated that the DMMP analysis included a cost contingency allowance. Given that cost is a key factor in the selection of the preferred alternative, the selection could be affected depending on the assumptions and data used in preparing the cost analysis. The panel understands that a more detailed analysis of the selected alternative will be performed as part of the final design, which should provide more detailed and up-to-date cost information.

Engineering. Since the DMMP included detailed drawings and information for the preferred alternative, the panel focused on the design of the Cat Island chain alternative. The engineering

principles and methods used in conducting a design analysis and developing the conceptual design were sound. The panel's comments primarily relate to the lack of sufficient data and important considerations needed to improve the analysis. The panel recognizes that this is not the final design and that additional detailed analyses will be performed to address the identified concerns.

Environmental. The DMMP presented specific environmental benefits associated with the preferred alternative. The panel acknowledged that the DMMP recognizes the important consideration of involving different stakeholders including regulatory agencies and local communities as part of the planning process. The panel did identify certain environmental considerations that were not included in the DMMP that pertain to negative environmental impacts that could result from the project. The panel recognizes that permitting aspects and additional measures to mitigate environmental impacts will be addressed in later phases of the project.

A number of editorial comments were also provided. Although they should be addressed to improve the overall quality of the DMMP, they are not included in the final list of IEPR comments submitted into DrChecks. These editorial comments are provided in Appendix A.3 of the report.

6 References

Agency Technical Review Comments and Responses. Provided by USACE Detroit District.

Department of the Army. 2010. USACE Engineer Circular (EC) No. 1165-2-209, *Civil Works Review Policy.* 31 January.

Fact Sheet, Evaluation of In-Water Placement Alternatives for the Green Bay Dredged Material Management Plan (White Paper). Provided by USACE Detroit District.

Office of Management and Budget (OMB). 2004. *Final Information Quality Bulletin for Peer Review*, released 16 December.

USACE Detroit District. 2005. *Cat Island Chain Restoration Design Development Report.* Prepared by W.F. Baird & Associates Ltd. April.

USACE Detroit District. 2007. *Value Engineering Study Report On Cat Island Chain Restoration CAP Section 204.* September.

USACE Detroit District. 2010. *Phase II Report, Dredged Material Management Plan Study, Green Bay Harbor, Wisconsin.* November.

USACE Detroit District. 2011. *Green Bay Dredged Material Management Plan Independent External Peer Review Scope of Work*. March.

Appendix A – IEPR Comments

A.1 Final IEPR Comments in DrChecks

This Appendix provides the Green Bay IEPR comments on the DMMP for Green Bay, Wisconsin. The comments cover a range of issues that pertain to the technical aspects of the DMMP. Each comment is formatted into four parts that include the following: (1) a clear statement of the concern, (2) the basis for the concern, (3) the significance of the concern (the importance of the concern with regard to project implementability), and (4) the recommended actions necessary to resolve the concern to include a description of any additional research that would appreciably influence the conclusions. Comments were rated as "high," "medium," or "low" to indicate the general significance the comment has to the sufficiency of the DMMP. The significance ratings are applied using the following criteria:

- High = Describes a fundamental problem with the project that could affect the recommendation or justification of the project
- Medium = Affects the completeness or understanding of the recommendation or justification of the project
- Low = Affects the technical quality of the reports but will not affect the recommendation or justification of the project

A.2 Summary of Comments

Following is a listing of the final comments submitted to DrChecks.

Table A-1. Overview of Final Comments Identified by IEPR Panel

Significance – High	
1	The DMMP should address the impact of bearing stability, slope stability, and settlement of the islands.
2	The DMMP should include additional information and changes for the cost estimation methodology, approach, and data.
3	The Cat Island design basis and discussion of the overtopping impacts with respect to revetment elevation need to be clarified, and if a longer duration than 20 years is intended, the impact on the cost of Alternative 7 needs to be factored into the DMMP.
Significance – Medium	
4	It is not clear whether the DMMP adequately addresses the cost to import/export these commodities using alternate transportation (rail, trucking, or other ports).
5	There are several issues regarding the storage capacity and configuration of the islands. The DMMP should be updated to adequately address these issues.
6	How the access road was modeled and its response to hydraulic forcing is not clear.
7	There should be a containment berm constructed on the leeward side of the islands, and at minimum, a temporary berm should be used during dredged material placement, especially for hydraulic placement.

8	The conclusion that there is no negative risk associated with the vegetative protective habitat is unsupported.
9	The economics of source reduction measures should be considered in alternatives development in the DMMP.
10	The DMMP should specify whether the 400,000 cy of dried material from Bayport Confined Disposal Facility (CDF) to be used as a cap for Renard Island would be classified as "unrestricted."
11	Permitting requirements, particularly associated with wetlands impacts, should be addressed in the DMMP.
12	The effects of the inter-island openings during the 20-yr project duration period and the possibility that the openings may never be created should be discussed in the DMMP.
Significance – Low	
13	Appendix A of the DMMP does not clearly present the purpose of the pipeline.
14	The value added by the center berms is not apparent given the cost, and eliminating some or all of the center berms should be considered.
15	Hopper dredges do not necessarily need to moor at a bulkhead to pump out, which is indicated in Appendix C.
16	The design for the width of the crest should be revised.

The following pages outline the Comments in detail (as entered into DrChecks), including the four-part analysis. The comments are sorted based on their designated significance (High, Medium, or Low) in regards to the sufficiency of the DMMP.

Comment 1:
The DMMP should address the impact of bearing stability, slope stability, and settlement of the islands.
Basis for Comment:
The access road and West Cat Island are proposed on very loose (likely organic) sediment formations shown in Borings CI-3-97 and CI-3-07 in Appendix B. The analysis for settlement in Appendix B shows a settlement of 4-inches based on data from the more competent sediments in the other borings or from CI-3-07 at +40 feet (ft) below sediment surface. The panel believes actual conditions could lead to large settlements or even sliding or bearing failure of the wave barrier and parts of the West Cat Island or east end of the access road. Toe scouring and undermining of marine structures is a very common mode of damage and failure, often leading to costly future repairs. Failure to incorporate these findings into the DMMP could: 1. Impact shot rock quantities and the large stone quantities in the wave barrier and maintenance expenses to keep the wave barriers and the access road at the correct elevation; 2. Result in instability during construction or from scour induced by waves and currents from sinking the wave barrier into the underlying formations; or 3. Result in substantial project cost overruns for installation of extra core stone, armor stone, or apron stone.
Significance: HIGH
The DMMP does not adequately address the impact of bearing stability, slope stability, and settlement of the islands and these impacts on cost, which is significant for the overall selection of an appropriate design.
Recommendation(s) for Resolution:
The DMMP should clearly discuss how the access road and wave barrier settlement and stability issues in areas of very loose or soft foundation soil are addressed and if such considerations are reflected in the cost calculations.

