



# INDEPENDENT EXTERNAL PEER REVIEW PANEL

## for the BARTONS CREEK WATERSHED, LEBANON, TENNESSEE CONTINUING AUTHORITIES PROGRAM (CAP) SECTION 205 FLOOD RISK MANAGEMENT FEASIBILITY REPORT NASHVILLE DISTRICT

The U.S. Army Corps of Engineers submits the following information per requirements in the Water Resources Reform and Development Act of 2014, Section 1044(c)(4)(B).

<b>Entity Conducting the Review</b>	
Outside Eligible Organization:	Battelle 505 King Avenue Columbia, OH 43201
<b>Dates of Review</b>	
Review Initiation:	21 December 2018
Type I IEPR Final Report Submittal:	7 March 2019
<b>Reviewer Names and Qualifications</b>	
<b>David Bastian</b>	<b>Plan Formulation/Economics</b>
<p>Mr. Bastian is an independent consultant and P.E. for David Bastian Consulting in Annapolis, Maryland. His work specializes in USACE feasibility studies and their technical and policy compliance, adherence to plan formulation, and review of feasibility studies incorporating incremental cost analysis, ecosystem restoration, flood risk reduction, deep draft navigation, dredged material disposal, and hydraulic and river engineering. He earned his B.S. in civil engineering from the Georgia Institute of Technology and an M.S. in river engineering from Delft University, Holland. Mr. Bastian has 36 years of experience with USACE and as a contractor/consultant on USACE projects involving feasibility studies and public works planning, all based on the USACE six-step planning process. As a reviewer at HQ-USACE, he became familiar with and has direct experience with Engineer Regulation (ER) 1105-2-100 (Principles and Guidelines) as well as other USACE engineering regulations, manuals, and pamphlets and continues to use and stay familiar with the “planning community toolbox.” He co-authored the USACE Planner’s Workshop Manual. His project history has resulted in his review of and collaboration on more than 100 USACE reports evaluating and comparing alternative plans. Mr. Bastian is a practitioner of ER 1105-2-100 including Appendix F, whose guidance specifically addresses the CAP. He is aware that General Projects implemented under Section 205, Flood Control Act of 1948, as amended, are formulated for structural or non-structural measures for flood damage reduction in accordance with current policies and procedures governing projects of the same type specifically authorized by Congress (as outlined in Appendix E of ER 1105-2-100). As such, he understands that benefit and cost, risk and uncertainty, cost effectiveness, and incremental cost analyses are to be undertaken using procedures appropriate for the scope and complexity of the project. Mr. Bastian has over 20 years of experience in flood risk evaluation and has worked directly to identify and evaluate flood risk. For nine years, he was involved in the coastal economic evaluation for coastal Louisiana restoration, the greater</p>	

New Orleans hurricane and storm damage risk reduction system, and four other study areas along the Louisiana and Texas coasts. His extensive flood risk reduction review experience includes the Delaware River Basin Comprehensive Flood Risk Management Interim Feasibility Study and Integrated Environmental Assessment for New Jersey (2016) and the Souris River Basin Integrated Feasibility Report/Environmental Assessment (2017). He helped author and/or provide policy and technical compliance to the following studies: Upper Turkey Creek, Johnson & Wyandotte Counties, Kansas, Flood Risk Management Project; Kansas City Local Flood Protection Project (2005- 2006); Kansas City, Kansas, and Kansas City, Missouri, Topeka Local Flood Damage Reduction Project (2006-2007); and the Mississippi River Levee System (Units L-455 & R471-460), St. Joseph, Missouri/Elwood, Kansas (2006-2007) study. Mr. Bastian is familiar with large, complex Civil Works projects with high public and interagency interests through his extensive involvement with the Louisiana Coastal Study area pre- and post-Hurricane Katrina. Mr. Bastian is familiar with USACE flood risk and hurricane/coastal damage risk reduction analysis and economic benefit calculations, including the use of standard USACE computer programs such as the Hydrologic Engineering Center Flood Impact Analysis (HEC-FIA) modeling program. He has reviewed HEC-FIA and other model applications and their outputs for several flood risk reduction projects for technical economic justification. During his career, Mr. Bastian has developed economic input databases for deep-draft navigation studies at the Institute for Water Resources (IWR) (1980-1987); evaluated deep-draft economic feasibility for enlarging the Panama Canal (1987-1993); reviewed feasibility studies for economic justification (1993- 1998) at HQ-USACE; and reviewed and/or authored planning and economic analyses for various USACE projects (2001-present), including hurricane and storm damage risk reduction analyses for the New Orleans District, its architectural/engineering firms, and non-Federal sponsors (2006-2011). Since 1993, Mr. Bastian has reviewed USACE studies with a focus on evaluating and comparing alternative plans for compliance with plan formulation processes, procedures, and standards. Since 2001, he has participated in the preparation of the Kansas City, Turkey Creek, Texas City, and Boardman flood risk management and post-Hurricane Katrina and Texas City hurricane and storm damage risk reduction studies. He also has reviewed the Blanchard environmental restoration study and various dam safety studies regarding plan formulation compliance and economic justification. Mr. Bastian's experience at HQ-USACE and as a contractor/consultant on USACE projects includes applying ER 1105-2-100 to projects subject to Civil Works project evaluations, all of which involved the six-step planning process. During his career, he has reviewed and collaborated on more than 100 USACE reports evaluating and comparing alternative plans. He also has direct experience with other USACE engineer regulations, manuals, and pamphlets and was the co-author of the USACE Planner's Workshop Manual. Mr. Bastian has evaluated and conducted National Economic Development (NED) analysis procedures as they relate to flood risk management and to hurricane and coastal storm damage risk reduction. Specifically, for the Kansas City, Turkey Creek, Texas City, and Boardman studies, he evaluated traditional NED plan benefits associated with flood risk management and evaluated application of HEC Flood Damage Reduction Analysis (HEC-FDA) software. Mr. Bastian's previous employment at USACE included positions as Deputy Chief of Staff for Support, Office Chief of Engineers; Assistant Director of Civil Works, Office Chief of Engineers; technical and policy compliance review expert, Washington Level Review Center; and navigation research, USACE IWR. He has served as a USACE Washington-level technical and policy compliance review expert and managed interdisciplinary reviews of over 70 feasibility reports. Mr. Bastian's participation in professional societies includes the American Society of Civil Engineers, the American Association of Port Authorities, the Permanent International Association of Navigation Congresses, and the Western Dredging Association.

