AECOM
12420 Milestone Center Drive
Suite 150
Germantown, Maryland 20876
www.aecom.com

301.820.3000 tel
301.820.3009 fax

February 28, 2017

Ms. Jessica Chambers
State of West Virginia
Department of Administration, Purchasing Division
2019 Washington Street East
Charleston, West Virginia 25305

Subject: **Expression of Interest**
Flood Warning & Analysis Mapping
Solicitation Number: **CEOI 0606 HSE1700000003**

Dear Ms. Chambers:

The State of West Virginia is looking for a vendor to support the State in developing accurate approximate 1-percent-annual-chance floodplains to better identify flood risk and build safer communities that are resilient to storm events. To assist the State, AECOM has built a team that offers unparalleled experience, expertise, innovation, and foresight to serve the State in this initiative. Our project team comprises engineering, mapping, and hazard mitigation professionals who know and understand hydrology and hydraulics, floodplain mapping, and local community mitigation germane to West Virginia. In short, we are offering the State:

Licensed Qualified Staff – A project team with extensive relevant experience, local presence, and knowledge, having worked throughout West Virginia since 1953.

Mapping Program Leadership – An industry leader in floodplain mapping and flood hazard analysis. We have produced approximately 40 percent of FEMA's mapping inventory nationwide. Additionally we have worked with 25 state Cooperating Technical Partners (CTPs) to update their flood mapping and provide expertise in risk analysis and mitigation.

Knowledge of the Region – Familiarity with the flood risks and mitigation challenges associated with the Appalachian Mountain and Plateau regions.

Thank you for the opportunity to showcase our staff qualifications and past performance on similar scope projects and to offer our approach to flood hazard analysis and mapping. The attached Expression of Interest provides details to affirm our claim to be the industry leader for flood hazard analysis and mapping. We are confident that this submittal demonstrates our experience and successful past performance on similar scope projects.

If you require additional information or would like to meet the AECOM team, please contact our proposed Program Manager, Christine Estes, PE, CFM at 301.820.3282 or christine.estes@aecom.com.

Sincerely,
AECOM Technical Services, Inc.

John D. Bowers, PE
Vice President

Christine Estes, PE, CFM
Program Manager

02/27/17 09:36:53
WV Purchasing Division

Purchasing Divison
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Expression of Interest
02 — Architect/Engr

Proc Folder: 281223

Doc Description: Flood Warning & Analysis Mapping- Expression of Interest

Proc Type: Central Contract - Fixed Amt

Date Issued	Solicitation Closes	Solicitation No	Version
2017-02-01	2017-02-28 13:30:00	CEOI 0606 HSE1700000003	1

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Name, Address and Telephone Number:

AECOM Technical Services, Inc.
12420 Milestone Center Drive, Suite 150
Germantown, Maryland 20876
phone: 301.820.3000

FOR INFORMATION CONTACT THE BUYER

Jessica S Chambers
(304) 558-0246
jessica.s.chambers@wv.gov

Signature X [signature] **FEIN #** 95-2661922 **DATE** February 24, 2017

All offers subject to all terms and conditions contained in this solicitation

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

Christine Estes

(Name, Title)
Christine Estes, PE, CFM, Program Manager

(Printed Name and Title)
12420 Milestone Center Drive, Suite 150, Germantown, MD 20876

(Address)
301.820.3282 (phone) 301.820.3009 (fax)

(Phone Number) / (Fax Number)
christine.estes@aecom.com

(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

AECOM Technical Services, Inc.

(Company)

John D. Bowers, Vice President

(Authorized Signature) (Representative Name, Title)

John D. Bowers, PE, Vice President

(Printed Name and Title of Authorized Representative)

February 24, 2017

(Date)

301.820.3152 (phone) 301.820.3009 (fax)

(Phone Number) (Fax Number)

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: AECOM Technical Services, Inc.

Authorized Signature: _____ Date: February 24, 2017

John D. Bowers, PE, Vice President

State of Maryland

County of Montgomery, to-wit:

Taken, subscribed, and sworn to before me this 24th day of February, 2017.

My Commission expires November 19, 2017.

AFFIX SEAL HERE

SHARON A. SMITH NOTARY PUBLIC MONTGOMERY COUNTY MD

NOTARY PUBLIC Sharon A. Smith

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CEOI 0606 HSE 1700000003

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[X]	Addendum No. 1	[ ]	Addendum No. 6
[ ]	Addendum No. 2	[ ]	Addendum No. 7
[ ]	Addendum No. 3	[ ]	Addendum No. 8
[ ]	Addendum No. 4	[ ]	Addendum No. 9
[ ]	Addendum No. 5	[ ]	Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

AECOM Technical Services, Inc.
Company

John D. Bowers, PE, Vice President
Authorized Signature

February 24, 2017
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.
Revised 6/8/2012

Contents

A. Qualifications and Experience 1

Introduction 1

1. Licensed Professional Engineers 3
2. Staff Qualifications and Experience 4
3. Meeting Client Expectations, Schedules and Budgets 14
4. References 15
5. Staffing Plan 16
6. Past Projects 19

A. Qualifications and Experience

AECOM's vision is to be a dependable, trusted, and innovative partner to the State of West Virginia.

Introduction

AECOM, through its legacy companies, including URS Corporation, has been providing engineering services to the State of West Virginia since the 1950s. Since 2009, AECOM has also worked closely with the Federal Emergency Management Agency (FEMA) Region III under the Risk MAP Production and Technical Services contract. We have performed hundreds of flood studies for the Region, including in West Virginia.

AECOM is a premier, fully integrated professional and technical services firm positioned to design, build, finance, and operate infrastructure assets around the world for public and private-sector clients. With over 85,000 employees—including architects, engineers, designers, planners, scientists, and management and construction services professionals—we serve clients in over 150 countries around the world. AECOM is ranked as the #1 engineering design firm by revenue in *Engineering News-Record* magazine's annual industry rankings and has been recognized by *Fortune* magazine as a World's Most Admired Company. AECOM provides a blend of global reach, local knowledge, innovation, and technical excellence in delivering customized and creative solutions that meet the needs of clients' projects.

AECOM has prepared this submittal to present our team, interest in, and qualifications for performing riverine flood hazard analysis and mapping services for the Division of Homeland Security and Emergency Management (DHSEM) in response to your Request for Expression of Interest. AECOM offers DHSEM a unique combination of capabilities and experience:

- Successful nationwide completion of hydrologic and hydraulic (H&H) modeling and mapping covering 200,000+ square miles of land area and 135,000+ miles of stream.
- A Program Manager that has direct, relevant experience with FEMA's Risk Mapping, Assessment and Planning (Risk MAP) program nationwide and specifically with FEMA Region III.
- Experience and knowledge working in West Virginia for more than 60 years.
- Recent experience in West Virginia, providing the exact services requested. AECOM performed a flood study for Jefferson County, WV, which included the development of advisory flood heights for over 100 miles of stream and creating deliverables for the WV Flood Tool.
- A long history of assessing and modeling flood risk, responding to flooding events, and conducting proactive mitigation planning working with all levels of government, from federal to state to local communities.
- A dedicated staff of over 500 engineers, and geographic information system (GIS) professionals who work full time on watershed and Special Flood Hazard Area projects.
- Experience conducting or reviewing flood studies in over 1,000 counties nationwide and in every FEMA region, and producing over 43,000 Flood Insurance Rate Map (FIRM) panels.
- State-of-the-art local, regional, and national technical capabilities and subject matter expertise, enabling us to provide additional services that the State might need, such as sophisticated two-dimensional (2D) hydraulic and levee modeling, dam breach analysis,

Hazus and risk assessments, and efficient floodplain characterization.

- Intricate knowledge of FEMA's programs and Risk MAP. AECOM has been serving as a contractor for FEMA and numerous states and partners for over 40 years. In this capacity, our team members work routinely with FEMA Headquarters and Region III on technical studies, giving us a comprehensive understanding of the overall direction and evolution of the Risk MAP program.
- A strong history of meeting working with clients budget and schedule requirements.
- AECOM has a nation-wide presence on helping clients meet their communication and outreach goals.

More than 60 Years of Experience in the State

AECOM's work in the West Virginia began in 1953 with a small project to investigate the water and sewer system for the Town of Union in Monroe County, and over the years, expanded to full program work throughout the State. Other legacy projects in West Virginia include the architectural and engineering design of our nation's first automated People Mover Transit System in Morgantown and the Charleston Coliseum design. We also converted a military base in Martinsburg to accommodate one of the largest aircraft in the world, designed a 1,200-inmate federal prison on a mountaintop-removal coal mine site, promoted green infrastructure on a variety of projects, and provided engineering services for highways and bridges throughout the State. Our West Virginia offices have performed work in every county in West Virginia.

AECOM's West Virginia presence is reflected through our two offices in Morgantown and Kenova. Our Morgantown office has four Professional Engineers (PE) and one GIS professional that can support this contract. We continue to grow in our expertise and are adding team members who enhance the services we are able to provide to our clients.

Our staff in the Morgantown office has a long history with flood mapping and GIS in the State, particularly north-central West Virginia. We have been involved with local planning and GIS development in Monongalia County for over 10 years and are familiar with the mapping resources available to GIS professionals in the State. In addition to our GIS staff, the Morgantown office is also home to a strong and respected transportation group working daily with the West Virginia Department of Transportation and other State agencies. Our staff routinely address bridge hydraulic and floodplain studies associated with roadway crossings of streams in counties around the State. In West Virginia, AECOM is also a recognized leader in planning, design, visualization, alternatives analysis, cost estimation, prioritization, and public involvement.

For FEMA Region III, AECOM performed a hydrology and hydraulics analysis and floodplain mapping of over 3,000 miles of new Zone A; including over 100 miles for Jefferson County, WV. We have performed Discovery tasks and developed Flood Risk Products for six HUC-8 watersheds in the Region, including the Conococheague-Opoquon Watershed, which covers four states, including West Virginia.

Recently AECOM was the lead for a FEMA-initiated flood study in the Upper Monongahela Watershed. This project involved the production of Non-Regulatory Flood Risk Products for the entire Upper Monongahela Watershed and new detailed flood studies for selected stream reaches. Through the discovery process available data was collected, which included coordinating with local officials and other stakeholders. This information was reviewed and in coordination with FEMA Region III, it was decided that approximately 15 total miles of stream would be studied, including various stream reaches in and around the Cities of Morgantown and Fairmont.

Upper Monongahela Watershed Risk MAP study performed by AECOM

Under contract with the Canaan Valley Institute (CVI), AECOM developed the first Digital Orthophoto Quarter Quadrangle (DOQQ)-based FIRM for Hampshire County in 2000. We performed the hydraulic analysis to evaluate the 1-percent-annual-chance flood for the Zone AE streams in the county, totaling approximately 58 miles of new study. We also conducted flood studies and FIRM production for Gilmer and Preston Counties for CVI.