Comment 2:
The DMMP should include additional information and changes for the cost estimation methodology, approach, and data.
Basis for Comment:
Although the panel did not include an expert in the area of cost estimating, it performed a review of the construction cost estimates for the DMMP with primary focus on the two alternatives that use the Bayport facility for Inner Harbor sediment and either Cat Island or Open Water Disposal for the Outer Harbor Sediments. The report develops a cost for dredging, transporting, and pumping off the mechanically dredged sediment from the Outer Channel of $12.22/cy. The estimate further breaks down the cost of dredging ($8.69/cy) and a pump off ($3.53/cy). These costs seem comparable to the rates in the Great Lakes from 2009. However, Appendix C does not develop a similar level of detail for Alternative 9 to dredge the Outer Channel and transport for open water disposal off the Sturgeon Bay channel in Lake Michigan. For the open channel alternative, a cost of $67.10/cy is used in the summary cost sheets. If the dredging of $8.69/cy is subtracted, the transport and dumping cost must be $58.41/ cy. For a roundtrip distance of 100 miles (DMMP Figure 8), the estimate seems particularly high. The attached spreadsheet prepared by the panel provides a rough order of magnitude analysis for a probable cost of the transport. Considering the panel's estimate, it seems that the cost differential of Alternative 9 and 11 in comparison to Alternatives 7 and 11 is not that significant. Appendix C indicates that all cost is in present-day dollars, but some costs do not reflect the 2011 cost data. It is not clear what the USACE policy is regarding cost analysis basis. The panel questions if the cost estimates need to be updated to the 2011 cost basis in order for the USACE to make a decision regarding the alternatives. For example, fuel cost is estimated at $2.50/gallon (gal) while today's cost for off-road diesel is closer to $3.68/gal. The estimate in Appendix C does not indicate that the cost for stone was validated by checking prices with quarries in the vicinity or recently completed projects. It is not clear if the DMMP O&M cost estimates in Appendix C include maintenance of the wave barrier to the correct elevation, armoring the channel bottoms between the islands, and vegetation of the finished islands. The DMMP should provide additional information regarding the consideration of the costs of these items. As discussed in Appendix F, the dredging cost is developed using a 10-cy bucket (clamshell) mechanical dredge. Hydraulic cutterhead dredging was not considered in the cost analysis. A hydraulic dredge fitted with a booster pump would be feasible to span most of the channel length and would likely be more cost effective. If there is a reason for not using a hydraulic dredge, this should be explained in the DMMP narrative. The value of 8% estimated for inspection/supervision seems high for alternate components that are only dredging but may not be enough for island or wave barrier construction components. It might be more accurate to build up the inspection/supervision cost using manpower, rates, labor hours, and duration of projects. There is significant uncertainty if dredge materials can be used for forming beach. The cost analysis appears to assume that dredge material will be acceptable for beach. Furthermore, if the

beach materials are finer than assumed, then the beach slope will extend farther and possibly exceed the extended lake bed permit limit. Mobilization/de-mobilization are considered fixed costs but are not necessarily fixed. Experience and the history of the dredging costs provided in this study show great variability. Although difficult to predict, these costs vary greatly from year to year depending on market factors, fuel prices, etc.
Significance: HIGH
The DMMP does not contain certain information on the cost estimation methodology, approach, and data such that the cost of the project and justification for the cost can be adequately presented.
Recommendation for Resolution:
The DMMP should be revised to include explanations on the cost methodology, approach, and data particular to the: • Assumptions for dredging and transport for open water disposal in Alternative 9 • Use of cost data not representative of present-day values • Validation of checking prices of the cost for stone with quarries in the vicinity or recently completed projects • Maintenance of the wave barrier • Reasons for not using a hydraulic dredge • Justification for using 8% for inspection/supervision • Level of certainty that dredge materials can be used for forming beach • Costs associated with mobilization/de-mobilization and whether these should be considered fixed

Comment 3:
The Cat Island design basis and discussion of the overtopping impacts with respect to revetment elevation need to be clarified, and if a longer duration than 20 years is intended, the impact on the cost of Alternative 7 needs to be factored into the DMMP.
Basis for Comment:
The DMMP does not provide a clear basis regarding the expected design life of the Cat Island approach, Alternative 7. The design basis is suggested as a 20-yr return period wave on page D-55 of Appendix D, which is the same standard used in the DMMP text. However, Appendix C uses A 50-yr project life (page C-11). DMMP states that +8 ft Low Water Datum (LWD) is the standard for the top of the wave protection. Appendix A, Sections C1 and C2, Attachment B, page A-14 shows +8 ft top of armor stone. If the design standard is a 20-yr return period and the lake elevation plus surge from Table 2.1 of Appendix D has a 3.3-ft wave added onto the seiche stilling elevation, the wave will just overtop elevation +8 ft. If the standard is a 100-yr design life, then the wave is added to a maximum stilling level of +8 ft, and a final elevation of +10 ft seems more appropriate to ensure the breakwater at Cat Island will not be overtopped during the design life. Depending on the sensitivity to overtopping, the current elevation could be overdesigned or underdesigned. It appears that the current design allows a certain amount of overtopping; however, the acceptable quantity of overtopping and the level of expected damage to the facilities considering both the extreme events and the cumulative impacts from multiple events over the life of the facility need to be stated. In this case, it may be more cost effective to allow certain quantity of overtopping from run-up of a certain return period design condition (wave height, wave period, and seiche elevation), but use smaller stone or an erosion mat to protect the adjacent surface of the Dredged Material Disposal Facility (DMDF) from damage due to the overtopped water.
Significance: HIGH
DMMP does not adequately discuss the design basis of acceptable overtopping in view of the revetment elevation and physical and cost impacts of overtopping, which are important considerations in the selected design of the project.
Recommendation for Resolution:
The DMMP should clearly discuss the design basis of acceptable overtopping in view of the revetment elevation and physical and cost impacts of overtopping.

Comment 4:
It is not clear whether the DMMP adequately addresses the cost to import/export these commodities using alternate transportation (rail, trucking, or other ports).
Basis for Comment:
Albeit the environmental impacts would be greater for the case of trucking, this should be considered for the cost/benefit. To that end, environmental impacts and risks associated with lightering and more shoaling (grounding of ships) should be considered as well. Also, market adjustments and benefits to other ports from diverted cargo must be considered to truly evaluate the project from a national cost/benefit perspective. Federally-funded projects are typically evaluated from the net benefits to the entire nation.
Significance: MEDIUM
The DMMP does not clearly analyze the cost to import/export the commodities using alternate transportation (rail, trucking, or other ports) important for adequately understanding whether a complete cost/benefit analysis has been performed.
Recommendation for Resolution:
The DMMP should clearly discuss the extent to which alternative transportation was considered in the cost/benefit analysis. This analysis is important so that these considerations are adequately represented in the determination of the preferred alternative.

Comment 5:
There are several issues regarding the storage capacity and configuration of the islands. The DMMP should be updated to adequately address these issues.
Basis for Comment:
As a standalone document, the DMMP should provide sufficient information regarding how storage capacity and the size and shape of the islands were determined. Storage Capacity: It is not clear how the storage capacity of the islands was computed: whether the self-settlement and dewatering and the consequent volume decrease was included in the analysis, or whether the settlement of the foundation of the islands was included in the analysis, as soft soil conditions are indicated in some borings. Size and Shape of the Islands: Questions that arise without knowing the basis for the determination of the size and shape of the islands include: (1) Why was a different island size not considered? (2) Given the overall value increases with more islands constructed, could the islands be expanded in size both vertically and areally to store more material? (3) Why was a different island configuration not considered? The largest construction cost appears to be stone because it is required in larger quantities on the north (northeast) revetments where waves are higher. Islands could be made shorter west to east and longer north to south. With less northeast frontage, the revetment cost would be less. The access road could have been made sacrificial upon completion of the islands, and become a submerged breakwater striking a balance between wave protection and circulation. Specifically, more value would be gained by evaluating the cost impacts of different island configurations, revetment designs, and the cost impacts for different overtopping scenarios as well as the environmental impacts/benefits of such. Additional alternatives should be considered, which could have saved costs.
Significance: MEDIUM
The DMMP does not clearly address issues regarding the storage capacity and configuration of the islands important for determining the most appropriate design of the preferred alternative.
Recommendation for Resolution:
The DMMP should be revised to include explanations of: • How the storage capacity of each island was calculated including the assumptions • How the island size (area and height), shape, and orientation were optimized • How the revetment design was optimized

Comment 6:
How the access road was modeled and its response to hydraulic forcing is not clear.
Basis for Comment:
The partial removal of the access road from the mainland to the West Island appears to be a good balance between allowing circulation and maintaining some wave protection. The report should assess the potential damage to these mini-islands given they will have smaller stone exposed to waves. The partial access road to remain did not appear to be considered in the STFATE modeling of Baird's Hydraulics and Hydrology analysis report (Appendix D).
Significance: MEDIUM
The DMMP does not clearly identify how the access road was modeled and its response to hydraulic forcing, important for understanding whether key considerations and impacts are properly addressed.
Recommendation for Resolution:
The DMMP should clearly discuss how the access road was modeled and its response to hydraulic forcing to ensure impacts to the access road are properly addressed.