<b>Bruce Halverson</b>	<b>Hydrology and Hydraulic Engineering</b>
<p>Mr. Halverson is a senior engineering consultant with Kleinschmidt Associates. He specializes in analyses of extreme hydrologic events and the quantification of their effects, risk analyses and the development of H&amp;H designs, use of modeling systems, and computer programming related to hydraulic modeling. He earned an M.S. in civil engineering from Louisiana State University, is a registered P.E. in Illinois and Wisconsin, and is a Certified Floodplain Manager. Mr. Halverson is Kleinschmidt's primary quality control (QC) reviewer and modeling strategist for all H&amp;H projects. He has extensive experience with projects involving risk, uncertainty, frequency, and damage potential assessments. One example of this experience is the hydrologic and hydrodynamic modeling he conducted after Hurricane Katrina for the USACE Interagency Performance Evaluation Task Force (IPET). This modeling included a HEC Hydrologic Modeling System (HEC-HMS) model to compute the runoff from the hurricane's overnight rainfall and a HEC River Analysis System (HEC-RAS) unsteady-state model that featured 100 storage areas, more than 80 hydraulic structures, 34 miles of interconnected canals, and four pump stations. The end results of the modeling were flood inundation approximations which will be used to evaluate various remediation plans for dealing with future hurricanes. Mr. Halverson has had substantial involvement as technical advisor or primary investigator for more than 30 large riverine modeling projects, including simulations of historic flood events, dam failure analyses, or design events such as Probable Maximum Floods. These rivers include the Connecticut River, Wisconsin River, Broad River (South Carolina), Winooski River (Vermont), Clinton River (Michigan), and St. Joseph River (Michigan). Mr. Halverson has experience with many different USACE modeling packages, including HEC-RAS, HEC-HMS, HEC-FDA, HEC Geospatial River Analysis System (HEC-GeoRAS), HEC Geospatial Hydrologic Modeling System (HEC-GeoHMS), HEC Data Storage System (HEC-DSSVue), HEC Statistical Software Package (HEC-SSP), and their predecessor models. For the Section 205 Flood Damage Reduction Study for Blacksnake Creek (St. Joseph, Missouri), Mr. Halverson was responsible for performing H&amp;H modeling to determine if there was a reasonable expectation that remedial measures would be cost-effective and warrant Federal interest. The modeling effort included the use of XP Solutions' XP-SWMM modeling software and USACE's HEC-RAS, as well as HEC-FDA in conjunction with the HEC-RAS model results. He also performed flood frequency and flood damage risk assessment for the Belle Isle Flood Damage Reduction Project (Monona, Wisconsin), which included the development of flood risk statistics and annual expected damages used to determine eligibility for Federal Emergency Management Agency (FEMA) flood damage mitigation funding. Mr. Halverson recently served as the modeling expert for the Chicago District USACE Technical Review Committee for Lake Michigan Diversion Accounting. For that effort, his primary responsibility was to review procedures and models used to develop flow diversion quantities from Lake Michigan. Mr. Halverson is a member of the Association of State Floodplain Managers, Society of American Military Engineers, and Association of State Dam Safety Officials. He also has served on the Board of Directors for the Midwest Hydro Users Group.</p>	

