

# Methodology and Contributor Biographies

# METHODOLOGY



# Introduction

In the development of the Report Card grades, seven fundamental components of the infrastructure were considered. These components were not weighted. The grade for each category was allocated at the discretion of each infrastructure subcommittee on the basis of their review and analysis of the data. These subcommittees may have determined grades on the basis of a particular plus or minus in any of the components. The fundamental components assessed were:

- **Capacity** – Evaluation of the infrastructure’s capacity to meet current and future demands.
- **Condition** – Evaluation of the infrastructure’s existing or near future physical condition.
- **Funding** – Identification of the current level of funding (from all levels of government) for the infrastructure category and comparison to the estimated funding need.
- **Future Need** – Evaluation of the cost to improve the infrastructure and determination of whether future funding prospects will be able to meet the need.
- **Operation & Maintenance** – Evaluation of the owners’ ability to operate and maintain the infrastructure properly and determination that the infrastructure is in compliance with government regulations.
- **Public Safety** – Evaluation of to what extent the public’s safety is jeopardized by the condition of the infrastructure and what the consequences of failure may be.
- **Resilience** – Evaluation of the infrastructure system’s capability to prevent or protect against significant multi-hazard threats and incidents and the ability to expeditiously recover and reconstitute critical services with minimum damage to public safety and health, the economy, and national security. (For more information on resilience, see below.)

## Grading Criteria

The *2010 Report Card for Indiana’s Infrastructure* followed a traditional letter grade scale.

- A = 90-100%
- B = 80-89%
- C = 70-79%
- D = 51-69%
- F = 50% or lower

## Research and Grading Process

1. Review available data or surveys for each category. Data collected will be used as follows:
  - Assess infrastructure using existing reported grades

- Identify current amount being spent and dollars needed to replace existing infrastructure, in most recent available year
  - Identify dollars needed to upgrade infrastructure to meet future needs
  - Identify percent capacity of problem
  - Identify quantity of infrastructure, number of bridges, miles of road, pipe, etc.
  - Assess consequences of doing nothing
2. Compile and analyze the data, resulting in the development of a summary report. The following criteria will be used in presenting the data:
    - Total need defined by dollars needed
    - Existing and future needs and current funding levels
    - Percent of capacity represented by the problem
    - Quantity that the problem represents
    - Consequences of doing nothing
  3. Determine an initial grade.
  4. Analyze, validate, and determine final grade.