Comment 7:
There should be a containment berm constructed on the lee side of the islands, and at minimum, a temporary berm should be used during dredged material placement, especially for hydraulic placement.
Basis for Comment:
A cross-section of a containment berm for this area was not shown or discussed. A containment berm must be engineered to withstand static pressure of the slurry during placement, and contain fugitive fines from forming a potentially damaging plume. Sand or fine grained material can be used to construct the berm and is often the primary material used because of its relative lower cost when compared to stone, but it must be compacted to gain the necessary strength.
Significance: MEDIUM
The DMMP does not show a containment berm in the design, which is important for mitigating adverse impacts during the dredged material placement.
Recommendation for Resolution:
The design of the islands in the DMMP should include a containment berm on the lee side of the islands, and at minimum, a temporary berm used during dredged material placement, especially for hydraulic placement. The containment berm should withstand static pressure of the slurry during placement, and contain fugitive fines from forming a potentially damaging plume.

Comment 8:
The conclusion that there is no negative risk associated with the vegetative protective habitat is unsupported.
Basis for Comment:
The following verbiage is included: "Any vegetative protective habitat will be an improvement over existing conditions. As such, there is no negative risk." This claim is unsupported. Plans are to allow the islands to vegetate via the seedbed in the sediments. Disturbed areas are ideal locations for colonization by invasive species and such species have become very prevalent in the upper-Midwest. With current plans, these islands could become large repositories of invasive species and a source for contamination of other areas in the region. This could be avoided via seeding with native species and active management to control invasive species. This potential problem was also noted by the U.S. Fish and Wildlife Service. USACE should be responsible for a final vegetative cover for each island as constructed and for management of the entire area until closure rather than stipulating this can be done by others. Similar to Mitigation Regulations, the USACE should consider establishing a five-year monitoring plan for the facility focused on invasive removal and replanting high-value species. The beaches on the leeward side of the island will provide attractive habitat for birds, especially gulls. It has been documented that near-shore pollution of Great Lakes beaches and many other bound water bodies can be partially attributed to bird droppings as a result of avian use of those beaches. The concentrations of birds on the Cat Island beaches can be anticipated to be very high, but there was no discussion of the quantity of guano or the impacts on water quality as it washes into the lake. The impacts of this increased nutrient and bacterial loading was not discussed as an issue in the island alternatives. This is especially important since the islands and wave barriers will inhibit water exchange in the leeward areas, and there is potential for algae blooms and other issues that could negatively affect the ability to achieve the environmental goals that are sought in these leeward areas. The effects of increased siltation in Pete's Marsh and Duck Creek Wetland as a result of the project have not been adequately addressed. The environmental acceptability of the Base Plan is partially predicated on no negative impacts to Pete's Marsh and Duck Creek Wetland and environmental benefits are projected as a result of restoration of aquatic vegetation. The environmental acceptability of the Base Plan may not be as represented. For instance, will construction of the road and West Island result in Pete's Marsh silting in? Will siltation inhibit the desired establishment of aquatic macrophytes in open water areas? Page 113 of Cat Island Chain Restoration, Design Development Report (Baird Report, April 2005) actually states that optimum conditions for promoting restoration requires sediment loads from Duck Creek and the Fox River to be managed at levels prior to 1973 and that this was beyond their scope.
Significance: MEDIUM
The DMMP lacks a complete discussion of the environmental impacts associated with the project important for fully identifying all impacts, risks, and costs resulting from project implementation.

Recommendation for Resolution:
The DMMP should fully identify reasonable environmental risks associated with the proposed project and consider solutions to manage the identified risks. Such risks include invasive species and water quality impacts from guano. Determining the preferred alternative should consider resulting impacts that will affect the overall cost and risks associated with the project, and in the case of siltation and water pollution concerns, the environmental acceptability of the preferred alternative.

Comment 9:
The economics of source reduction measures should be considered in alternatives development in the DMMP.
Basis for Comment:
The alternatives did not include an assessment of source reduction of sediments entering the bay from the Fox River and Duck Creek. Best Management Practices in the watershed could reduce the sediment load entering the bay. This could potentially reduce the amount of dredging required in the inner harbor and/or reduce the size of the storage facilities. The inner harbor area is also the source of contaminants requiring expansion of the Bayport CDF for disposal of the contaminated dredge materials. One issue to examine is whether there would be a need for the Bayport facility if source reduction measures were implemented. This should be addressed.
Significance: MEDIUM
The DMMP does not evaluate source reduction measures as part of the alternatives, which would address the long-term problem of reducing the quantity of dredged material.
Recommendation for Resolution:
The DMMP should include an assessment of source reduction measures as an alternative. Doing so addresses the source of the problem to deal with the quantities of dredged material and can ultimately reduce lifecycle costs. If this assessment is beyond the scope of the DMMP and control of USACE, the DMMP should define the spectrum of alternatives for consideration (i.e., alternatives that only address the management of a given amount of dredged material after dredging). Additionally, this recommendation should be shared with other future USACE dredged material management projects as appropriate.

Comment 10:
The DMMP should specify whether the 400,000 cy of dried material from Bayport Confined Disposal Facility (CDF) to be used as a cap for Renard Island would be classified as "unrestricted."
Basis for Comment:
Use of 400,00 cy of dried material from Bayport CDF as a cap for Renard Island is included in Alternative 11, which is part of the Base Plan. No information was found regarding whether this material would be classified as unrestricted and could in fact be used for this purpose.
Significance: MEDIUM
Identifying whether the dried material from Bayport CDF to be used as a cap for Renard Island is classified as "unrestricted" is important for understanding environmental and cost impacts.
Recommendation for Resolution:
The DMMP should specifically state that the dredge material from the Bayport CDF to be used as a cap for Renard Island is "unrestricted" material.

Comment 11:
Permitting requirements, particularly associated with wetlands impacts, should be addressed in the DMMP.
Basis for Comment:
The Base Plan will result in wetlands impacts. There was no discussion of permit requirements related to these impacts and more specifically how they will be mitigated. The USACE's own regulations in 33 CFR Part 332 stipulates requirements such as the need for a specific mitigation plan, financial assurances including funds for long-term maintenance, and site protective instruments. Although these might be included as the terms of a permit, these and any other permitting issues should be addressed in the DMMP. In general, the DMMP does not address additional environmental impacts and permits which may have to be obtained before construction. The Finding of No Significant Impacts (FONSI) document finds the project is consistent with federal regulations and the federal process adequately addresses the concerns of the federal resource agencies and the respective resource they protect. However, for construction of the islands, the USACE must address the state permit requirements and likely will have to address net wetland impacts, water quality, filling in open water and floodways, and state listed endangered species. Assuming that the state or local government is in full support of the project because they are a sponsor does not exonerate the USACE District from its obligation to go through the state's environmental review processes, during which concerns of the state and public must be adequately addressed; overwhelming political popularity or partnerships is often not enough to surmount a legitimate technical concern raised by a regulator, member of the public, or even opportunistic politician. In short, the DMMP should provide a summary of the state process, which includes an evaluation of the best- and worst-case scenarios from the cost and schedule perspectives. The rate of diminishing value and costs associated with mitigating such effects should be considered in the justification for the preferred alternative. Appendix A should evaluate whether or not mitigation will be required for filling the Cat Islands, and if so, this should be included costs in the analyses. If not, specific reasons or clearance letters from federal and state agencies should be provided. Establishing the baseline condition for existing Cat Islands should consider how long the islands are assumed to last and how the diminishing environmental value of the islands (rate of degradation) is estimated. When evaluating credit from the creation of habitat on mitigation project sites, regulators take into account habitat lost from the site.
Significance: MEDIUM
Aspects of permitting requirements should be a key consideration when selecting the preferred alternative, and the extent to which this evaluation has been done in DMMP or will need to be done in the future is not detailed.
Recommendation for Resolution:
Permitting requirements (including mitigation measures for impacts) that will be required as a result of impacts from the project should be identified in the DMMP to fully understand the risks, costs, and environmental acceptability of the preferred alternative.