Additionally, AECOM has worked for the U.S. Army Corps of Engineers (USACE) Huntington District for the past 16 years. Our USACE work in the State includes the update of master plans for flood control projects throughout West Virginia and design, installation, and operations and maintenance of the Automatic Data Acquisition Systems (ADAS) at Bluestone Dam.

Local Presence – National Knowledge

The team assembled for the State of West Virginia combines our local experience with our national knowledge of floodplain mapping. AECOM has been performing floodplain mapping for FEMA, states, and local agencies throughout the United States for over 40 years. As a FEMA contractor, we have continuously improved our production processes and tools so that we can produce countywide and watershed floodplain studies and FIRM updates better, faster, and more cost-effectively.

AECOM's goal is to be a dependable, trusted, and innovative partner to the State of West Virginia. Together, we want to help build a stronger West Virginia with safer, smarter, and more sustainable communities.

AECOM's vision for meeting the State's needs is rooted in decades of experience serving Cooperating Technical Partner (CTP) states throughout the country. AECOM has partnered with 42 of FEMA's CTPs, including 25 states, under 75 different Mapping Activity Statements (MASs). AECOM is currently a CTP contractor for statewide floodplain mapping projects for several Regions throughout the country. Some states where AECOM currently holds state CTP contracts include Colorado, Delaware, Georgia, Iowa, Kansas, Mississippi, New Jersey, New York, North Carolina, South Carolina, Puerto Rico and Utah. Our project team has been involved from start to finish, from a CTP perspective, and we are ready to help solve any challenges that DHSEM might face. This experience enables AECOM to anticipate change and develop tools, guidance, and training materials to help clients successfully implement their comprehensive Risk MAP program across communities, states, and regions.

AECOM has nationwide project experience working for state and local CTPs and FEMA

We will continue to build upon our recent accomplishments by increasing flood risk awareness and engaging communities to fully understand new flood maps. This will help them take action to reduce potential loss of life and property from flood hazards. We will support the State in identifying flood hazard mitigation actions and we will effectively communicate and explain those actions to its citizens through creative and effective community engagement and outreach activities.

1. Licensed Professional Engineers

AECOM is licensed to practice engineering in the State of West Virginia. Our proposed Program Manager, Christine Estes, is a both a Registered PE and a Certified Floodplain Manager (CFM) and possesses more than 16 years of engineering and mapping experience. Our project team also includes licensed PEs in West Virginia, including our Hydrology and Hydraulics Technical Advisor, David Weaver, PE. Ms. Estes is able to apply for a WV PE license through reciprocity and expects to receive her licensure before contract award.

2. Staff Qualifications and Experience

Our proposed team for this project was carefully selected to provide the State with a strong local presence while leveraging our state-of-the-art regional and national expertise, which only a large specialized firm such as AECOM can provide. AECOM brings professional quality, plus a staff that is strongly committed to supporting West Virginia in delivering its mapping program.

AECOM's proposed project team's knowledge and understanding of the National Flood Insurance Program (NFIP) has been developed through our long-term relationship with FEMA and our involvement with local and state agencies. Our staff working at the Regional Support Center in Philadelphia are considered an extension of the Regional staff. We have a close relationship with FEMA Region III that will benefit the State of West Virginia when coordinating flood studies.

Key Personnel

Program Manager – Christine Estes, PE, CFM. Ms. Estes has over 18 years of experience in civil and environmental engineering, as well as more than a decade of project management experience managing multi-disciplinary teams for large water resources engineering and mapping contracts. Ms. Estes is the department head for AECOM's Floodplain Analysis and Coastal Engineering group located in Germantown, MD. This group comprises more than 56 staff specializing in water resources, mapping, FIRM processing, hydrology and hydraulics, and technical support to the FEMA Production and Technical Services (PTS) contracts. For over 6 years, she has served as the AECOM Program Manager for all Risk MAP work performed for FEMA Region III. She has extensive floodplain management experience and has worked on FEMA studies since the start of her career. She has prepared complex H&H models for rivers, reservoirs, and watersheds. Her modeling and software expertise includes HEC-RAS, HEC-1, HEC-2, HEC-HMS, XP-SWMM, ICPR, and ArcGIS. Ms. Estes has worked on the FIRM production of over 75 countywide studies for which she provided management, engineering, mapping, and/or quality control expertise.

Principal in Charge – John Bowers, PE. Mr. Bowers has more than 36 years of experience in engineering, program management, and company operations. As a Vice President within the Water Business Unit, Mr. Bowers is authorized to negotiate with the State, as well as allocate whatever resources are necessary to meet all requirements under the proposed contract. His work includes management of FEMA technical assistance contracts and he has extensive experience (more than 10 years) managing a large nationwide indefinite delivery/indefinite quantity contracts, overseeing as many as 100 concurrent task orders (TOs), and deploying specialty resources from all over the United States.

Quality Assurance Officer – Joseph Chapman, PE, CFM. Mr. Chapman has more than 29 years of experience in the civil engineering field and will provide quality assurance throughout the duration of the contract. He has extensive experience in floodplain mapping, flood risk assessment, and flood mitigation projects in support of federal, state, and local agencies and has provided post-disaster support ranging from field damage assessments to the development of flood recovery mapping to support rebuilding efforts for the past 25 years. Mr. Chapman has managed and supported over a dozen CTP clients nationwide. Mr. Chapman currently serves as AECOM's North American Technical Practice Leader for Flood and Natural Hazard Risk Management. He has extensive experience delivering quality products for CTPs across the nation.

Hydrologic and Hydraulic Modeling Lead – Michael Seering, PE, CFM. Mr. Seering has more than 13 years of experience in civil and environmental engineering with a focus on water resources and project management. He now serves as the Hydrology and Hydraulics Team Lead for the Germantown, MD office, overseeing nine engineers ranging from junior to senior levels. He has prepared floodplain mapping studies and has performed H&H evaluations for states, FEMA, and USACE throughout the country, including H&H in FEMA Region III.

Hydrologic and Hydraulic Technical Advisor – David Weaver, PE. Mr. Weaver is an experienced project manager who oversees and develops planning studies, engineering design, design-build, and construction management for a variety of project

types and disciplines. Mr. Weaver will assist with the Hydrology and Hydraulics tasks. As branch manager of the Morgantown, WV office, he supervises the operations in that office and coordinates with other AECOM offices around the country.

Mapping, FIRM, and Data Management Lead – David Rubenstein, CFM. Mr. Rubenstein has dedicated his 15-year career to the study, development, and outreach of flood hazard areas for the NFIP. Mr. Rubenstein has over eight years of experience as a Study and Project Manager for AECOM's Water Resources Group. Mr. Rubenstein also has over 13 years of experience in GIS. Mr. Rubenstein has worked on numerous projects in FEMA Region III. Mr. Rubenstein is a long time resident of Hedgesville, WV and is a member of the West Virginia Floodplain Management Association.

Hazard Mitigation Planning Lead/ Community Outreach Lead - Chet Parsons, AICP CTP Mr. Parsons has 19 years of experience in the fields of regional planning, transportation, and hazard mitigation. He has managed planning and recovery efforts for communities in New York, North Carolina, and West Virginia following natural disasters and major storm events. He is skilled in community engagement and recovery planning, helping establish plans and strategies for resiliency and recovery through identification of sensitive areas and opportunities for improvement and redevelopment. He is actively serving the communities of Morgantown, Hurricane, and Huntington as a planning consultant.

Topographic Data Development Lead – Amelia Vincent, PE, CFM. Ms. Vincent brings 18 years of experience in the development of topographic data sources. She serves as a subject matter expert on terrain analysis and development on multiple FEMA contracts in Region III, as well as multiple state contracts. She has extensive experience with ArcGIS, WISE, and HEC-RAS software and Light Detection and Ranging (LiDAR) data processing.

Hazard Mitigation Planning Support – Jae Park, PhD, CFM. Dr. Park has more than 25 years of experience in the areas of hazard mitigation and disaster recovery. He has managed over $400 million in federal and state funding for 11 presidentially declared disaster recoveries and worked with FEMA in establishing hazard mitigation and recovery policies. He provides programmatic management support ranging from National Technical Review of FEMA's Hazard Mitigation Assistance grant applications and Benefit-Cost Analysis (BCA) training to program guidance and policy development for the agency.

Community Outreach Support – Ann Terranova, CFM. Ms. Terranova has created, managed, and implemented strategic community engagement and outreach programs to assist clients in solving highly controversial and complex technical and environmental problems. Through demonstrated experience, she knows how to successfully plan for and complete community engagement and risk communications projects. Ms. Terranova served as the Risk Communications and Outreach Lead for former URS, now AECOM, participation as a joint venture member company for Risk MAP. Ms. Terranova also served as the Task Leader and Senior Community Planner for FEMA's Long-Term Community Recovery program conducting needs assessments for coastal communities in Mississippi and Texas impacted by Hurricane Katrina.

Quality Control Lead – Jeffrey Sengebusch. Mr. Sengebusch is a FIRM Processing Team Leader with 15 years of experience working with the NFIP, including quality assurance / quality control (QA/QC) reviews of FIRMs and Flood Insurance Study (FIS) Reports, FIRM and FIS production, and all aspects of Post-Preliminary Processing. He possesses extensive knowledge of FEMA Guidelines and Specifications, and has conducted QA/QC reviews on over 350 FISs, including more than 30 in Region III and more than 10 in West Virginia. Mr. Sengebusch is also the Project Manager for several NFIP FISs in Region VI for which he manages all financial and production aspects.

Table 1 below demonstrates the experience of the key personnel with projects that are directly relevant to the scope proposed by the State.

Table 1: AECOM Staff Experience on Relevant Projects

Name	FEMA Production Technical Services A&E	FEMA Risk MAP	North Carolina Floodplain Mapping	South Carolina Flood Mapping	Delaware Flood Mapping Study	Kentucky Statewide Map Modernization	Kansas Flood Mapping	FEMA Hazard Mitigation	Monongalia County Planning and GIS support WV
Christine Estes, PE, CFM	■	■	■	■	■	■	■	■	
Joseph Chapman, PE, CFM	■	■	■	■					
Michael Seering, PE, CFM	■	■	■	■			■	■	
David Rubenstein, CFM	■	■	■	■			■		
Amelia Vincent, PE, CFM	■	■	■	■	■				
Jae Park, PhD, CFM	■	■						■	
Ann Terranova, CFM	■	■						■	
Jeffrey Sengebusch	■	■	■	■	■		■	■	
Chet Parsons, AICP, CTP								■	■
David Weaver, PE									■
Erik Gruenes, EIT	■	■							
William Leonetti, EIT	■	■							
Kjersti Lupo, CFM	■	■		■			■		
Heather Blair, CFM	■	■		■			■		
Noah Porter	■	■		■			■		

Experience with Similar Projects

Over the past 15 years, AECOM has performed over 500 countywide FEMA studies covering over 80,000 miles of stream and produced more than 27,000 FIRM panels nationally. AECOM staff's knowledge and understanding of the NFIP has been developed through our long-term relationship with FEMA and our involvement with local and state agencies.