## Resilience

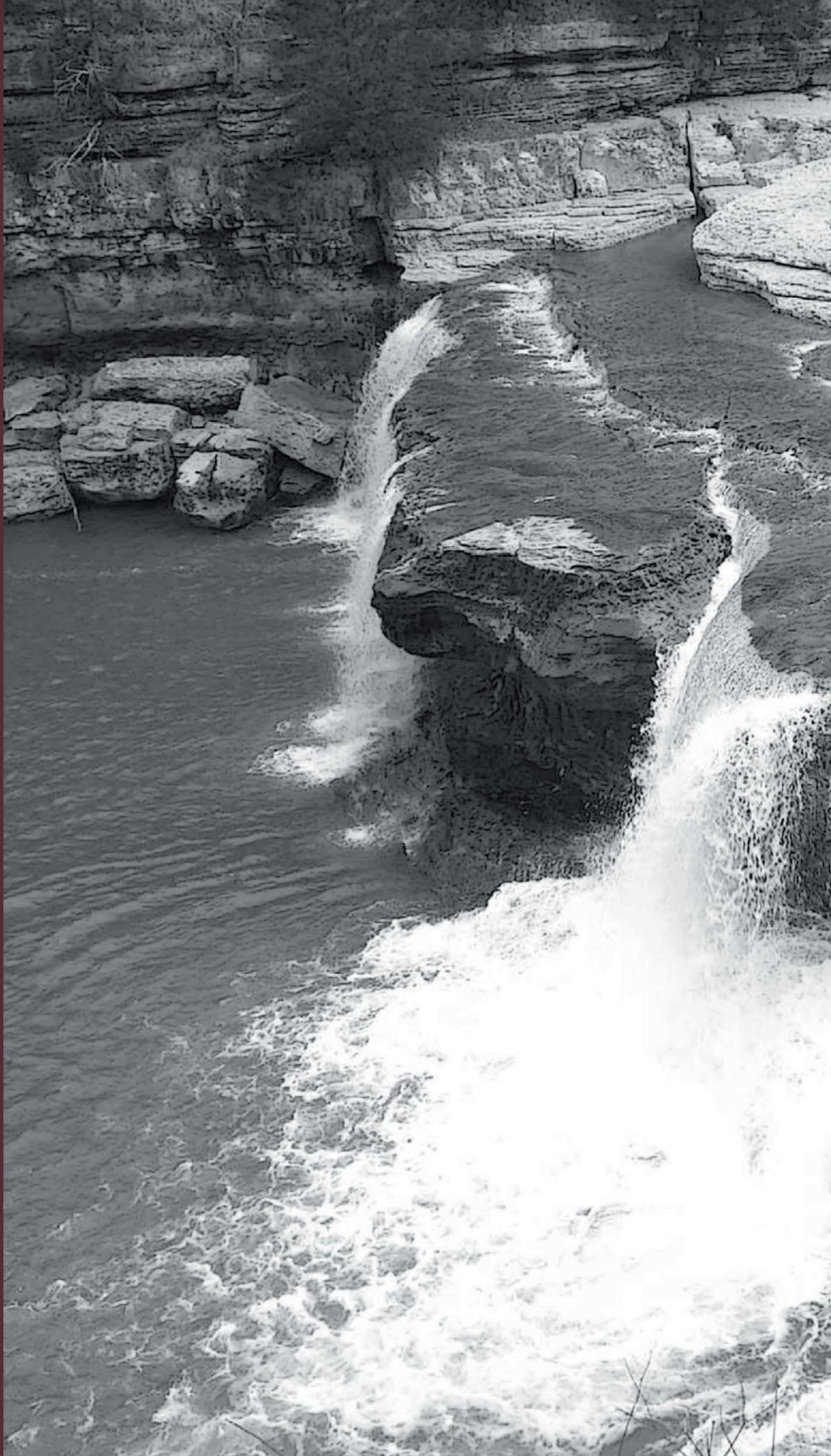
Infrastructure resilience is the capability of systems to prevent or protect against significant multi-hazard threats and the ability to rapidly recover and ensure continuity of critical services, with minimal negative impact to public health and safety. In evaluating resiliency for each of the seven categories, the following criteria were considered:

- Risk and consequence management (both within each sector and across sectors)
- Life-cycle maintenance
- Sector and system interdependencies
- Time, ease, and cost of recovery

As the metrics for evaluating resilience are in their infancy, the *2010 Report Card for Indiana’s Infrastructure* includes brief qualitative comments for each category. There is an overarching need to develop multi-hazard risk assessments for each sector and use them to inform public perceptions and priorities.

As applied to infrastructure, the concept of evaluating resilience embodies a shift from a strategy based on pure protection to one that ensures the continuity of operations in the face of aging as well as man-made and natural hazards. The scope of resilience includes security, disaster preparedness and mitigation, and response and recovery activities. A strong, prosperous, and competitive nation must develop and maintain a resilient infrastructure.

# CONTRIBUTOR BIOGRAPHIES



**AZIZ AHMED, PE**, is a project manager at RW Armstrong in Indianapolis. He has over 14 years of diversified experience in developing water resources plans, infrastructure master plans, system models, and capital improvement programs. He is an experienced manager in design and construction management. Mr. Ahmed is a member of AWWA's Water Resources Management Committee, Climate Change Committee, and Water Supply & Distribution Facilities Design & Construction Committee. He is very active in local chapters of AWWA.

**RICHARD O. ALBRIGHT, PE, F.ASCE, F.ACI**, is a professional engineer in the state of Indiana. He has worked for civil and structural engineering consulting firms and for organizations in the cement and concrete industries, and has been a county engineer. He has served ASCE at the local, state, and national levels as elected officer and as committee member and chairman.