Comment 12:
The effects of the inter-island openings during the 20-yr project duration period and the possibility that the openings may never be created should be discussed in the DMMP.
Basis for Comment:
Various analyses of the effects of the project on the leeward side of the islands, specifically aquatic plant re-establishment, appear to be based on modeling of final proposed design conditions of 300-ft openings between the islands. However, for the 20-yr life of the project, these inter-island openings will not be present, and the only water exchange will be via culverts installed under the access road. Additionally, since removal of the road to create these openings is left to the discretion of Brown County and the resource agencies, it may never occur, and the assumptions based on such removal then become false.
Significance: MEDIUM
The DMMP does not discuss the effects of inter-island openings during the 20-yr project duration, as well as the possibility that the openings may never be created. These considerations are important for understanding specific impacts associated with this design detail.
Recommendation for Resolution:
The DMMP should discuss the effects of inter-island openings during the 20-yr project duration.

Comment 13:
Appendix A of the DMMP does not clearly present the purpose of the pipeline.
Basis for Comment:
In the Great Lakes there are no hopper dredges, and hydraulic dredging is never used unless the sediment is very clean sand. The pipeline is for a pump-off unloading situation that is typical in the Great Lakes (Appendix C Cost Engineering Report assumes a pump-off system will be used). USACE Detroit uses the same practice at Pt. Moulle, where the USACE maintains the pipelines. At these pump-off CDFs, the contractor is required to take the makeup water from the CDF. It is not clear in the DMMP how this would be performed.
Significance: LOW
There is some confusion about the purpose of the pipeline and the source of water pump-off operation without a clear explanation included in the DMMP.
Recommendation for Resolution:
The DMMP should clearly state the purpose of the pipeline to eliminate confusion and discuss the source of water for pump-off operation.

Comment 14:
The value added by the center berms is not apparent given the cost, and eliminating some or all of the center berms should be considered.
Basis for Comment:
It is not clear why different habitats are needed and why they are expected to be different on each side of the center berm if the design is essentially the same for all. The cost of the center berms does not appear to provide adequate value.
Significance: LOW
The center berms are not an apparent value-added design detail.
Recommendation for Resolution:
The center berms should be removed from the design.

Comment 15:
Hopper dredges do not necessarily need to moor at a bulkhead to pump out, which is indicated in Appendix C.
Basis for Comment:
Hopper dredges have multiple pump-out configurations. Commonly used in beachfill projects on the east and west coasts, the hopper dredge could connect to a flexible hose on a buoy, which the dredge connects to during pump-out. The flex hose transfers the slurry from the dredge to the pump-out line on the lake bed (sink-line) and to the fill (or disposal) site. The floating hookup is placed at a distance from shore, which provides adequately deep water in a location close and convenient to the fill site.
Significance: LOW
The DMMP mentions a pump-out configuration, which may not be the most suitable configuration.
Recommendation for Resolution:
The DMMP should identify hopper dredge pump-out configurations that are appropriate for the site conditions and should not be limited to a bulkhead pump-out configuration.

Comment 16:
The design for the width of the crest should be revised.
Basis for Comment:
Page A-8 of Appendix A says that a 15-ft wide crest allows for two-way truck traffic. The standard truck width is 9 ft.
Significance: LOW
The DMMP incorrectly states this design detail.
Recommendation for Resolution:
The text in Appendix A should be updated to indicate that turnoffs are proposed to handle two-way truck traffic during wave barrier construction.

A.3 Editorial Comments on the DMMP

Editorial comments are provided in this report as a reference for USACE. Some of the comments listed do have some significance to the technical understanding of the project; however, the actions necessary to address the comments only involve editorial changes.

Table A-2. Editorial Comments

No.	Comment	Notes
1	Table 6 would be easier to understand if there were separate columns separating capacity into "Outer" and "Inner."	Origin and computation of capacities is unsupported and difficult to follow. The mass balance of material is important for the reader to understand the technical approach of the project.
2	In Appendix A, the construction of the access road sequence of construction drawing should be more detailed or removed entirely.	The sequence of construction is not listed in notes, but the removal sequence is included. It is not typical and rather awkward to provide more detail on deconstruction sequence than construction sequence. This could lead to a misunderstanding of the intended construction sequence.
3	The term "Alternative 15" should be used in the Executive Summary so the reader is familiar with how the preferred alternative is referenced before beginning the report.	The document can be difficult to follow, solely because of its length; anything to improve thought organization for the reader is helpful.
4	The use of the term "In Green Bay, WI" in Section 7 is redundant and misleading in the descriptions of alternatives in water DMDF, since all the in water DMDFs are in Green Bay.	This is confusing because it makes the reader question whether all the DMDF are in the Bay.
5	Define early in the document what is meant by "partial wave barrier."	In coastal engineering practice, this term dictates a segmented or submerged breakwater. Defining the term in its first use will help eliminate confusion.
6	The second paragraph in Appendix A, Section 5.1 is awkward and erroneous.	As written, the paragraph indicates only a road or hard barrier can attenuate hydraulic energy. The barrier to reduce hydraulic energy behind former Cat Islands does not have to be road, or necessarily a hard barrier.

No.	Comment	Notes
7	For Figure 3.11 showing accretion and erosion in the lower bay, the channel bathymetry should not be used to construct the bottom surface since timing of data collection relative to dredging projects can show artificially higher erosion or accretion rates.	Stark irregularities in depth changes close to channel are the result of an unnatural event, which would change drastically depending on when the data snapshot was taken relative to channel dredging.

Appendix B – IEPR Panel Members

Noblis selected three panel members to conduct an IEPR of the DMMP for Green Bay, Wisconsin. Consistent with the requirements of the USACE SOW, the panel members provided expertise in three areas: environmental, civil/structural engineering, and dredging and dredged material management. All panel members met and exceeded the minimum requirements for each specified areas of expertise, as outlined in Table 3. The panel represented a well-balanced mix of individuals from academia, large companies and small consulting firms, and individual consultants.

In addition, recognizing the importance of site-specific knowledge and expertise related to Green Bay and Fox River, Noblis selected a Technical Advisor to assist the panel and provide input in relevant subject areas. The Technical Advisor is familiar with the 404 and Section 10 regulations for federal permits and the state requirements from Michigan, Illinois, and Wisconsin. The Technical Advisor has also been working with the Wisconsin Department of Natural Resources on the environmental clean-up of Fox River offering extensive expertise and current knowledge of activities related to dredging and disposal of Fox River sediments. The IEPR Panel considered input and comments from the Technical Advisor as it formulated its formal comments and recommendations.

B.1 Résumés of panel members

The résumés of the panel members and the Technical Advisor follow.

Tuncer B. Edil, P.E., Fellow ASCE, Diplomate of Geotechnical Engineering

Qualifications Summary

- Experience in dredging operations, transport, and dredged material placement. Worked with dredged materials placement/consolidation research (have several papers) and PCB contaminated sludge management (capping) with several papers. Also worked with geosynthetics.
- 40 years of research/consulting experience relating to soft sediments and their disposal/and management. Was involved with research on disposal of Golden Horn sediments in Istanbul, Turkey. Conducted research in the Great Lakes coastal erosion and processes. An expert on natural and recycled materials.
- BS, MS, PhD in civil engineering. A geotechnical and geoenvironmental engineering specialist with a general background in civil and environmental engineering.
- Familiarity with USACE dredged placement regulations.