Table 2 provides a brief overview of our experience with similar projects. This experience is further documented by the references provided in Section 3 and our Past Projects in Section 5.

AECOM has provided engineering support to FEMA since the 1970s and state and local clients since 2000. Our support has been suitable for FIRM production for Map Modernization and Risk MAP projects and watershed basin studies, and has resulted in quality products delivered on time and within budget.

Table 2: Specific Project Experience At-a-Glance

Client and Program	Similar Experience
FEMA Risk MAP Program – PTS, Regions II, III, IV, VI, VIII, and IX (under two joint venture contracts)	Manage TOs spanning seven AECOM offices. Maintained a Schedule Performance Index (SPI) over 0.99 for a contract worth approximately $600M. Updated riverine and coastal studies for over 6,800 miles of detailed study, over 46,000 miles of approximate study, and over 5,500 miles of redelineation, and updated 16,100 FIRM panels for over 6,000 communities. Technical methods have ranged from the traditional one-dimensional (1D) steady state HEC-RAS modeling, to two-dimensional (2D) unsteady state modeling for more complicated flow situations, and alluvial fan analysis in western study areas. AECOM has produced Risk MAP products for 25 watersheds covering over 900 communities, working closely with the Regions to find innovative approaches to using Risk MAP products.
North Carolina Floodplain Mapping Program	Managed 118 TOs totaling over $100M. Managed 60 sub agreements totaling $30M. Performed 15,000+ miles of H&H modeling and produced 10,000+ FIRM panels to date. Acquisition and processing of over 40,000 square miles of LiDAR-derived terrain data. All quality, schedule, and budget requirements have been either met or exceeded.
South Carolina Flood Mapping Initiative	AECOM completed over 12,000 miles of H&H analysis. Mapped over 7,000 square miles of Special Flood Hazard Area. Developed over 4,500 individual FIRM panels. Completed 36 countywide FISs. Issued new preliminary FIRMs in 42 out of 46 counties and one watershed. Currently developing preliminary map products for four counties and six watersheds. Completed storm surge modeling using ADCIRC and SWAN for entire coast of South Carolina. Conducted over 105 community meetings throughout the State. Completed six and developing 14 other Risk Map product projects. Processed over 25,000 square miles of LiDAR-derived elevation models with hydrologic breaklines.
Delaware Flood Mapping Study Services	AECOM completed three flood mapping task orders: 60 miles of limited detailed study in Sussex County, 32 miles of limited detailed study in the Appoquinmink watershed, and 30 miles of limited detailed study in the Murderkill watershed. AECOM is currently completing 170 miles of limited detailed study, 57-miles of base-level study, and 33 miles of redelineation in Kent and Sussex Counties, DE. The current TO includes a limited survey of 230 road crossings and the development and processing of 39 revised FIRM panels.
Kentucky Statewide Map Modernization, QA/QC and Risk MAP	The AECOM Team is responsible for 12,030 square miles of terrain processing; 13,115 square miles of hydrology; 4,120 miles of hydraulic analyses; 7,360 square miles of FEMA map panels; and 50 counties reviewed for compliance with Kentucky preferences and FEMA Guidelines and Specifications for the Kentucky Risk MAP Program. Our consolidated FEMA Cost Performance Index (CPI) and SPI are 1.0 and 0.99, indicating remarkable CTP performance to FEMA.
Kansas River Modeling and Floodplain Analysis	AECOM has been working with the State of Kansas, on its CTP contract, since 2008. AECOM has performed H&H on over 1,200 miles of stream and approximately 100 miles of redelineation.
FEMA Hazard Mitigation Technical Assistance Program	AECOM, through its legacy firms, including URS, has continuously served FEMA's mitigation program since 1995. We have provided pre-disaster, during disaster, and post-disaster mitigation and environmental services for every disaster type and in every state.
Monongalia County Comprehensive Plan	AECOM developed recommendations for future growth and development in the four established planning districts of the county through a thorough analysis of existing conditions, growth trends, and future projections.

2-1. Hydrologic and Hydraulic Modeling

AECOM has performed hundreds of flood frequency assessments using a variety of methods, including statistical analysis of gage data and U.S. Geological Survey (USGS) regional regression equations. We frequently use the method described in USGS Technical Bulletin No. 17B, *Guidelines for Determining Flood Flow Frequency*, to determine frequency peak flow discharges based on recorded gage flow data.

AECOM's success in hydrologic modeling is due to our continued use of the optimal available technologies, which allows us to provide our clients very cost-effective, high quality models. The team is experienced in using ArcGIS, ArcHydro, HEC-GeoHMS, and Watershed Modeling System (WMS) to automate watershed hydrologic analysis. Our engineers are skilled at controlling inputs to and quickly assessing outputs from automated procedures to get quality models. These tools use triangulated irregular networks developed from digital terrain models (DTMs) to automatically delineate watershed and sub-basin boundaries, determine flow paths, and provide runoff factors based on available soil coverage and land use information. In addition, we have used GIS to provide automated extraction of Manning's n-values from digital land use coverage.

In conjunction with our hydrologic modeling capabilities, AECOM staff members are also highly experienced in conducting hydraulic stream analyses. AECOM has performed hydraulic analyses in support of FISs for FEMA for more than 33 years. On a typical workday, more than 20 AECOM engineers and mapping specialists in the Germantown, MD Office use automated methods to conduct modeling and mapping tasks for flood hazard mapping projects.

We have used the USACE's HEC-RAS software to perform hydraulic modeling for over 135,000 miles of streams. We have used HEC-RAS for studies in almost every FEMA Region in the country, for many state CTPs, and also for local municipal clients.

Mr. Seering, AECOM's Hydrologic and Hydraulic Modeling Lead, has over 13 years of experience in riverine flood engineering, with 6 years focused on performing hydrology and hydraulics modeling and 6 years focused on managing flood study teams for watershed and countywide projects. He has performed and managed numerous flood studies for thousands of miles of Zone A study streams, using a variety of toolsets and methodologies. While functioning as a manager on FEMA flood studies, he has also served as a subject matter expert, working with FEMA to update their standards and guidance for hydrology and hydraulics, including Zone A engineering.

2-2. Floodplain Identification and Mapping

AECOM has been creating floodplain mapping deliverables, for FEMA and CTPs, for almost two decades now. The AECOM team is very familiar with FEMA's standards and has mapped approximately 40 percent of FEMA's mapping inventory nationwide. Since 2000, AECOM has mapped over 80,000 miles of streamline. Whether it is a detailed study, limited detail, redelineation, or approximate study, AECOM has created the required floodplain mapping deliverables.

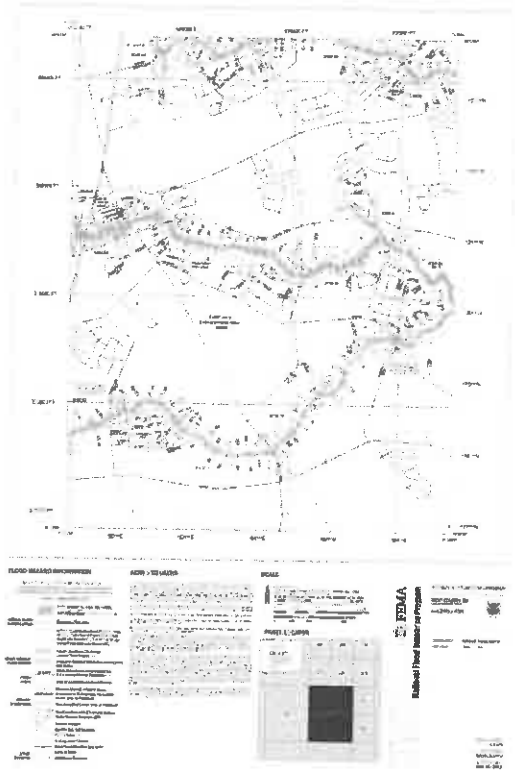
Example of post RAS and floodplain mapping

2-3. Digital FIRM Development

AECOM has a long history of successfully developing digital FIRMs to FEMA standards, including preparing FIRM databases for over 1,000 counties and producing over 43,000 FIRM panels.

The FIRM production platform developed by AECOM provides several enhancements that reduce our overall FIRM production costs while improving the accuracy of the end product. AECOM has developed tools that format our production databases to FEMA's standards and has created export functions to produce GIS deliverable output for Mapping Information Platform (MIP) uploads and FEMA Map Service Center submittals. The use of these tools affords AECOM cost efficiency when producing FEMA FIRMs for the State of West Virginia.

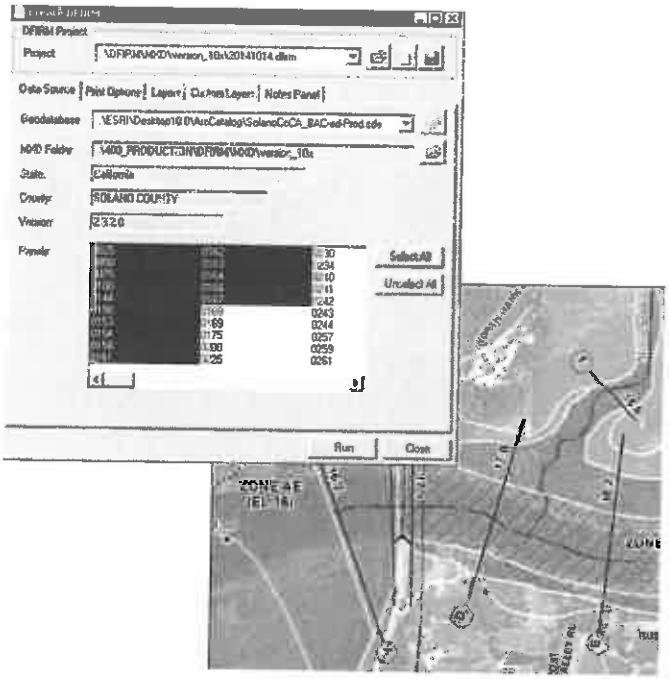
AECOM has an unmatched record in producing digital products for FEMA's flood hazard mapping program. In the past 2 years, AECOM produced more than 1,850 FIRM panels, which included more than 3,000 miles of Zone A to FEMA specifications.



Example: FEMA Flood Insurance Rate Map

AECOM has the technical capabilities to produce the cartographic products that will be vetted and approved by the DHSEM project team, as demonstrated by the work we are performing in West Virginia under our Risk Assessment, Mapping, and Planning Partners (RAMPP) TO contracts with Region III. Our cartographic products are optimized for display in web and mobile applications, and play an integral role in the next generation of public outreach campaigns and notification methods.