**JENNIFER M. ALFORD, PE, PTOE, M.ASCE**, studied Civil Engineering at The Ohio State University where she earned her bachelor's degree in 1997. She is currently a senior project engineer in the Columbus, Ohio, office of American Structurepoint, Inc., a multi-discipline consulting firm, where she has worked since 2000. Her resume includes railroad grade separations, traffic studies, traffic signal design, highway design, roundabout design, and site development. She is a licensed professional engineer in Ohio and a professional traffic operations engineer through the Institute of Transportation Engineers. She has been an active member of ASCE for 10 years and assisted with the Ohio Infrastructure Report Card last year. She received the 2006 Young Engineer of the Year award from the Ohio Society of Professional Engineers for her contributions to the engineering profession in the state.

**MICHAEL R. CLINE, PE, M.ASCE**, is a vice president and director of Engineering Operations at Hanum, Wagle, and Cline Engineering. Mr. Cline has over 33 years of experience specializing in the study, master planning, design, and construction of water systems, stormwater drainage systems, and wastewater treatment and collection systems. Mr. Cline is an active member of the American Water Works Association, Indiana Water Environmental Association, and American Consulting Engineers Council, and is a diplomat with the American Academy of Environmental Engineers. He is recognized by the Indiana Department of Environmental Management as an authority in the planning and design of water and wastewater

systems and sits on several national environmental engineering committees. Mr. Cline received his BS in Civil Engineering from Ohio State University.

**REBECCA A. CRANE, EI, AM.ASCE**, studied Civil Engineering at Brigham Young University, where she received her bachelor's degree in 2006. She is currently a project engineer for URS Corporation's Indianapolis office. She has experience in roadway design, assisting in geometric design, drainage design, and the preparation of contract plans and engineers estimates for rural and urban transportation projects. During her pre-undergraduate experience, Ms. Crane researched cement-treated base pavements, chloride concentration on bridge decks, and pavement durability, resulting in five peer-reviewed publications. She is an active member of ASCE.

**DAVID P. DEVINE, PE, LS**, has been a member of ASCE for 23 years and is active at the branch, section, and national level. He is the current chair of the Committee on Licensure and Ethics for ASCE and is on the editorial board of the ASCE journal Leadership and Management in Engineering. He also currently serves on the ASCE Board-level Paraprofessional Task Committee. He has been teaching at the university level for the past nine years and has worked in engineering consulting, government, and international development for 11 years.

**RICHARD E. DURHAM, PE, LS, F.ASCE**, studied Civil Engineering at Tri-State University, where he earned his bachelor's degree in 1979. He is currently the president of DURHAM Engineering, Inc., in Anderson, Indiana, a consulting firm serving all of Indiana. Mr. Durham has been with DURHAM Engineering since 1988 when he formed the company. His resume includes transportation design for roadway and aviation reconstruction and rehabilitation projects, including interstate highways, urban roads, and rural routes, as well as airport runways, taxiway and apron design. He is a licensed professional engineer in three states. Mr. Durham has been an active member of ASCE for over 30 years. He is currently a member of the ASCE Report Card Committee working to improve infrastructure throughout the state of Indiana and the United States. Under his leadership, DURHAM Engineering has received a number of awards for innovative and high-quality transportation projects.

**JOHN E. FISHER, PE, HG, F.ASCE**, is the chairman of the Board for Lawson-Fisher Associates, PC, in South Bend,

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Indiana. Mr. Fisher has over 40 years' experience in hydraulics, hydrology, hydroelectric, water pollution control, water supply, sewage collection, water storage and distribution, highways, sanitary, flood control, drainage, dam projects, park development, and detailed planning projects. Mr. Fisher is a registered professional engineer in ten states and a certified professional hydrologist. Mr. Fisher earned his BS in Civil Engineering from the University of Notre Dame in 1966 and his MS in Civil Engineering from Notre Dame in 1968.