Education

- PhD, Civil Engineering, Northwestern University, 1973
- MS, Civil Engineering, Robert College, 1969
- BS, Civil Engineering, Robert College, 1967

Certifications and Licenses

- Registered Professional Engineer, State of Wisconsin (#E-14606, 1974)

Summary of Professional Experience

University of Wisconsin-Madison —*Department of Civil and Environmental Engineering*

- Chair, Geological Engineering Program
- Research Director, Recycled Materials Resource Center
- Professor, Department of Civil & Environmental Engineering
- Professor of Geological Engineering
- Associate Professor, Departments of Civil & Environmental Engineering and Engineering Mechanics
- Assistant Professor, Departments of Civil & Environmental Engineering and Engineering Mechanics
- Occasional Lecturer, Department of Engineering Professional Development
- Served as consultant on geotechnical and geoenvironmental problems to engineering firms and government agencies; major assignments were with:
  - Warzyn Engineering and Service Co., Inc., Madison, WI
  - Ashland County Soil-Water Conservation District, Ashland, WI
  - Wisconsin Department of Transportation, Madison, WI
  - Wisconsin Department of Natural Resources, Madison, WI
  - Wisconsin Coastal Zone Management Program, Madison, WI
  - Southeastern Wisconsin Regional Planning Commission, Waukesha, WI
  - Bay Lake Regional Planning Commission, Greenbay, WI
  - Soils and Engineering Services, Inc., Madison, WI
  - Wisconsin Steel Pipe Manufacturers, Madison, WI
  - Strand Associates, Inc., Madison, WI

- Madison Metropolitan Sewerage District, Madison, WI
- United States Park Service, Bayfield, WI
- General Directorate of State Hydraulic Works, Ankara, Turkey
- Mead & Hunt, Inc., Madison, WI
- Geotechnical Engineering Corporation, Roseville, MN
- Call & Nicholas, Inc., Tucson, AZ
- Sitka Corporation, Kirkland, WA
- RMT, Inc., Madison and Milwaukee, WI
- STS Consultants, Ltd., Milwaukee, WI and Northbrook, IL
- Infracon, Inc., Northfield, IL
- TaliesinPreservation Commission, Spring Green, WI
- U.S. Army Corps of Engineers via Earth Tec, Inc., Oak Brook, IL
- Johns Manville International, Inc., Waukegan, IL
- Beacon Ballfields, Inc. Middleton, WI
- Manitowoc Co., Manitowoc, WI
- Montgomery Watson, Madison, WI
- Ayres Associates, Inc., Eau Claire, WI
- Natural Resource Technology, Inc., Pewaukee, WI
- Deep Foundations Institute, Hawthorne, NJ
- Liesch Associates, Inc., Plymouth, MN
- Field Turf Tarkett, Montreal, Canada
- Alvarado & During, Panama
- US Environmental Protection Agency, Washington D.C.

- Served as academic consultant to:
  - Bandung Institute of Technology, Indonesia
  - Surabaya Institute of Technology, Indonesia
  - Istanbul Technical University, Turkey
  - Middle East Technical University, Turkey
  - Yildiz Technical University, Turkey
- Served as expert witness to law firms; major assignments were with:
  - Hinshaw & Culbertson LLP, Milwaukee, WI, 2006, submarine pipe failure
  - DeWitt Ross & Stevens S.C., Madison, WI, 1997, on building settlement
  - Petrie & Stocking S.C., Milwaukee, WI, 1997, on soil collapse and settlement
  - Rivkin, Radler & Kremer, Chicago, IL, 1996, on riverbank stability
  - Bad River Indians Legal Office, Odanah, WI, 1996 on building settlement
  - Godfrey, Braun & Hayes, Milwaukee, WI, 1996 on sewer pipe collapse
  - Fitzgerald, Schorr, Barmettler & Brennan, P.C., Omaha, NE, 1995, on well sealing
  - Foley & Lardner, Attorneys at Law, Madison, WI, 1995, on landfill liner construction
  - Jenner & Block, Chicago, IL, 1991, on landfill vertical expansion John Sosey, Attorney at Law, Milwaukee, WI, 1993, on coastal slope stability
  - Witkin, Weiby, Maki & Durst, Superior, WI, 1985, on seepage cell performance
  - Michael, Best & Friedrich, Milwaukee and Madison, WI, 1983 and 1984, on coastal slope stabilization; 1984, on earth construction
  - Ross & Stevens, Madison, WI, 1984, on sanitary landfill siting; 1991 on peat settlement
  - Wickwire, Gavin & Gibbs, Madison, WI, 1981, on clay liner failure; 1989, on excavation dewatering; 1996, on breakwater armor stone density
  - Phelan, Pope & John, Ltd., Chicago, IL, 1982, on retaining wall collapse

- Geisler & Kay, Madison, WI, 1981, on steel pipe corrosion
- Quarles & Brady, Milwaukee, WI, 1977, on shore erosion
- Gekas & Associates Ltd, Chicago, IL, 2009, soft ground

Northwestern University —*Lecturer, Department of Civil Engineering*

Mirza Engineering Company, Chicago —*Engineer*

University of Illinois-Chicago Circle —*Teaching Assistant, College of Architecture*

The Ministry of Village Affairs, Istanbul, Turkey —*Bridge Engineer*

Mono Engineering Firm, Istanbul, Turkey —*Partner*

Sigmond (Sonny) S. Rutkowski, P.E.

Qualifications Summary

- Expertise in aquatic ecology. Projects include the Southport Development Project for The Commonwealth of Pennsylvania, Baltimore Harbor DMMP, Multi-Facility DMMP, and Inner Apra Harbor LTMS.
- Over 16 years of Engineering Consulting experience including design, financial, and management roles. Projects include the Southport Expansion Project, Rolnick Properties, and Migrating Stamp Sands.
- BS in Civil and Environmental Engineering, and MS degree in Ocean Engineering.
- Knowledgeable of Great Lakes coastal and wetland ecosystems. Projects include the Migrating Stamp Sands, Dredge Template Design, and structural evaluation at the Toledo Ohio Refinery Dock.
- For the last ten years, worked on numerous projects involving design and permitting of coastal engineering. Most involved Environmental Assessments and other NEPA processes working closely with/for the USACE.
- A licensed Professional Engineer in the states of New Jersey, Pennsylvania, Louisiana, and Texas.
- Experience with the development of large civil works navigation projects, to include the Southport Development Project for The Commonwealth of Pennsylvania.
- More than 16 years of experience in design, coordination, and management of marine engineering, water resources engineering, port, and dredging projects.
- Regional expert in the NEPA process for coastal development projects coordinating habitat evaluations and aquatic toxicology analysis.
- Responsible for successfully obtaining over 20 Water Quality Certificates, Chapter 105 permits, Section 10 permits from PADEP, NJDEP, DNREC, and the USACE for dredging, and marine construction projects on the Delaware River.
- Experienced in design and permitting of marine structures including revetments, bulkheads, and breakwaters.
- Expertise in a variety of shore protection, beach nourishment, navigation channel, and land reclamation projects.
- Evaluated sediment transport budgets for the design of beachfills.
- Over five years field experience in hydrographic surveying and use of GPS and RTK GPS vessel positioning, computerized navigation, data logging including single, dual frequency, and multi-beam sweep depth sounding.
- Extensive involvement with regional dredging and beneficial use projects including both state and federal permitting and engineering design.