Mr. Rubenstein, AECOM's Floodplain Mapping, FIRM Development, and Data Management Task Lead, worked on and managed over 30 studies, from start to finish, throughout the country. In recent years, Mr. Rubenstein played a significant role in the Alleghany and Bradford, PA floodplain mapping tasks, which are similar in geography to parts of West Virginia.



Example: Flood Insurance Rate Map data

2-4. Data Management

AECOM is very experienced managing data for flood studies, including base map data, large aerial photography and terrain datasets, and all flood study output data (model results, floodplain boundaries, FIRM databases, etc.). We have more than adequate server capacity to archive large datasets for flood studies long after the projects are complete.

AECOM's vast CTP involvement provides us with second-to-none experience managing CTP projects and tasks in the FEMA MIP. All AECOM flood study managers are responsible for monthly updates in the MIP and uploading all data deliverables to the MIP

according to FEMA's strict specifications. Our project team has several MIP experts ready to assist our already experienced project and task managers in navigating the FEMA flood study process in the MIP. If there is an issue with or in the MIP, our MIP experts have likely seen it before. If we haven't, our team has the experience and the connections to make sure we contact the correct person to get the issue resolved quickly.

We are intimately familiar with FEMA's requirements to update its Coordinated Needs Management Strategy (CNMS) database to record valid streams once studies are complete and identify mapping needs that are found during the flood study process. We have lead several CNMS tasks for FEMA, including performing the validation of 62,000 miles of streams nationwide.

Under our FEMA PTS contract, we also have a TO to update the National Flood Hazard Layer (NFHL) once new studies become effective. We understand how important it is for FEMA to maintain the NFHL database to provide a consistent and accurate flood layer for the country that can be used by communities and the public to understand their flood risk.

Under contract with FEMA Region III, we are currently working on developing advisory 1-percent-annual-chance storm event (Zone A) floodplains and depth grids for Jefferson County, WV and we are preparing the data for use on West Virginia's Flood Tool. We have worked with Eric Hopkins at WV GIS Technical Center to ensure our deliverables meet the requirements for compatibility with the site.

We are very familiar with West Virginia's online WV Flood Tool (shown below) and use it frequently to view data for the State. We also frequently use many other state websites that have been developed for flood risk communication, including USACE's toolset in Iowa, Louisiana's LA Floodmaps developed by Louisiana State University, and Maryland's Flood Risk Application.

2-5. Topographic Data Development

AECOM's experience serving FEMA and State governments with DTM and topographic data development dates to the inception of the Flood Map Modernization program. AECOM has supported FEMA and assisted in developing its Data Capture Standards (*Guidelines and Standards for Flood Risk Analysis and Mapping* and *Guidelines and Specifications for Flood Hazard Mapping*) and stakeholder LiDAR business plans and acquisition specifications (North Carolina and Tennessee), managed LiDAR acquisition and QC programs, and developed value-added topographic data products supporting flood studies. In addition to our service to FEMA, AECOM has other national/international experience in topographic and bathymetric data development activities in more than 40 states and six countries totaling over 150,000 square miles.

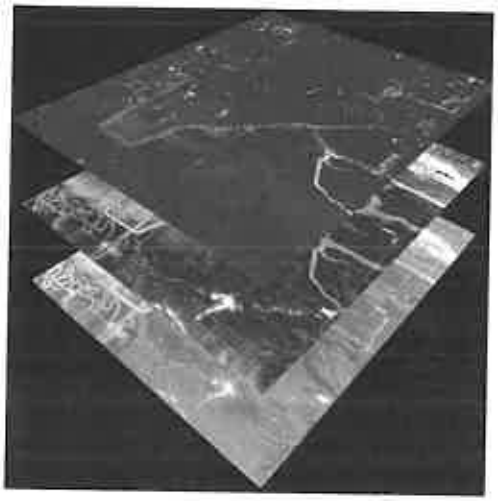
AECOM is experienced in using different types of topographic and bathymetric data sources, such as LiDAR, mass points, breaklines, rasters, and contours as source feature classes, and combining them to create a seamless DTM.

We use ArcGIS and LiDAR editing tools to pre-process data into the correct feature class format and convert the source data into the required study area projections and units. Our engineers and GIS staff members are proficient working with topographic and bathymetric data sets in different formats (such as LiDAR, 2D and 3D shapefiles, File GeoDatabase feature classes, USGS Digital Elevation Models, rasters, AutoCAD, and MicroStation files), datums, units, and projections. We are skilled in using ArcGIS to develop DTMs for hydraulic analyses and to develop hydrologically correct DTMs for hydrological analyses. Our staff also developed and use automation methods, such Python scripts, model builder tools, and macros to efficiently perform batch routine tasks.

AECOM is able to effectively manage large amounts of LiDAR data. With increasingly smaller point spacing and increased accuracy of the LiDAR, there is an increase in the density of the data points and file sizes. Countywide LiDAR data sets may range from 50 to 150 GB. AECOM is experienced with working with large data sets within File GeoDatabases and Spatial Database Engines as a platform for DTMs.

Our Topographic Team Lead, Ms. Vincent has developed DTMs utilizing topographic data sources

including LiDAR, USGS National Elevation Dataset rasters, mass points, breaklines, and contours for use with H&H modeling as well as floodplain mapping for counties and watersheds in Delaware, Maryland, and Virginia. Ms. Vincent has also developed seamless DTMs consisting of bathymetric and topographic data for the overland wave analysis and coastal flood studies in Virginia. As a subject matter expert in terrain, Ms. Vincent has performed numerous detail checks and independent technical reviews of DTMs and seamless topographic and bathymetric terrains for studies in West Virginia, Delaware, Maryland and Pennsylvania.



Example: Various Topographic Layers

2-6. Hazard Mitigation Planning

AECOM planners nationwide have assisted more than 400 local government entities to prepare hazard mitigation plans (HMPs) in compliance with Title 44 of the Code of Federal Regulations Section 201.6, including a recently completed multijurisdictional HMP for Huntingdon County, PA. Our successful completion of these plans and subsequent approvals by FEMA demonstrates our in-depth understanding of the local hazard mitigation planning process, federal requirements, and how to work with a wide variety of communities. For FEMA Region III, we supported two multijurisdictional plan reviews in 2010 and conducted a pilot program for plan integration in Maryland, Delaware, and Pennsylvania and prepared a guide called *Plan Integration: Linking Local Planning Efforts* dated December 2014.

As one of FEMA's prime contractors, AECOM has unparalleled experience in hazard mitigation planning. Through several contracts with FEMA, including the Hazard Mitigation Technical Assistance Program (HMTAP) contract and the Risk MAP contract, AECOM has been involved in numerous mitigation planning projects at the state, regional, and local levels. We will bring this expertise to bear in efficiently developing your HMP for rapid FEMA approval.

AECOM brings detailed knowledge and understanding of FEMA mitigation planning requirements and mitigation planning processes from the following FEMA experience:

- Technical assistance for the 2011 update of the *Local Mitigation Plan Review Guide*
- Development and delivery of Mitigation Strategy training module for communities updating their plans
- Development of the new "Plan Review Workshop" on reviewing a mitigation plan in 2012
- Authoring the FEMA 386 series of nine How-To Guides for mitigation planning
- Preparation of planning training sessions for FEMA and more than 20 plan development workshops nationwide

2-7. Community Outreach

AECOM has extensive experience with outreach related to both the FEMA Map Modernization Program and its Risk MAP Program. Numerous AECOM professionals have attended Discovery, Flood Risk Review, Consultation Coordination Officer (CCO), Open House, and Resiliency Meetings. Working to deliver FEMA's and the states' message of reducing flood damage by building more resilient and sustainable communities has been at the core of AECOM's work with the NFIP for over 30 years.

AECOM has worked with numerous communities in the State of West Virginia to assist with mitigation planning, community engagement, and recovery planning throughout the past few decades.

AECOM assisted FEMA in Mississippi, after Hurricane Katrina, as well as in New York and New Jersey, after Hurricane Sandy, during the controversial roll-out of Advisory and Preliminary FIRMs. In both Mississippi and Texas, the AECOM team worked closely with neighborhood advocacy groups to conduct an outreach campaign that focused on hard-to-reach disaster survivors.

For the State of North Carolina, AECOM assisted in over 100 community meetings by preparing

presentations and maps and addressing mapping and engineering questions from citizens and public officials.

2-8. Other Services

AECOM understands that West Virginia is only requesting services for enhanced approximate level flood hazard analysis and mapping at this time; however, we have listed a few other services that we are experts in and that could benefit the State.

Program Management

AECOM is experienced in assisting CTPs in the development of MASs. AECOM has assisted the South Carolina Department of Natural Resources (SCDNR) in the development of 24 MASs since the inception of the current SCDNR CTP contracts. This has directly resulted in over $28M of CTP funding to the State. AECOM has also contributed to and assisted in the development and updating of CTP Business Plans for SCDNR and other CTPs.

Preliminary and Post-Preliminary Processing

In addition to having requisite engineering and GIS mapping capabilities and qualifications, we have in-place systems to support the preliminary and post-preliminary processes necessary to incorporate new flood studies into effective FEMA products. This includes providing for legal due processes required by NFIP regulations, including preparation of public notices and Flood Hazard Determination Notices, supporting local communities in updating and adopting NFIP-compliant floodplain management ordinances, conducting public and community meetings, reviewing and resolving any appeals or protests submitted during the statutory appeal period, completing all necessary FEMA paperwork, archiving the data in approved FEMA format, and preparing the final deliverables submission package directly to FEMA. Through the Risk MAP contracts, AECOM has successfully conducted the regulatory preliminary and post-preliminary process for hundreds of studies and has processed them all the way to the effective date.

Non-Regulatory Risk Map Flood Risk Products

From past FEMA and state contracts, AECOM has extensive experience in creating non-regulatory Flood Risk Products, including the Flood Risk Database, Flood Risk Report, and Flood Risk Map for approximately 50 counties or watersheds. The non-regulatory risk information helps FEMA meet its Risk MAP vision of delivering quality data that increases public awareness and leads to action that reduces risk to life and property. Our innovative approach to producing Risk MAP products follows our approach to producing any product. We focus on automated tools and processes that link engineering components to GIS outputs. AECOM has developed automated GIS tools, such as "Chance Analyst," that streamline the data production of the required products. All non-regulatory products developed go through the required independent QA/QC steps stipulated by FEMA guidelines before the products are distributed to the public, including internal QA/QC and independent review by FEMA Region III staff. AECOM is committed to providing assistance and resources to DHSEM and we can train officials in the use of non-regulatory products that are developed for all Risk MAP projects.