**R. JERRY FROST, PE, M.ASCE** has over 25 years of design and consulting experience in the bridge, roadway, and transportation industries from both the public and private business organizations throughout his career. Mr. Frost has a BS in Civil Engineering from Ohio Northern University, MS in Civil Engineering from Penn State University, and MBA from University of Maryland, University Center. He worked for the Pennsylvania Department of Transportation and multiple consulting firms before opening his own firm in 2005. He has been actively involved with ASCE for nearly his entire professional career. He is licensed in over ten states.

**BART GIESLER** has been actively representing Indiana airports for nearly 20 years. Mr. Giesler started lobbying for Aviation Association of Indiana (AAI) in 1992 and later became the association's executive director. AAI represents all aspects of aviation in Indiana, and membership includes general aviation airports, commercial service airports, fixed based operators, state universities, and airport consultants and suppliers. AAI hosts three quarterly meetings and an annual meeting in the fall. At these meetings, airport representatives hear presentations from the FAA, the Indiana Department of Transportation Office of Aviation, Transportation Safety Administration and other informative speakers. AAI is recognized as the voice of aviation in the state.

**KATHERINE E. GRAHAM, PE, M.ASCE**, is a civil engineer employed at American Structurepoint, Inc., in Indianapolis, Indiana. Ms. Graham has been at American Structurepoint for six years and has been involved in planning, design, and construction of drinking water, wastewater, and stormwater projects ranging from general consulting for sewer districts to complex and phased approaches to

larger drinking water, wastewater, and stormwater design projects. Ms. Graham is currently a member of the ASCE Metropolitan Indianapolis Branch of the Indiana Section and is also involved with the branch Environmental and Water Resources Institute and chairs the Continuing Education Committee. Ms. Graham graduated from Purdue University in 2004 with a BS in Civil Engineering.

**THERESA HARRISON, PE, M.ASCE**, is a senior engineer and corporate safety office for Lawson-Fisher Associates, PC, in South Bend, Indiana. Ms. Harrison has over 18 years of transportation experience. She is a member of ASCE, ITE, and APWA, and has received her BS and MS in Civil Engineering from the University of Michigan.

**ZACH HURST, PE**, is the chief design engineer for the St. Joseph County Department of Public Works. Mr. Hurst oversees the bridge program for St. Joseph County, which includes inspecting, monitoring, plan review, budgeting, and design of approximately 260 structures ranging in length from 4 feet to 400 feet. Prior to joining St. Joseph County, Mr. Hurst spent four years in the private sector doing structural design on projects ranging from railroad underpasses to senior living facilities. Mr. Hurst is a 2004 graduate of the University of Illinois with a BS in Civil Engineering. He is a licensed professional engineer in the state of Indiana, and a member of the American Society of Civil Engineers.

**JARED HUSS, PE, M.ASCE**, is a civil engineer employed at Lawson-Fisher Associates, PC, in South Bend, Indiana. He has been there for seven years and has been involved in designing transportation projects ranging from complex geometric interchanges to local public intersections and roads. Mr. Huss has also been involved in the monitoring and assessment of various hydroelectric dams. He is a past president of the ASCE North Central Branch of the Indiana Section and is currently a member. Mr. Huss graduated from Tri-State University in 2003 and has a BS in Civil Engineering.

**KELLY LAVALLEY, PE**, is a civil engineer employed at United Consulting in Indianapolis, Indiana. Ms. LaValley has six years of experience in the wastewater and drinking water industries. She is currently a member of the ASCE Metropolitan Indianapolis Branch of the Indiana Section

and is also involved in other wastewater and drinking water professional associations, including WEF and AWWA. Ms. LaValley received her MS in Civil Engineering from Colorado State University.

**NATHAN LIENHART, PE**, has been involved in the aviation development industry as a consultant to airports for over eight years. As an employee of RW Armstrong since graduation from college, his experience ranges from municipal general aviation airports to large commercial/cargo airports, including both domestic and international. Mr. Lienhart attained a BS in Civil Engineering from Tri-State University (now Trine University) in 2002 and currently holds active professional engineering licenses in 11 states and two commonwealth territories of the United States. Prior to graduation, Mr. Lienhart participated in several internship and cooperative education endeavors ranging from construction materials testing to consulting engineering and surveying.