<b>Alane Young</b>	<b>Environmental Law Compliance</b>
<p>Ms. Young is a project manager/senior geologist at Covington Civil &amp; Environmental, LLC. She earned her M.S. in geology from Mississippi State University in 1986. She has 32 years of experience in managing environmental projects. Her key responsibilities through her career have been preparing National Environmental Policy Act (NEPA) environmental documentation, including categorical exclusions (CXs) and environmental assessments (EAs), and assisting in the preparation of environmental impact statements (EISs). Her expertise also includes performing Phase I and Phase II environmental site assessments (ESAs), site characterizations, soil and groundwater remediation projects, wetland delineations, and environmental permitting. She also has managed U.S. Environmental Protection Agency Brownfield Assessments Grants. Ms. Young is an expert in compliance with environmental laws, policies, and regulations. She recently served as</p>	

the environmental science/NEPA expert for the Integrated Draft Feasibility Study and Environmental Impact Statement (FS/EIS), Pearl River Basin, Mississippi, Federal Flood Risk Management Project, Hinds and Rankin Counties, Mississippi (January 2018 – October 2018). Her responsibility was to review the draft FS/EIS for compliance with Council on Environmental Quality (CEQ) regulations for implementing NEPA, and specifically compliance with the following acts, executive orders and USACE policies: Endangered Species Act, Fish and Wildlife Coordination Act, Clean Air Act, Clean Water Act, Magnuson-Stevens Fishery Conservation and Management Act, National Historic Preservation Act, Bald and Golden Protection Act, Migratory Bird Treaty Act, Farmland Protection Policy Act, Federal Water Project Recreation Act, Resource Conservation and Recovery Act, Executive Order (EO) 11988 Floodplain Management, EO 11990 Protection of Wetlands, EO 12898 Environmental Justice, EO 13112 Invasive Species, EO 13690 Flood Risk Management, energy requirements and conservation potential, and USACE policy on climate change adaptation. She reviewed the project's Habitat Evaluations Procedure (HEP) report, which included an aquatic evaluation of the post-construction aquatic habitat conditions, especially impacts to obligate and facultative riverine guilds. Her responsibilities also included review of the wetland delineation and determination, the Phase I cultural resources survey, and the environmental evaluation of hazardous, toxic and radiological waste sites. Ms. Young has experience with water resource environmental evaluation and review. She has been integrally involved in ecosystem and water resource project development, planning, permitting, implementation, management, and monitoring of Mississippi's Natural Resource Damage Assessment (NRDA) Early Restoration Phases I, III, and IV projects, with over \$100 million in projects funded. She works with the Mississippi DWH Trustee Implementation Group to develop NRDA restoration projects for NRDA settlement monies in accordance with the Programmatic Damage Assessment and Restoration Plan and Programmatic EIS. Following Hurricane Katrina in 2005, Ms. Young was responsible for NEPA compliance for 21 Hurricane Katrina disaster recovery projects (funded by FEMA and the U.S. Department of Housing and Urban Development) across the Mississippi Gulf Coast, and she was task lead for NEPA environmental compliance for the Galveston County (Texas) Housing Assistance Program Round 2 for Hurricane Ike. These disaster recovery projects required preparation of NEPA EAs and in some cases included Phase I ESAs, Phase II ESAs, and environmental remediation. Ms. Young is familiar with U.S. Fish and Wildlife Service (USFWS) Habitat Evaluation Procedures (HEP) and other methods of determining non-monetary values of fish and wildlife resources and evaluating suitability, assessing habitat impacts, and formulating mitigation. Ms. Young was actively involved in the development of the Grand Bay National Estuarine Research Reserve/National Wildlife Refuge Land Acquisition and Habitat Management project. The Project consisted of acquisition of up to 8,000 acres and land management of up to 17,500 acres. Historic project development included Habitat Equivalency Analysis (HEA) to determine the marsh benefits from acquisition and management actions. Monitoring data will be collected to assess project success using the USFWS Rapid Assessment Metrics to Enhance Wildlife Habitat and Biodiversity within Southern Open Pine Ecosystems, which includes metrics on wet longleaf and slash pine flatwoods and savannas. Ms. Young was also actively involved in the development of the Hancock County Marsh Living Shoreline Project, which includes the construction of approximately six miles of breakwater (Living Shoreline) and the creation of 46 acres of subtidal reef and 46 acres of marsh. Project development included HEA to determine marsh benefits resulting from reduced shoreline erosion and the creation of marsh. Project development also included Resource Equivalency Analysis to determine the biomass of secondary productivity that will result from the colonization of the breakwater, establishment of the living shoreline/reef, and colonization of the subtidal reef. Monitoring data will be collected to assess project success.