Example of flood depth grids

Dam and Levee Engineering

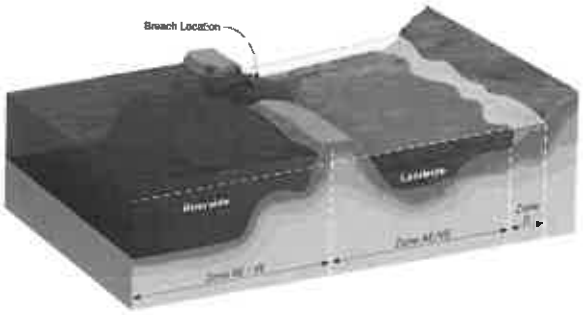
AECOM provides all phases of engineering related to dams and impoundments—from planning through environmental and regulatory permitting, design, construction, and operation and maintenance of facilities. We have provided multidisciplinary planning and design services to the Natural Resources Conservation Service, USACE, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, as well as state and local governments throughout the country. We can support DHSEM with a range of services regarding West Virginia's 606 dams and 76 levees recognized by the USACE.

Our designs have won awards from many state and national organizations, such as the Association of State Dam Safety Officials, the American Consulting Engineers Council, and the American Society of Civil Engineers. Our dam instrumentation and ADAS was the first to be recognized by the USACE.

AECOM provides expertise with specialized H&H analyses and mapping required for levee analysis using the protocols under FEMA's Levee Analysis

and Mapping Procedures (LAMP). AECOM's LAMP experts, including Mr. Seering, were key players in developing the LAMP protocols through our PTS contract with FEMA and have been involved with more than 10 LAMP pilot projects across the country. AECOM also has LAMP projects beyond the pilots in Louisiana, Texas, and New Jersey. AECOM recently helped Indiana County, PA understand their options regarding certification for the Cherry Tree Levee system. We modeled scenarios according to LAMP procedures and developed maps that showed those scenarios. We participated in community meetings where the LAMP modeling and mapping was presented, which helped the County have a better understanding of certification potential, remaining rehabilitation needs, and grant information available to them.

In addition to the standard 1D steady state modeling used for the majority of FEMA studies, AECOM has extensive experience in more complex unsteady state and 2D modeling techniques necessary to analyze levee breaching situations in accordance with LAMP protocols. For example, our ongoing Emergency Action Plan updates for the Mississippi Department of Wildlife, Fisheries, and Parks require the use of unsteady HEC-RAS analyses to develop dam failure inundation maps. We routinely model complex embankment failure scenarios using 2D models, such as FLO2D and HEC 5.0. As evidenced by our LAMP pilot projects in St. Charles and Jefferson Parishes near New Orleans, we understand the complex interactions between interior drainage systems and levee breach analyses.



Example of structural based inundation procedure

3. Meeting Client Expectations, Schedules and Budgets

3-1 Project Monitoring

AECOM's experience processes, and tools provides the DHSEM a team that will achieve its financial and schedule objectives. Our Program Manager is able to assist DHESM with FEMA's MIP. AECOM creates a customized, cost effective management information system to ensure projects stay on schedule and within budget.

On previous PTS contracts AECOM has maintained an average Schedule Performance Index (SPI) of .99 for all regional task orders and has received almost 100% of the award fee; which is tied to schedule and budget completeness.

AECOM has been working with CTPs and with FEMA for decades now. Our continued business with repeat clients, show our ability to meet client's schedules and budget restraints. AECOM understands if you keep a client engaged throughout the entire process you have a greater chance of meeting the client's schedule and budget requirements.

Through our previous experience AECOM has learned to proactively address any challenges, our managers will employ a mature risk management approach which includes consistent tracking of issues, identification of mitigation strategies, and ongoing coordination with all parties to track schedules. DHSEM will benefit from our experience, hands on approach and transparency across the team. Risks to project delivery will be documented in the monthly progress report delivered to the DHSEM, if requested, with potential impacts and strategies to mitigate the risk.

3-2Client Focus

AECOM places much emphasis on client satisfaction, and we believe most of that starts with transparency. We welcome feedback to help us identify both areas where we are meeting and exceeding expectations, and areas that we can enhance to better serve DHSEM. For each task order, we can hold regularly-scheduled status meetings and provide monthly status reports; to exchange ideas and information that will enhance the delivery of dialog with external and internal stakeholders. The success of the State will be a top priority for each task order in which AECOM is involved.

3-3 Mitigating Schedule Delays

AECOM initiates steps to prevent schedule delays at the start of every project. During the project planning process, we identify potential delays and develop mitigation strategies. AECOM will be able to effectively identify and mitigate potential delays because we have experience and knowledge related to the specific work. AECOM handles unexpected schedule delays by developing strategies to minimize the impact on the overall schedule. The impacts and initial strategies are communicated early to the State NFIP Coordinator, so that mitigation approaches have the consent of the State and can be implemented early. Large schedule impacts may require a more rigorous approach. In the case where data from others is submitted late, AECOM can adjust the schedule in a way that prevents or minimizes the delay from propagating throughout the rest of the flood risk project.

Having worked on previous CTP and PTS, our Program Manager has a well- developed understanding of FEMA's preferences and has built strong relationships with staff representing local, State and Federal partners.

4. References

1) **Maria Cox Lamm**
South Carolina Department of Natural Resources
1000 Assembly St, #434
Columbia, SC 29201
Phone: 803.734.3672
Email: CoxM@dnr.sc.gov

2) **Tom Morey**
Kansas Department of Agriculture – Division of Water Resources
Topeka Office
900 SW Jackson, Room 456
Topeka, KS 66612
Phone: 785.296.5440
Email: tom.morey@kda.ks.gov

3) **Michael Powell, CFM**
Delaware Department of Natural Resources
89 Kings Highway, Dover, DE 19901
Phone: 302.739.9921
Email: michael.powell@State.de.us

4) **Scott Ralston**
Iowa Department of Natural Resources
Wallace State Office Bldg.
502 East 9th Street
Des Moines, IA 50319
Phone: 515.281.2942
Email: scott.ralston@dnr.iowa.gov

5) **Alex VanPelt**
Kentucky Division of Water
200 Fair Oaks Lane, 4th Floor
Frankfort, KY 40601
Phone: 502-564-3410 x4952
Email: alex.vanpelt@ky.gov

5. Staffing Plan

Introduction

Our project team comprises professionals who understand hydrology and hydraulics, floodplain mapping, and local community mitigation challenges in West Virginia. Building on our years of experience providing innovative solutions throughout the country, AECOM has assembled a dynamic team to provide engineering and mapping support services with solutions that are as unique as the State of West Virginia. Our Germantown, MD office will be responsible for managing and performing the services described in this submittal, and other offices, including in Morgantown, WV and Kenova, WV, will provide additional support. Our Program Manager, Principal in Charge, Quality Officer, and Technical Task Leads all work out of the Germantown, MD office. We will use staff in our West Virginia offices to provide technical production and outreach support.

AECOM brings both national expertise and local knowledge to this initiative. AECOM offers a local presence with in-depth knowledge of unique flooding characteristics in West Virginia, as well as extensive outreach capabilities. AECOM is rounded out with national experts who can help solve the State's complex engineering, data collection, and GIS needs. The Germantown office has over 30 onsite engineers and GIS staff, but also has the nationwide reach to bring in many experts and staff to assist as needed.

AECOM has a unique combination of highly qualified and experienced team members who have dedicated a significant amount of their careers to performing floodplain mapping in FEMA Region III, especially Ms. Estes, our Program Manager. Collectively, our team provides a comprehensive range and depth of experience different from other teams, especially regarding floodplain mapping in Region III and for the national FEMA Risk MAP initiative. By combining the cumulative resources of AECOM, our ability to deliver on your expectations is unparalleled.

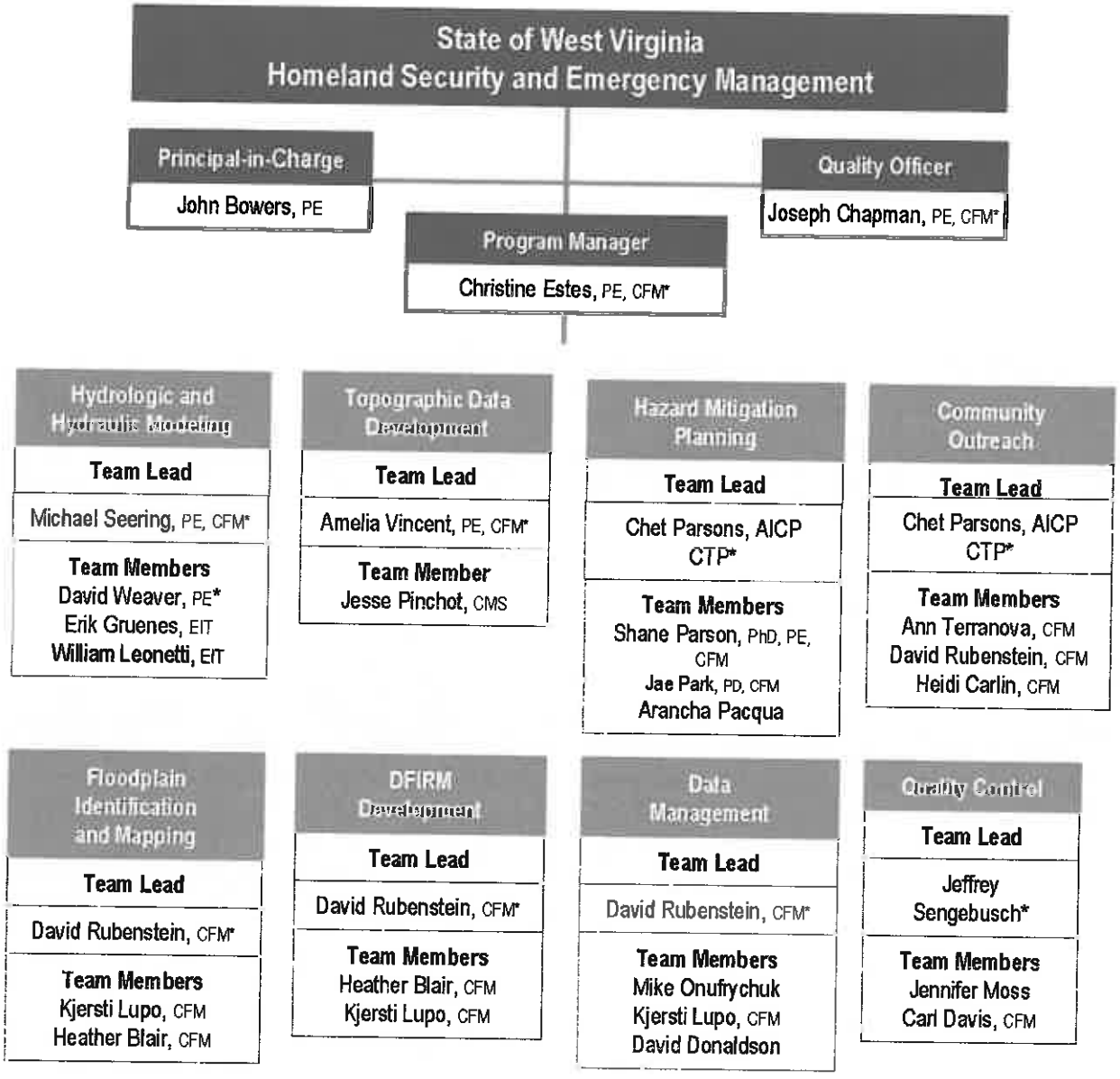
The organization chart on the following page shows the management and technical staff combined under the leadership of our Program Manager, Ms. Christine, Estes, PE, CFM.