**RANDY LINDLEY, PE, CPSWQ** is a graduate of Purdue University, holding a BS in Interdisciplinary Engineering. He is a professional engineer in the states of Indiana, Michigan, and Wisconsin. He holds a Class IV and D Wastewater Operator Certification in Indiana. He is also a certified professional stormwater quality (CPSWQ) through EnviroCert International, Inc. Mr. Lindley is experienced in all components of wastewater, water, and stormwater projects, including planning, design, and construction. As a senior civil engineer with Lawson-Fisher Associates, PC, his responsibilities include the preparation of engineering reports, design plans and specifications, and performing construction administration for a variety of municipal infrastructure projects. Mr. Lindley is also knowledgeable about the regulatory and permitting aspects of environmental infrastructure projects.

**DR. SCOTT LUDLOW, PE**, is a principal engineer with Earth Exploration, Inc., in Indianapolis and has 25 years of consulting experience in geotechnical engineering. During his career, he has been involved in several projects throughout the United States, ranging from small-scale site investigations to complex studies involving such special considerations as excavation support and earth retention systems, dams and embankments, seismic stability and deformations, machine vibrations, soil nailing

and earth reinforcement, in-situ testing, and deep foundations. He has contributed to the development of Indiana Department of Natural Resources' document titled "General Guidelines for New Dams and Improvements to Existing Dams in Indiana" and is a member of ASCE's Earth Retaining Structures committee. Dr. Ludlow has also authored or coauthored numerous research reports and technical articles and is a professional engineer in 20 states.

**MICHAEL L. MCCOOL JR., PE**, is a graduate of Purdue University, holding an MS in Civil Engineering and a BS in Aeronautical and Astronautical Engineering. He is a professional engineer in the states of Indiana and West Virginia, and an INDOT-certified team leader with certification to inspect complex bridges. Additionally, he serves as a member of the INDOT/ASCE Structural Committee and the County Bridge Conference Planning Committee, and as vice-chair of the National PCI Committee on Bridges. Mr. McCool also volunteers as a guest lecturer for a masters-level course on LRFD bridge design at Purdue University. Mr. McCool is experienced in all phases of bridge design and inspection projects. As manager of the Beam, Longest and Neff, LLC, Bridge Department, his responsibilities include the supervision of design and plan development for bridge replacement and rehabilitation projects. Mr. McCool has been utilizing the AASHTO LRFD Bridge Design Specifications on his West Virginia projects since 1998. His focus has been in the design of various structures for transportation projects and completing county-wide bridge inspection projects.

**JEFF MCKEAN, PE, M.ASCE**, is a civil engineer employed at Lawson-Fisher Associates, PC, in South Bend, Indiana. Mr. McKean has 20 years' experience in the wastewater and drinking water industry. Mr. McKean is currently a member of the ASCE North Central Branch of the Indiana Section and is also affiliated with other water and wastewater professional organizations, including WEF and AWWA. Mr. McKean graduated from Southern Illinois University at Edwardsville in 1990 with a BS in Civil Engineering.

**BRIAN MCKENNA, PE, CFM**, is a civil engineer employed at Christopher B. Burke Engineering, Ltd., in Indianapolis, Indiana. Mr. McKenna has nine years of experience in

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dams and spillways, levees and flood control structures, stream relocation and rehabilitation, bridge and culvert modeling, stormwater master planning, and stormwater and sanitary sewer design. Mr. McKenna is a member of the ASCE Metropolitan Indianapolis Branch of the Indiana Section and is also involved in the branch Environmental and Water Resources Institute. Mr. McKenna graduated with a BS in Civil Engineering from the University of Evansville in 1999 and an MS in Civil Engineering from Colorado State University in 2001.