Education

- MS, Ocean Engineering, Stevens Inst. of Technology, 1998
- BS, Civil Engineering, Lehigh University, 1993

Certifications and Licenses

- Licensed Professional Engineer, Commonwealth of Pennsylvania (#PE 062672, 2003)
- Licensed Professional Engineer, State of New Jersey (#42937, 2002)
- Licensed Professional Engineer, State of Louisiana (# 30786, 2003)
- Licensed Professional Engineer, State of Texas (# 92470, 2003)
- 40-Hour Hazardous Waste Site Training Course, OSHA 29 CFR 1910.120(e)(3)

Summary of Professional Experience

WESTON —*Senior Project Manager, Lead Engineer, Senior Engineer*

Multi-facility Dredged Material Management Plan (DMMP), Philadelphia, Pa., Confidential Client

- Prepared a rolling ten-year plan for maintenance dredging, placement, beneficial use, and related permitting for the client's six facilities in the Philadelphia region. The facilities required the removal of 100,000–250,000 cubic yards of dredged material annually. Designed the dredging templates based on existing navigational requirements of each facility. Assessed the long-term dredging needs of the client and prepared strategies to standardize an annual maintenance dredging procedure for each facility. Prepared a feasibility level plan that incorporates dredged material management, placement cell management, permitting, and beneficial reuse. Standardized the subcontractor procurement process for dredging-related services including hydrographic surveys, environmental and geotechnical field testing, and dredging contractors. Investigated dredging alternatives and new dredging technologies to reduce costs and environmental impacts of contaminated sediments. Reviews and updates the DMMP to incorporate changes in regulatory requirements, new placement areas and dredging technologies, and additional beneficial reuse opportunities.

Rolnick Properties Shore Protection Design, Brewer, Maine, Environmental Protection Agency

- As Lead Coastal Engineer, designed a shore protection revetment along a river to protect impacted shoreline sediments from being eroded into the waterway. The project involved calculation of sediment erosion forces and potential sediment transport rates as well as designing the size, shape and materials of the revetment.

Migrating Stamp Sands Mitigation Feasibility Study, Gay, Mich., MDEQ, Senior Project Engineer

- Conducted a feasibility study (FS), analyzed sediment transport, and designed stabilization measures to limit migration of copper-contaminated stamp sand to adjacent coastal habitat. Approximately 37 million cubic yards of stamp sand was deposited by the mill along the shoreline of Lake Superior from the 1880s through 1930s. Wind-induced waves and currents have eroded the original stockpile and transported the stamp sand offshore and to native beaches south of the stockpile. Conducted an FS for alternatives to stabilize the original stockpile and mitigate the effects of stamp sand that has already been eroded. Responsibilities included hydrodynamic data collection and analysis, development of conceptual design alternatives, CEDAS modeling of alternatives, and the formulation of drawings, cross-sections, and cost estimates for all alternatives.

Dredged Material Long-Term Management Strategy and Beneficial Use—Phase I Inner Apra Harbor, Guam, U.S. Department of the Navy, COMNAV Marianas

- As Project Manager/Lead Project Engineer, responsibilities include the assessment and evaluation of dredged material management options for Apra Harbor, located on the island of Guam. Design of placement options included upland CDF placement, open water placement, and beneficial use. Assessment and evaluation include benefits and impacts in relation to the environment, recreation, and ecological surroundings including aquatic toxicology.

Maintenance Dredging Characterization and Permitting, Philadelphia, Pa., Philadelphia Regional Port Authority

- As Senior Engineer, prepared a New Jersey WQC application for maintenance dredging of approximately 200,000 cubic yards of material using a clamshell dredge. Wrote Sampling and Analysis Plan (SAP) for environmental and geotechnical field testing to characterize sediments to be removed. Designated sediment sampling locations and depths based on hydrographic survey. Prepared a detailed Sediment Characterization Report for submittal to regulators. Prepared amendment to WQC application based on regulatory comments. WQC was approved in January 2002; maintenance dredging was conducted in Spring 2003.

Feasibility Assessment for Placement of Dredged Materials at the Philadelphia Naval Business Center, Various Locations, Delaware River Port Authority (DRPA)

- As Project Engineer, conducted a feasibility assessment and developed an Implementation Plan to use dredged materials from the Delaware River Channel Deepening Project as construction fill in the development of the Philadelphia Naval Business Center (PNBC) Eastern Waterfront Campus. Performed the role of Lead Project Engineer directing the engineering and economic feasibility including the identification of data gaps needed for future design. Confirmed the economic distance of transport, and the available quantities and types of dredged materials. Performed a geotechnical assessment of the dredged materials and existing soils to assess the

feasibility of the placement of dredged materials at the site. Identified, developed, and comparatively assessed five alternatives for the placement of dredged materials at the PNBC site including conceptual engineering design, schedule, and cost.

Baltimore Harbor and Channels Dredged Material Management Program (DMMP), Various Locations, USACE, Baltimore District, Lead Engineer for Dredging and Disposal Strategies

- Coordinated a project team to assess dredged material placement and beneficial use alternatives for USACE Federal Channel and Maryland Port Administration maintenance dredging. The project will be accomplished in four phases including evaluating the USACE Planning Guidelines using Habitat Units (Habitat Evaluation Procedure [HEP] analysis) and incremental cost analysis. Responsibilities included evaluation of open water placement alternatives for all of the Chesapeake Bay and C&D canals including ecological, environmental, water quality, recreational, and commercial benefits and impacts. Additionally responsible for conducting project cost analysis and addressing regulatory and permitting issues.

New Jersey Intracoastal Waterway Ecological Restoration FS and Environmental Assessment (EA), Various Locations, USACE, Philadelphia District

- As Project Engineer on a team preparing an FS for the USACE, Philadelphia District to conduct ecological restoration of 36 degraded sites along 70 miles of New Jersey's Intracoastal Waterway (NJICW). The project will restore or enhance degraded habitats utilizing over 6 million cubic yards of dredged material from the NJICW during the 20-year project life-cycle. Compiled existing condition summaries, without project condition analysis, plan formulation, cost estimates/incremental cost analysis, and selection of the best buy plans. Designed conceptual restoration plans, prepared cost estimates, and planned the sequence of construction, analyzed wave and water-level hydrologic conditions, and sediment and surface-water quality chemical data.

Southport Expansion Project Environmental Permitting and Preliminary Design, Pennsylvania Governors Office, Department of General Services

- Senior Project Manager of a $1.55 M high profile project to construct a new port facility adjacent to the existing PRPA Packer Avenue Marine Terminal on the former US Navy Yard site. This multifaceted, time critical project involves completing all Federal State and Local Permitting, including Chapter 404, Section 10, Chapter 105, and an Enhanced Environmental Assessment. Coordinated all technical staff efforts including field studies of sediment, aquatic and terrestrial biota totaling over $600,000. Managed the schedule and budget, leading project financial and technical staff through an aggressive nine month delivery of the permit applications. Project is currently on schedule and budget.

Maintenance Dredging Template Design, Sediment Testing and Dredging of a Petroleum unloading berth, Toledo, Ohio, Confidential Refinery Client

- Project Manager and Lead design engineer responsible for completing the design, permitting and construction oversight for a dredging project involving the removal of approximately 100,000 cubic yards of soft sediments. Designed the dredge template depth, horizontal dimensions and side slopes customized to accommodate the vessels using the facility. Reviewed the as-built drawings and recent condition inspection reports for the existing pier and relieving platform and dock structures to determine if dredging to target depths would not pose a risk to the structures. Conducted the sediment characterization for dredged material for disposal permits. Procured the dredging contractor and provided the construction oversight for the client.

Ordnance Reconnaissance Study for the Sandy Hook to Barnegat Inlet, Beach Erosion Control Project, New Jersey, USACE – New York District, Project Engineer

- Conducted a study and prepared a comprehensive report recommending the most economical and safest alternative to complete the largest beach nourishment project in the U.S. in which live ordnance was found in the sand borrow area. Alternatives included using magnetometers to detect and remove ordnance from the borrow area, mechanical screening of the ordnance during dredging operations, and delineating new sand borrow sources.