In addition to the staff shown on the next page, AECOM has more than 1,000 staff throughout Region III in related disciplines who can supplement the proposed staff. We have the capacity to quickly complete flood studies, as evidenced by our completion of over 100 miles of advisory flood height analysis for Jefferson County, WV within two months.

Staff by Discipline in Region III and Germantown, MD

Discipline	Region III	Germantown
Civil Engineers	315	41
Coastal Engineers	13	11
Computer Programmers	32	29
Dam Engineers	6	6
Emergency Management Specialists	75	75
Foundation/Geotechnical Engineers	30	7
Geologists	119	28
GIS Specialist	67	29
Hydrology and Hydraulics	30	11
Mapping and FIRM Processing	15	15
Mitigation Planners	111	11
Project Managers	285	50
Public Outreach Specialists	13	13
Water Resources Engineers	104	32

AECOM's Proposed Organization



* Key Personnel (resumes are included at the end of this section)

The roles and responsibilities of these staff are as follows:

Table 3: Key Personnel Roles and Responsibilities

Name	Role	Responsibilities
Christine Estes, PE, CFM	Program Manager	Ms. Estes is responsible for leading the effort of the development of enhanced approximate 1-percent-annual-chance floodplains for the State of West Virginia. Ms. Estes will be responsible for client communication, and management and overall health of all projects.
Joseph Chapman, PE, CFM	Quality Assurance Officer	Mr. Chapman will provide quality assurance throughout the duration of the contract. He will apply has extensive experience in floodplain analysis and mapping and working with CTPs across the Country to ensure that the project team is providing DHSEM with quality deliverables.
Michael Seering, PE, CFM	Hydrologic and Hydraulic Modeling Lead	Mr. Seering will be responsible for leading the H&H modeling for the State of West Virginia. Mr. Seering will be responsible for H&H staffing and ensuring staff are performing the work according to FEMA's Standards.
David Weaver, PE	Hydrologic and Hydraulic Modeling Advisor	Mr. Weaver is a project manager who will use his over 25 years of experience and local knowledge of West Virginia to assist in the H&H modeling tasks, and use his knowledge of local conditions to advise on appropriate H&H methodology. Mr. Weaver will work out of the Morgantown office as he supervises the operations in that office.
David Rubenstein, CFM	Floodplain Identification and Mapping Lead	Mr. Rubenstein will be responsible for performing the tasks associated with floodplain development. This includes cleaning and smoothing the floodplain delivered by engineers and following FEMA's Standards and completing the Floodway Boundary Standards forms.
David Rubenstein, CFM	FIRM Development Lead	Mr. Rubenstein will be responsible for performing the tasks associated with FIRM development for this study. Mr. Rubenstein will follow FEMA's Standards for FIRM development for this task.
David Rubenstein, CFM	Data Management Lead	Mr. Rubenstein will be responsible for maintaining and following FEMA's Data Capture Standards Technical Reference manual.
Amelia Vincent, PE, CFM	Topographic Data Development Lead	Ms. Vincent will be responsible for processing topographical data for the modeling efforts required for the State of West Virginia.
Chet Parsons, AICP CTP	Hazard Mitigation Planning Lead/	Mr. Parsons will use his many years in hazard mitigation planning to further assist the State of West Virginia with any hazard mitigation planning needs.
Chet Parsons, AICP CTP	Community Outreach Lead	Mr. Parsons will use his many years of experience as a community outreach specialist to assist the State of West Virginia in communicating flood risk to community officials and the public.
Jeffrey Sengebusch	Quality Control Lead	Mr. Sengebusch will use his years of QC experience to ensure all deliverables meet the requirements and expectations of the State of West Virginia and FEMA. Jeff will make sure that all reviews are compliant with FEMA's Technical Reference Manuals. Jeff will review all draft and final deliverables.

6. Past Projects

The projects below provide details that attest to the quality of work AECOM delivers. The table below provides a quick summary of the relevancy between these projects and the required scope of work.

Table 4: AECOM Projects Encompass All Scope Requirements

Project Name	Hydrologic and Hydraulic Modeling	Floodplain Identification and Mapping	FIRM Development	Data Management	Topographic Data Development	Hazard Mitigation Planning	Community Outreach
FEMA Risk MAP Contracts	■	■	■	■	■	■	■
North Carolina Floodplain Mapping Program	■	■	■	■	■	■	■
South Carolina Flood Mapping Initiative	■	■	■	■	■	■	■
Delaware Flood Mapping Study Services	■	■	■	■	■		
Kentucky Statewide Map Modernization, QA/QC and Risk MAP	■	■	■	■	■		■
Kansas River Modeling and Floodplain Analysis	■	■	■	■			■
FEMA Hazard Mitigation				■		■	■
Monongalia County, WV Planning and GIS Support				■		■	■

Key Personnel Resumes

AECOM

Christine Estes, PE, CFM

Program Manager

Areas of Expertise

Floodplain Management

Watershed Management Plans

Stormwater Management

Watershed, Lake, and Stream Restoration

Hydrology and Hydraulics

NPDES Compliance

Low Impact Development (LID)

Education

MS, Civil and Environmental Engineering, Virginia Tech University

BS, Civil Engineering, University of Virginia

Licenses/Registrations

Registered Professional Engineer: VA, MD, GA, IA

Certified Floodplain Manager, 2006

AECOM Certified Project Manager, 2008

Years of Experience

18 years

Professional Associations

Association of State Floodplain Managers (ASFPM)

Virginia Floodplain Managers Association (VFMA)

Virginia Lakes and Watersheds Association (VLWA)

Maryland Associations of Floodplain and Stormwater Managers (MAFSM)

Pennsylvania Association of Floodplain Managers (PAFPM), member of Stormwater Sub-committee

Summary

Ms. Estes has over 18 years of experience in civil and environmental engineering. As a water resources engineer, she has performed studies for floodplain management, total maximum daily loads (TMDLs), national pollutant discharge elimination system (NPDES) compliance, stormwater management, watershed planning, Low Impact Development (LID) implementation, and water quality monitoring. She has prepared complex hydrologic, hydraulic, and water quality models for rivers, reservoirs, and watersheds. Her modeling and software experience includes the use of HEC-RAS, HEC-1, HEC-2, HEC-HMS, HSPF, BASINS, CE-QUAL-W2, XP-SWMM, iCPR and ArcGIS. Ms. Estes has over a decade of project management experience. Ms. Estes has worked on the Flood Insurance Rate Map (FIRM) production of over 75 county-wide studies where she provided management, engineering, mapping, and/or quality control expertise.

Experience

FEMA Region III, RAMPP Risk Map. Deputy Regional Manager. Ms. Estes serves as the Deputy Regional Manager for FEMA Region III under RAMPP's (Joint Venture of URS and Dewberry) Risk Map contract. Ms. Estes is responsible for overseeing all of Region III related activities performed by URS under the Risk Map contract, including FIRM production, coastal analysis, hazard risk assessment, outreach assistance, and technical support.

FEMA Region III, Conococheague-Opoquon Watershed Discovery and Risk MAP Project, Pennsylvania, West Virginia, Virginia, Maryland. Project Manager. Ms. Estes led Risk MAP Discovery tasks for the Conococheague-Opoquon Watershed. She developed the Discovery report and assisted with map development and participated in Discovery meetings with communities. She is now managing the creation on Flood Risk Products for the watershed including depth grids, Hazus analysis and a Flood Risk Database, Report, and Map.

FEMA Region III, Jefferson County, WV Zone A Study. Project Manager. Ms. Estes is leading an effort to create advisory 1% annual chance storm event floodplains for all effective Zone A floodplains in the County. She has overseen the new hydrologic analysis using regression equations, hydraulic analysis using HEC-RAS, and mapping and depth grid development using Geo-RAS and ArcGIS tools.

Iowa Department of Natural Resources, Physical Map Revision (PMR), Buchanan County, IA. Project Manager. Ms. Estes is the Project Manager for this task order contract with IA DNR. This project involves updating the Flood Insurance Study, conducting hydrologic analysis, conducting base and enhanced hydraulic analysis of the Wapsipinicon River within the City of Independence and Buchanan County, IA, and producing Digital Flood Insurance Rate Maps (DFIRMs) and a Flood Insurance Study (FIS) to incorporate the updated analysis.

SCDNR, DFIRM Production, Georgetown County. SC. Project Manager. Ms. Estes is the Project Manager for this task order contract with SCNDR. This project involves updating the Flood Insurance Study, performing coastal analysis, conducting hydrologic and hydraulic analysis of Approximate, Limited Detailed, and Detailed Study Streams, and producing Digital Flood Insurance Rate Maps (DFIRMs) and a Flood Insurance Study (FIS) for Georgetown County, SC.

Kansas Department of Agriculture, Kansas MapMod, Senior Engineer. Ms. Estes provided management of quality control/quality assurance activities for approximate flood studies in Kansas. She has reviewed hydrology, hydraulics, floodplain mapping, DFIRMs, and FIS texts for 8 counties.

FEMA Region III, Lower Susquehanna-Swatara Watershed Study, Pennsylvania. Project Manager. Ms. Estes is the Project Manager for this watershed study, which involves Discovery and new base level hydrology and hydraulics analysis for all Zone A streams within the watershed. The study will result in new floodplain mapping and workmaps for the watershed.

FEMA Region III, Scottsville Levee Remapping, Albemarle County, VA. Project Manager. Ms. Estes is the Project Manager for this remapping task for FEMA Region III. This project involves updating the Flood Insurance Study and producing Flood Insurance Rate Maps (FIRMs) for Albemarle County, VA to reflect the accreditation of the Scottsville levee.

FEMA Region III, FIRM Production, Bradford County, PA. Project Manager. Ms. Estes was the Project Manager for this county-wide flood study for FEMA Region III. This project involved updating the Flood Insurance Study, conducting hydrologic and hydraulic analysis of Approximate and Detailed Study Streams and producing Flood Insurance Rate Maps (FIRMs) for Bradford County, PA.

Alabama DECA, DFIRM Production, Senior Engineer and Task Manager, Covington and Butler Counties, AL. Senior Engineer and Task Manager. Ms. Estes provided management, technical guidance, and quality assurance and quality control of the countywide restudy and DFIRM production for Butler and Covington counties.