**SKY K. MEDORS, PE, CFM**, earned his bachelor's degree from Purdue University in 1996. He is currently a senior civil engineer at the firm of Lawson-Fisher Associates, PC, in South Bend, Indiana. Sky has significant experience in inspections, site investigations, analyses, design, construction, and emergency action plan development for dam safety projects. He is a registered professional engineer in Indiana, Michigan, and Ohio, and a certified floodplain manager in Indiana. His professional affiliations include the Association of State Dam Safety Officials, United States Society on Dams, Association of State Floodplain Managers, Association of Conservation Engineers, Indiana Association of Floodplain Managers, and American Society of Civil Engineers. Mr. Medors has also served as chairman on ASDSO's New Member Committee.

**TERRY RAINIER, PE** joined RW Armstrong in 1976 after graduating from Purdue University with a bachelor's degree in Civil Engineering. Mr. Rainier started as a project engineer for airport development projects and worked his way up to director of airports and managing partner for RW Armstrong. Through Mr. Rainier's 34 years in the aviation industry, he has worked extensively with air carrier airports, commercial service (Part 139 certificated) airports, joint military/civil airports, privately owned airports, and general aviation airports covering more than 75 airports. Mr. Rainier is also a board member and current president of the Aviation Association of Indiana.

**AMY ROTH, PE**, is a project engineer at Jones & Henry Engineers, Ltd. Ms. Roth is a member of the Michigan and Indiana Sections of ASCE.

**NILESH SHRINGARPURE, EI**, is a civil engineer at Clark-Dietz Engineers in Indianapolis, Indiana.

**PIPER TITTLE, PE, M.ASCE**, is a vice president at Lawson-Fisher Associates, PC, in South Bend, Indiana. Ms. Tittle has 20 years of experience in water resources projects. She is a member of ASCE, WEF, and AWWA, and received her BS and MS in Civil Engineering from the University of Washington.

**MICHAEL WENNING, PE, F.ASCE**, studied civil engineering at the US Coast Guard Academy before transferring to Purdue University where he earned his BS in Civil Engineering in 1981. He is currently a department manager for both the Indianapolis, Indiana, and Columbus, Ohio, offices of American Structurepoint, Inc., a multi-discipline consulting firm, where he has worked since graduation. His resume includes over 500 bridge replacement and rehabilitation projects, including highway, railroad, and pedestrian structures. He is a licensed professional engineer in four states. He has been an active member of ASCE for over 25 years. Mr. Wenning received the 2004 Indiana Engineer of the Year award for his contributions to the engineering profession in the state. He is currently a member of the INDOT/ASCE Structures Committee working to improve bridge design throughout the state. Under Mr. Wenning's leadership, the Bridge Department at American Structurepoint has received a number of awards for innovative and high-quality bridge and transportation projects.

**MICHAEL S. WIGGER, PE, AM.ASCE**, studied civil engineering at Purdue University where he earned his bachelor's degree in 1999 and his master's degree in Geotechnical emphasis in 2000. He is currently the geotechnical engineering manager at Earth Exploration, Inc., in Indianapolis, Indiana—a firm specializing in geotechnical engineering, geophysical testing, construction monitoring and materials testing, and laboratory and exploratory field services. His resume includes project coordination, report preparation and review, client development, proposals, and invoice preparation. Mr. Wigger's work is focused toward public-funded projects with geotechnical involvement ranging from consultation to design of bridge foundations, earth retention systems, dams, tunnel-related elements, roadways, and other infrastructure improve-

ments. He is currently on the Board of Directors of the Metropolitan Indianapolis Branch of ASCE and is a director of the Geotechnical Group. He has also served on planning committees for the Purdue Geotechnical Society and the Indiana County Bridge Conference. Mr. Wigger is a registered professional engineer in Indiana.

**JAMES A. WURSTER, PE, LS, AIA, M.ASCE**, is the founder of American Structurepoint, Inc., in Indianapolis, Indiana. Mr. Wurster started the company as primarily a transportation firm that, under his leadership, expanded to several areas of expertise, including roads, bridges, water, wastewater, surveying, civil-site design, structural engineering, forensic engineering, and architecture. Mr. Wurster is a graduate of Purdue University.

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