Duffield Associates —*Project Engineer*

Delaware City Flood Mitigation Plan, Delaware City, Del.

- As Project Engineer, conducted a flood study and prepared a report for submittal to the Federal Emergency Management Agency (FEMA) detailing the flood risks of a small coastal town on the Delaware Bay. Responsibilities included identifying general flood risks and specific high-risk areas, compiling historic flood data, and creating conceptual designs of infrastructure projects to mitigate potential flood hazards. The report

successfully secured FEMA funding for select mitigation projects suggested in the report.

Parsons Brinckerhoff, Quade and Douglas —*Lead Marine Engineer*

Burlington Breakwater Condition Inspection and Rehabilitation, Burlington, Vt., USACE – New York District

- Performed a condition inspection of the Burlington, Vt., harbor breakwater. Coordinated the dive team, land surveyor, and hydrographic surveyors to assess the structural integrity of the timber crib breakwater. Co-authored the report detailing the condition of the breakwater. Computed cost estimates for rehabilitation feasibility.

Davidson Laboratory, Stevens Institute of Technology (Coastal Engineering Research)

Great Lakes Dredge and Dock Company

Professional Associations

- American Society of Civil Engineers, Associate Member
- Association of Coastal Engineers, Associate Member
- Delaware River Maritime Exchange

Randy L. Vogel, M.S.

Qualifications Summary

- Expertise in aquatic ecology. MS degree in botany/ecology, and is well-rounded in ecology and plant taxonomy. A wetland specialist in charge of Wetland Mitigation Banking. Directing the update of the Illinois Natural Areas Inventory, the most comprehensive community classification and grading system in Illinois and probably the nation.
- Experience includes mine reclamation, natural resource inventories, urban forestry, stream, wetland and natural community restoration, stormwater treatment, and wetland delineations.
- Over 25 years experience in natural resource planning, impact analysis, and habitat restoration.
- Has been a consultant working on water resource and wetlands issues for the past seven years. Worked six years in a regulatory capacity in the impact analysis section of the Illinois Department of Natural Resources and one year in the Bureau of Water at the Illinois Environmental Protection Agency.
- Quite familiar with wetland ecosystems throughout the Midwest including some rare systems such as pannes associated with coastal areas of the great lakes.
- In managing the wetland mitigation banking effort for his company, has been directly involved in project work requiring USACE permits. Familiar with various USACE offices and have worked closely with them on numerous occasions. Worked closely with the USACE and other federal agencies during tenure at the Illinois Department of Natural Resources. Total experience working with USACE is approximately 13 years.

Education

- MS, Botany, Eastern Illinois University, Charleston, Ill., 1977
- BS, Botany, Eastern Illinois University, Charleston, Ill., 1976

Certifications and Licenses

- Wetland Classification System training, U.S. Fish and Wildlife Service
- Habitat Evaluation Procedure (HEP) training, U.S. Fish and Wildlife Service
- Low-Impact Development and Alternative Stormwater Management Seminar, Lorman Business Center
- Wetland Delineator Training, Institute for Wetland and Environmental Education & Research
- PADI Open Water Diver Certification

Summary of Professional Experience

Applied Ecological Services, Inc., Chicago, Ill. — Principal

- Supervising ecologists, landscape architects, engineers, and GIS personnel.
- Directing AES's involvement in the update of the Illinois Natural Areas Inventory including field operations and GIS data management.
- Directs AES's involvement in wetland mitigation banking activities, directing planning, construction, monitoring and maintenance activities for five wetland mitigation banks.

PREVIOUS PROJECTS

- Served in a State regulatory capacity supervising review of surface mining permits and development of environmentally and ecologically sound reclamation methodologies.
- Employed in the not-for profit sector where was actively involved in issues related to urban forestry, invasive plants, (including development of protocols for quarantine and testing of new ornamental plant introductions),

and accidental exotic insect introductions.

- In the private sector, supervised numerous projects related to watershed planning and natural resource inventories.
- Was actively involved in the design and construction of stormwater BMPs in the watershed and in overall ecological restoration of disturbed lands.

SELECTED PROJECTS

- Lake Hillsboro Stormwater dry basin development and ravine stabilization, Montgomery County, Ill.
- Wind Farm avian surveys, DeKalb and Pike Counties, Ill., and Green Co, Wis.
- Illinois Tollway Authority Endangered Plant Species Relocation Project, Lake County, Ill.
- Knoebel Woods Development, Natural Resources Inventory and Tree Survey.
- Galum Creek Stream Relocation & Restoration, Perry County, Ill.
- Ingleside Conservation Development, Kane County, Ill.
- Illinois Natural Areas Inventory, Statewide Illinois.
- Wildflowers Conservation Development, McHenry County, Ill.
- Atkinson Road Wetland Mitigation Bank Design and Permitting.

Timothy Harrington, PE (Technical Advisor)

Qualifications Summary

- Experience with large USACE dredging projects on the Great Lakes and in Florida working for or as a consultant for navigation dredging contractors. Experienced with the design of confined disposal facilities on upland sites and confined aquatic disposal sites at projects around the Great Lakes. Presently providing dredging specialist support to the WDNR at the Fox River PCB remediation site in Green Bay.
- Project experience in the Great Lakes includes Fox River, Waukegan Harbor, Duluth Harbor, Sault Ste Marie, various power plant intakes. Also experienced with projects in Florida for maintenance dredging at Ft. Lauderdale and St. Petersburg. Working in the dredging industry since 1981 with Contractors and as an engineer doing design and consulting work.
- BS and MS in Civil Engineering from Michigan State University 1974 and 1975, respectively. MS degree specialty in geotechnical and structural engineering.
- Familiar with the 404 and Section 10 regulations for federal permits and the State requirements from Michigan, Illinois, and Wisconsin. Familiar with requirements for open water placement for beach nourishment in both Great Lakes and Florida.
- 35 years experience in the application of engineering solutions to the management and completion of projects involving many structural, geotechnical, and environmental remediation components, specializing in sediment remediation, containment and marine facilities.
  - Managed Remediation Projects with containment components from design through construction.
  - Managed large complex projects with intertwined design, regulatory and construction issues
  - Designed and implemented the removal of lead shot from a gun club site
  - Designed and implemented the removal of organic compounds from sediment using thermal desorption technology
  - Designed intake structure modifications and repairs

Sediment and Soil Restoration Experience:

- Designed many innovative solutions for problems to contain soil and sediment and to allow beneficial reuse of the restored property, including:
  - Planning and management of ash recovery at TVA Kingston, Tenn., Ash Pond release.
  - Planning, design and oversight of dredging, dewatering and water treatment, quality control and quality assurance.
  - The removal of lead shot from sediment in Long Island Sound with the return of the sediment to the ocean (article published in May 2002 World Dredging Mining and Construction Magazine).
  - The removal of sediment from Waukegan Harbor for containment in an in-water CDF designed using sheet pile containments and a soil-bentonite slurry wall.
  - Development of a solution for the removal of 4,000,000 cubic yards of organic sediment from Lake Trafford in Florida with dewatering and containment in upland CDF.
  - Development of self-weight dewatering solutions to assist in the storage of 2,000,000 cubic meters of 8% solids sediment in an 80 hectare in-water CDF in Auckland, New Zealand.
  - Development of a solution to use a sub-aqueous cap to contain very soft sediments in the bottom of an inland lake in Michigan.