Georgia Dept. of Natural Resources (DNR), Georgia Flood Map Modernization Program Cooperating Technical Partner (CTP), Atlanta, GA. Senior Engineer and Task Manager. This project for the

Georgia DNR involved the production of Georgia's statewide flood map modernization program, in compliance with the Federal Emergency Management Agency (FEMA). Ms. Estes's responsibilities included the oversight and management of all engineering phases of floodplain mapping for two counties, including: hydrology, hydraulics, floodplain mapping, and QA/QC.

FEMA, Hazard Mitigation Technical Assistance Program (HMTAP) Watershed Planning and Management Studies, Nationwide. Senior Engineer. Ms. Estes was involved with the HMTAP contract, providing management of task orders, technical expertise for hydrologic and hydraulic modeling, and quality control of deliverables. Her HMTAP experience includes providing management services for the Flood Data Analysis Task Order that helped Iowa develop flood recovery maps for 16 counties (8,937 miles of stream) within 60 days as part of their recovery and mitigation efforts.

FEMA, FEMA MT-2 Reviews, Nationwide. Water Resources Engineer. Ms. Estes reviewed and processed CLOMR and LOMR (MT-2) requests to FEMA for floodplain and/or floodway revisions as a subcontractor. Her responsibilities involved examining submitted hydrologic and hydraulic models (HEC-1 and 2, HEC-RAS, etc), including complex hydraulic conditions, and preparing map revisions.

AECOM

Joseph Chapman, PE, CFM

Quality Assurance

Areas of Expertise

Technical Review
Quality Assurance
Floodplain Mapping
Risk Assessments
Mitigation

Education

BS, Civil Engineering, Clemson University

Licenses/Registrations

Professional Engineer: North Carolina
Professional Engineer (Civil): Texas

Years of Experience

29 years

Professional Associations

American Society of Civil Engineers
South Carolina Association for Hazard Mitigation
North Carolina Association of Floodplain Managers
Indiana Association for Floodplain and Stormwater Management

Training and Certifications

Certified Floodplain Manager

Summary

Joe Chapman has extensive experience in floodplain mapping, flood risk assessment and flood mitigation projects in support of Federal, State and Local agencies and has provided post-disaster support ranging from field damage assessments to the development of flood recovery mapping to support rebuilding efforts. Mr. Chapman has managed and supported over a dozen CTP clients nationwide.

Mr. Chapman currently serves as the North American Technical Practice Leader for Flood and Natural Hazard Risk Management for AECOM. He has more than 25 years' experience in managing and performing small- and large-scale water resource projects as both an engineer and project manager. From 2011 – 2014 he served as a Technical Director in AECOM's Australian business leading the Queensland Water Resources team. Prior to his time in Australia he led the Watershed Concepts division of AECOM's US Water Business line; in this role he was responsible for the operations of 12 offices with more than 160 employees in North America performing floodplain mapping, flood risk assessment, flood hazard mitigation, and geospatial projects in support of FEMA.

Mr. Chapman will provide quality assurance and serve as a technical advisor to the team.

Experience

South Carolina Flood Map Modernization, SCDNR, Statewide, SC. Principal-In-Charge (PIC) for AECOM's contract with the State, who is a CTP supporting FEMA's flood map modernization efforts. Provides guidance and direction related to contract negotiations, program specifications and priorities and provides senior technical guidance on study production. Also participates in outreach activities associated with scoping and PDCC meetings. To date, studies have included over 1,000 stream miles of completed detail, limited detail and approximate H&H engineering studies and over 350 completed vector-based DFIRM panels.

North Carolina Floodplain Mapping Program (NCFMP), State of North Carolina. Senior Technical Advisor. Oversees engineering and DFIRM mapping production. To date, this project has resulted in field survey of over 3,000 bridges and culverts; over 13,000 miles of hydrologic and hydraulic analysis; and production of over 8,500 FIRM panels. The project included future conditions analysis on detail study

and limited detail study streams in Wake, New Hanover, Orange, and Durham Counties.

Mississippi Flood Map Modernization, MDEQ, Statewide, MS. Senior Technical Advisor as part of MGI, LLC joint venture. Worked with State and FEMA officials in establishing the MS mapping program and developing program specifications and priorities. Assisted State officials in conducting scoping meetings and contributes to resolution of technical and programmatic issues and ongoing outreach associated with post-Katrina flood map updates.

FEMA Risk MAP Production & Technical Services, FEMA, Nationwide. Senior Project Manager responsible for the oversight of over $10 Million a year in riverine hydrologic and hydraulic modeling and mapping task orders. Also served as the LiDAR/Topographic Mapping Subject Matter Expert for the BakerAECOM team.

Mecklenburg County, Watershed Study Updates and Digital Flood Insurance Rate Map Mapping, Mecklenburg County, North Carolina. Principal in charge responsible for contract management and implementation of the quality assurance program. Work includes updated watershed-based studies for nine different watersheds covering over 180 miles of stream within the county. Studies included development of updated existing and future land hydrologic and hydraulic models for the 2-, 10-, 15-, 50-, 100-, and 500-year existing conditions storms and 100-year future conditions storm. Responsible for facilitating watershed-based stakeholder groups to obtain concurrence on land use updates that are developed.

City of Florence, Flood Mitigation Project, Florence, South Carolina. Project manager for development of a hazard mitigation plan and elevation certificate survey. GIS was used to identify and rank the floodplain problems and mitigation solutions were recommended to reduce the likelihood of flooding. Responsibilities included all public relations related to project impact, the development of an action plan, evaluation and ranking of known flood problems, and field survey and elevation certificates for more than 100 structures.

State-wide LiDAR Acquisition, FEMA Region VI IDIQ – LA. Technical Advisor. Coordinated with subcontractors regarding schedule and deliverables; coordinated with other partners including FEMA, USACE and LSU regarding deliverables and storage/ distribution of final terrain deliverables; and development of QC protocols to ensure compliance with FEMA requirements. Included subcontractor acquisition of over 43,000 square miles of LIDAR data, field survey of checkpoints in accordance with FEMA QA/QC standards, RMSE calculations and qualitative visual review of all LIDAR tiles, and development of final TIN and DEM deliverables.

AECOM

Michael Seering, PE, CFM

Hydrologic and Hydraulic Modeling Lead

Areas of Expertise

Project Management
Hydrology, Hydraulics
FEMA Flood Studies
FEMA Levee Analysis and Mapping

Education

ME, Civil Engineering, Colorado State University

BS, Biological Systems Engineering, Virginia Polytechnic Institute

Licenses/Registrations

Professional Engineer: MD

Years of Experience

13 years

Professional Associations

American Society of Civil Engineers

Association of State Flood Plain Managers

Training and Certifications

Certified Floodplain Manager, #US-06-02079
Computer Skills: ADCIRC, ArcGIS, AutoCAD, GeoRAS, HEC-RAS, Microstation, WISE

Summary

Mr. Seering is a Professional Engineer and Certified Floodplain Manager with skills in civil and environmental engineering and a focus on water resources and project management. His technical experience includes flood studies and stormwater management; his project management experience encompasses client communication, schedule and financial management, and technical team leadership. He has led business efficiency initiatives in first pass analysis and determinations of flood management ordinance requirements. He has managed and performed engineering analyses for numerous flood study projects for a variety of clients.

Experience

FEMA HQ Project Manager, IDIQ Stream Level Assessment of NVUE Miles in FEMA Regions II, III, and VI. Project Manager. Managed the budget and fulfillment of the technical scope of work of this project. This project involves stream level assessment for updated NVUE status of over 20,000 miles of expiring stream reaches for FEMA.

FEMA, Engineering and Mapping Tool Maintenance and Updates. Project Manager. Managed the budget and schedule for technical solutions to engineering and mapping tools to improve internal processes on FEMA flood studies.

FEMA Region III, Allegheny County, PA. Managed the budget, client relationship, and fulfillment of the technical scope of work of this project. This project involves conducting hydrologic and hydraulic analyses, including for leveed streams, producing FIRM panels, updating the FIS, developing Risk MAP products, and performing public outreach, including leading public meetings on FEMA regulations and flood risk.

FEMA Region III, Indiana County, PA. Project Manager. Managed the budget, client relationship, and fulfillment of the technical scope of work of this project. This project involves riverine levee analysis and outreach for the Cherry Tree Levee Systems under FEMA's Levee Analysis and Mapping Procedure.

FEMA Region VI, Conway and Pope Counties, AR. LAMP Subject Matter Expert. Provided technical guidance on technical execution and outreach for non-accredited riverine levees in Conway and Pope Counties, Arkansas under FEMA's Levee Analysis and Mapping Procedure.

FEMA Region III, IDIQ Carroll County, MD. Project Manager. Managed the budget, client relationship, and fulfillment of the technical scope of work of this project. This project involves reviewing and resolving community appeals, issuing a revised preliminary FIRM and FIS, and processing the post-preliminary FIRM and FIS.

FEMA Region III, IDIQ Brandywine Watershed, Delaware/Maryland/

Pennsylvania. Project Manager. Managed the budget, client relationship, and fulfillment of the technical scope of work of this project. This project involves conducting hydrologic and hydraulic analyses, producing FIRM panels, updating the FIS, development of non-regulatory risk products, and performing public outreach, including leading public meetings on FEMA regulations and flood risk.

FEMA HQ, Risk MAP Levee Support (Compass Joint Venture). Water Resources Engineer. Provided technical assistance in development and reporting for FEMA's levee policy development and implementation and levee data management, including coordination with USACE for joint systems.

FEMA HQ, Risk MAP Levee Support. Water Resources Engineer. Provided technical assistance in development and reporting for FEMA's Mid-term Levee Inventory (MLI) database, summary reporting for the Provisionally Accredited Levee (PAL) tracking spreadsheet, monthly technical report, and fulfillment of short-term information requests from the client. Represented the Joint Venture, RAMPP, on the integration of FEMA's MLI into USACE's National Levee Database (NLD). Represented RAMPP on the non-breach levee scenario work-group, which includes other contractors and the client. Researched international levee issues and performed pilot studies to provide recommendations to FEMA on its revision to levee analysis and mapping policy. Performed quality control reviews for the technical review and guidance for the breached levee scenarios and dispositioned public review comments for the new policy development for FEMA. Developed specifications for new Risk MAP products to be customized specifically for levees.

FEMA HQ, National Discovery. Project Manager. Managed the budget, client relationship, and fulfillment of the technical scope of work of this project. This project involves developing new National and regional guidance on obtaining and using datasets for FEMA Discovery Projects.

USACE, National Levee Database Outreach. Water Resources Engineer. Provided technical assistance at International Conference on Large Dams (ICOLD) to provide delegates with information and answer questions on USACE's National Levee Database (NLD).