Education

- MS, Civil Engineering (Geotechnical and Structural Engineering Specialty), Michigan State University
- BS, Civil Engineering, Michigan State University

Certifications and Licenses

- Licensed Professional Engineering, State of New Jersey, (GE 30238, 1985)
- Licensed Professional Engineering, State of Delaware (#7145, 1987)
- Licensed Professional Engineering, State of New York (#62728-1, 1986)
- Licensed Professional Engineering, State of Pennsylvania (#28505-E, 1979)
- Licensed Professional Engineering, State of Michigan (#27309, 1980)
- Licensed Professional Engineering, State of Indiana (#19646, 1981)
- Licensed Professional Engineering, State of Illinois (#062-041983, 1984)
- Licensed Professional Engineering, State of California (#35743, 1983)
- Licensed Professional Engineering, State of Georgia (#14874, 1984)
- Licensed Professional Engineering, State of Florida (#31484, 1982)
- Licensed Professional Engineering, State of Wisconsin (#36243, 2003)
- 40-Hour OSHA HAZWOPER Training
- 8-Hour Refresher for 40-Hour Hazardous Training
- Certificates for Continuing Education from ACI, AISI, SJI and others for Renewal of Professional Licensing

Summary of Professional Experience

Aether DBS, LLC., Naperville , IL —*Principal and Senior Environmental Engineer*

- Mr. Harrington's firm was acquired in January 2006 by Hard Hat Services now aether dbs. Both firms coming together increased respectively each others' capabilities as well as offered additional services to their clients. Mr. Harrington manages all major environmental remediation efforts and evaluations as well as being responsible for the Chesterton, Indiana office. Expertise is in soils and marine environments.

Harrington Engineering & Construction, Inc., Chesterton, Ind. —*President*

- Owner and provider of engineering and construction management services on domestic and international projects.
- Projects include design and construction management for the rebuilding of intake structures in Lake Michigan, removal and processing of sediment containing lead shot to restore beneficial reuse of a critical ocean shore environment, design of an upland landfill to contain sediment from the Fox River in Green Bay, Wisconsin, design of an in-water landfill in Auckland, New Zealand to contain low solids content sediment, and services on numerous facilities to construct or repair dock walls and marinas, resolve drainage problems and repair unstable slopes.

Canonie Environmental Services Corporation, Chesterton, Ind. — *Vice President, Construction Services Division*

- Responsible for the direction of operations in the eastern USA.
- Projects included the construction of an upland disposal facility at the 102nd street site in Tonowanda, New York, and the excavation of sediment from the St. Lawrence River, soil thermal treatment on high plasticity clay in Memphis, Tennessee, and site restoration including the removal of lime sludge and riverbank restoration in

western Pennsylvania.

Rust Remedial Services Inc., Chicago, Ill. — *Vice President, General Manager, Northern Region and the Thermal Operations*

- Managed work under contract totaling approximately $400 million and including numerous jobs where sediment remediation was a part of the total remedy including the Brio site in Houston, Texas, the construction of landfills in New York and Massachusetts, and removal of solidified sludge from two 20-acre basins in Southern New Jersey.

Canonie Environmental Services Corporation, Chesterton, Ind. —*Vice President, Eastern Operations*

- Responsible for design and construction projects, project manager, and project engineer for design and construction field engineering.
- Work included the design and construction of in-water and upland landfill's at Waukegan Harbor, Illinois, design and construction of a cap and slope protection for remnant sediments in the Hudson River, work on landfills caps in New Jersey and Indiana, and numerous projects working as a geotechnical engineering consultant on failure investigations.

D'Appolonia Consulting Engineers, Inc., Pittsburgh, Pa. — *Project Engineer*

- Worked on projects to build power plants, on the investigation and design of mine tailing impoundments for uranium tailings in New Mexico, on design of underground mine works for the waste isolation pilot plant in New Mexico, and on several projects for water supply and dewatering of aquifer formations.

Appendix C – Charge for IEPR Panel

The general charge guidance and questions developed and approved by USACE to support the IEPR of the DMMP for the Green Bay, Wisconsin project are listed below.

C.1 Objectives

The objectives of this work are to conduct an IEPR of the Green Bay Harbor, Wisconsin, DMMP. The IEPR will follow the procedures described in the Department of the Army USACE guidance *Peer Review of Decision Documents* (EC 1165-2-209), dated 31 January 2010, and the OMB's *Final Information Quality Bulletin for Peer Review,* released 16 December 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, the validity of the research design, the quality of data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypotheses being tested, the extent to which the conclusions follow from the analysis, and the strengths and limitations of the overall product.

This IEPR will analyze the adequacy and acceptability of the alternatives in the formulation of the DMMP as well as other potentially viable alternatives. The independent review will be limited to technical review and will not involve policy review. The peer review will be conducted by experts with extensive experience in environmental science and engineering as specifically related to deep draft navigation and development of dredged material disposal alternatives. The experts will be "charged" with responding to specific technical questions as well as providing a technical evaluation of the overall project.

The experts (i.e., peer review panel members) will identify, recommend, and comment upon assumptions that underlie the analyses and evaluate the soundness of models, methods, and assumptions. The panel members will evaluate whether the interpretations of analyses and conclusions are technically sound and reasonable, provide effective review in terms of both usefulness of results and of credibility, and have the flexibility to bring important issues to the attention of decision makers. The panel members may offer opinions as to whether there are sufficient technical analyses upon which to base the ability to implement the project. The panel members will address factual inputs, data, and the use of environmental and engineering models, analyses, assumptions, and other scientific and engineering tools/methodologies to inform decision-making.

C.2 Documents Provided

The following is a list of documents and reference materials provided for the review. **The document presented in bold is the only one for which comments were requested.** All other documents were provided for reference only.

- **Green Bay Dredged Material Management Plan**
- Agency Technical Review Comments and Responses (provided as a courtesy to the panel if they wish to read)
- Green Bay Dredged Material Management Plan Value/Engineering Study
- Evaluation of In-Water Alternatives for the Green Bay Dredged Material Management Plan (White Paper)

- Cat Island Chain Restoration Design Development Report

C.3 Charge for Peer Review

Members of this peer review panel were asked to determine whether the technical approach and scientific rationale presented in the Green Bay DMMP were credible and whether the conclusions were valid. The reviewers were asked to determine whether the technical work was adequate, competently performed, properly documented, satisfied established quality requirements, and yielded scientifically credible conclusions. The panel was asked to provide feedback on the review and selection of alternatives. The reviewers were not asked whether they would have conducted the work in a similar manner.

C.4 General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Green Bay, Wisconsin DMMP. Please focus on your areas 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 make any relevant and appropriate comments on any of the sections and appendices; you may be asked to focus specifically on certain areas. In addition, please note the following guidance. Note that the panel will be asked to provide an overall statement related to 1 and 2 below per USACE guidance (EC 1165-2-209; Appendix D).

1. Assess the adequacy and acceptability of the evaluation and selection of alternatives.
2. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation for construction, authorization, or funding.
3. Evaluate whether the interpretations of analysis and conclusions are reasonable.
4. Please focus the review on scientific information, including factual inputs, data, the use and soundness of models, analyses, assumptions, and other scientific and engineering matters that inform decision makers.
5. 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.
6. The panel will evaluate the cost/economic aspects to the extent practical since, consistent with the requirements of the Statement of Work, the panel does not include an expert in the area of cost estimating expert/economist.
7. 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 Independent Technical Review.
8. 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.

C.5 General Charge Questions

1. Were all reasonable nonstructural and structural management measures to address the problem identified and adequately considered?
2. Please comment on the scope and definition of the listed management measures.
3. Do the management measures provide a comprehensive set of features to help address the plan objectives?
4. Based on your knowledge, is the decision not to carry all the management measures forward (e.g., landfill cover, open-lake placement, etc.) to the detailed planning phase well-justified?
5. Does the proposed alternative meet the stated needs and objectives of the project to develop an implementable plan that is engineering, economically and environmentally sound?
6. Does the proposed alternative meet the stated purpose and need of the project at the least cost while minimizing environmental impacts and ensuring navigation safety?