FEMA HQ, FEMA Guidelines and Specifications. Water Resources Engineer. Provided technical assistance in development and reporting for FEMA's evaluation and revision to its standards and guidance outlined in the Guidelines and Specifications for development of the new Knowledge Sharing System, under the RAMPP Joint Venture PTS contract.

Georgia DNR, Flood Map Modernization Program CTP Contract. Water Resources Engineer. Developed hydraulic models for the delineation of floodplain boundaries for FEMA flood maps.

SCDNR, South Carolina Storm Surge Analysis, SC. Water Resources Engineer. Performed quality control reviews of topographic and bathymetric grids developed for coastal storm surge modeling in ADCIRC.

SCDNR, South Carolina Flood Study, SC. Water Resources Engineer. Developed hydraulic models for the delineation of floodplain boundaries for FEMA flood maps. Created flood profiles from hydraulic analyses output. Performed quality control checks on FEMA Flood Insurance Rate Map panels.

AECOM

David L. Weaver, PE

Hydrology and Hydraulics Technical Advisor

Areas of Expertise

Infrastructure Design and Construction
Drainage
Stormwater Management
Erosion and Sedimentation Control

Education

MS, Civil Engineering, University of Washington
BS, Civil Engineering, Clemson University

Licenses/Registrations

Professional Engineer: West Virginia

Years of Experience

29 years

Training and Certifications

AECOM Americas Project Manager Accreditation – Level 3, Senior Project Manager

Professional Associations

National Society of Professional Engineers
American Council of Engineering Companies, West Virginia
American Society of Civil Engineers
American Society of Highway Engineers
Morgantown Area Chamber of Commerce

Summary

Mr. Weaver is an experienced project manager who oversees and develops planning studies, engineering design, design-build and construction management for a variety of project types and disciplines. As branch manager of the Morgantown office, he supervises the operations in that office and coordinates with other AECOM offices around the country. Mr. Weaver also has an extensive background in structural rehabilitation and forensic investigations.

Experience

West Virginia Department of Transportation - Division of Highways, I-79 TIF District Interchange Design-Build, Monongalia County, West Virginia. Project Manager during the tender, design, and construction phases which involved the design of a new diamond interchange, 1.4 miles of new or reconstructed interstate, ramps, local roads, and overpass bridge, box culverts, and Reinforced Soil Slopes (RSS) structures.

West Virginia Department of Transportation - Division of Highways, Wells Bridge (WV 18), Tyler County, West Virginia. Project Director responsible for Design Study, Contract Plans, and associated NEPA (environmental) documents for the replacement of an existing 171 ft. bridge carrying WV Route 18 over Middle Island Creek. Project includes approach roadway, utility coordination, and right-of-way acquisition plans.

West Virginia Department of Transportation - Division of Highways, NBIS Inspection of the Rubles Run Bridge (WV-43) over Rubles Run, Monongalia County, West Virginia. Project Manager responsible for a 6-year inspection project in compliance with the National Bridge Inspection Standards. The project includes a complete hands-on, in-depth periodic and two periodic visual inspections for the Rubles Run Bridge on the Mon-Fayette Expressway. The dual, curved, six-span continuous weathering steel plate girder bridge, constructed in 2003, consists of plate girders and has an overall length of 1,387 feet. The superstructure is supported by high level reinforced hollow concrete piers and reinforced concrete abutments.

West Virginia Department of Transportation - Division of Highways, Twilight Bridge (CR 39), Ohio County, West Virginia. Project Manager responsible for development of plans, specifications, and cost estimates for superstructure replacement and substructure rehabilitation for a 102-foot bridge over Middle Wheeling Creek, including approach roadway,

temporary detour, utility coordination, and right-of-way acquisition plans.

West Virginia Department of Transportation - Division of Highways, NBIS Inspection of the Fort Henry Bridge (I-70) over the Ohio River, Ohio County, West Virginia. Project Director responsible for a 6-year inspection project in compliance with the National Bridge Inspection Standards. The project includes a complete hands-on, in-depth periodic and two periodic visual inspections and three interim inspections for the Fort Henry Bridge, carrying I-70 across the Ohio River. The bridge consists of 10 spans with a steel tied arch main span of 577 feet-6 inches and an overall length of 1,660 feet.

West Virginia Department of Transportation - Division of Highways, McDonalds/Upper Plaza (WV 2), Moundsville, Marshall County, West Virginia. Project Director responsible for Design Study, Contract Plans, Traffic Analysis, and Environmental (NEPA). This project consists of widening WV Route 2 in Moundsville to five lanes, realignment of the WV 2/US 250 intersection, traffic signalization, and the replacement/widening of two bridges. Project also includes public involvement, utility coordination, and right-of-way acquisition plans.

City of Morgantown, Walnut Street Infrastructure Improvement Project, Historic Central Business District, Morgantown, West Virginia. Project Manager responsible for site investigations, programing, conceptual design, and the development of plans, specifications, and cost estimates for the streetscape project from Spruce Street to High Street. Services also include stakeholder engagement, bidding/negotiation support, and construction administration.

West Virginia Department of Transportation - Division of Highways, US Route 35 Design-Build Tender Phase, from WV 869 to Mason CR 40, Putnam and Mason Counties. Project Manager during the tender phase design competition which involved the design 14.6 miles of new expressway, local roads, and three mainline bridges and multiple box culvert structures.

Federal Bureau of Prisons, FCI McDowell, McDowell County, West Virginia. Project Engineer for the design-build contract for the $225 million facility. Services included drainage, stormwater management, and erosion and sedimentation control.

West Virginia Department of Transportation - Public Port Authority, Inland Intermodal Port Economic and Market Analysis, West Virginia. Project Manager responsible for a study of the feasibility, planning, development, construction and operation of a proposed intermodal facility at Prichard. The study included a port market analysis, site feasibility analysis, construction and finance analysis, operations and sustainability analysis, and economic impact analysis.

AECOM

David Rubenstein, CFM

Flood Identification and Mapping; DFIRM Development; and Data Management Lead

Areas of Expertise

Program Management
Floodplain Mapping
DFIRM Production
Preliminary Processing
Post Preliminary Processing
ArcGIS
WISE

Education

AA, Communications, Montgomery College

Years of Experience

15 years

Professional Associations

Association of State Flood Plain Managers (ASFPM)
West Virginia Floodplain Management Association (WVFMA)
Virginia Lakes and Watershed Association (VLWA)
Kansas Association of Floodplain Managers (KAFM)

Training and Certifications

2006, Certified Floodplain Manager

Summary

Mr. Rubenstein is currently working for the Stormwater and Flood Mitigation Group, where he has over seven years of experience as a Study and Project Manager for the Water Resources Group. He manages the financial, production and client relation aspect of many FEMA National Flood Insurance and Certified Technical Partner projects. Mr. Rubenstein also has over twelve years of experience in Geographical Information Systems (GIS). As a GIS Specialist, he has detailed knowledge of many of the ARC GIS components.

Experience

Map Modernization Initiative, South Carolina Department of Natural Resources. Program Manager. Manages watershed and coastal studies involving over 1,000 stream miles of H&H modeling, coastal flood analyses, floodplain mapping, FIRM production and post-preliminary processing through map adoption. Manages Risk MAP conversion projects for watershed and coastal studies including production of Flood Risk Database, Flood Risk Reports and Flood Risk Maps. Responsible for the financial management and earned value reporting for all on-going projects

Kansas Department of Agriculture. Project Manager. Mr. Rubenstein is currently the Project Manager for the Kansas Department of Agriculture's CTP contract. The Team has a contract with the State of Kansas to reanalyze flood hazards throughout the various portions of the state. Kansas is partnered with FEMA, through FEMA's CTP initiative, and assumes primary ownership and responsibility for the NFIP FIRMs. The project includes collection of digital elevation data using LIDAR technology and development of flood elevation data using automated hydrologic and hydraulic technology. URS is using GIS based modeling systems that incorporates gage analysis and regional regression equations for the hydrologic simulation and HEC-RAS hydraulic software for development of floodplain and floodway boundaries. URS combines the modeling and Redelineation to produce Digital Flood Insurance Rate Maps (DFIRMs) for riverine areas.

DFIRM Coordinator. As DFIRM Coordinator Mr. Rubenstein was responsible for making sure the team of GIS/Mapping Specialists are creating DFIRMs according to FEMA's Guidelines and Specifications Manual. Mr. Rubenstein managed a team of 16 GIS specialists to meet the needs and deadlines of multiple projects and project managers. He

maintained constant contact with the various mapping partners to make sure that all maps are being created according to FEMA's specifications.

UMAP Leader. Mr. Rubenstein was the mapping lead on the internal software creation of UMAP, which uses an ArcInfo based program to create DFIRMs and the database more proficiently and accurately according to FEMA's Map Modernization specifications. Currently, he is the technical lead for mapping updates for GeoRampp (Mapping software for Risk MAP). Recently, David's expertise was used in FEMA's new Guidelines and Specification changes for Appendix K and L and PM 66.

DFIRM Task Manager, FEMA Region IV Map Modernization. DFIRM Task Manager for 8 counties under this contract. All of the counties mapped on were delivered on time and on budget to the client. For the Nassau County project, he was both the DFRIM Task Manager, and the Assistant Project manager. Under this assignment he managed staff, budget and addressed any mapping needs that were required.

DFIRM Task Manager, South Carolina Map Modernization. Mr. Rubenstein was the DFIRM Task Manager for 11 counties in South Carolina. David made sure that all panels were completed to FEMAs Specifications. Mr. Rubenstein still takes part in many of the state's Preliminary Community Coordination meetings.

FEMA, Risk MAP. Study Manager. Mr. Rubenstein is currently the study manager for over 10 projects under FEMA's Risk MAP program. David is responsible for all aspects of the multi-year, multi-million dollar projects. Mr. Rubenstein manages riverine analyses, coastal analysis, floodplain mapping, DFIRM production, post–preliminary processing, and non-regulatory Risk MAP products; for several countrywide studies in FEMA Regions II, III and VI. The projects involved studying over 1,000 miles of stream, creating over 500 FIRM panels, multiple DFIRM database and preliminary and post-preliminary processing. Mr. Rubenstein has created numerous non-regulatory products and has attended many community outreach meetings. All deliverables are compliant with FEMA's Guidelines and Specifications. David's studies have over 1,000 panels with combined budgets over two million dollars. These studies include Detailed, Limited Detailed, Approximate, Coastal and Redelineated Studies.

Current studies:

Montgomery County, Kansas
Brown County, Texas
Seneca Watershed, South Carolina
Wateree Waterdshed, South CArolina
Burlington County, New Jersey
Middlesex County, New Jersey
Monmouth County, New Jersey
Ocean County, New Jersey

Past Studies:

East Baton Rouge, Louisiana
Onondaga County, New York
Erie County, New York
Lafayette, Louisiana

FEMA, Hurricane Sandy Advisory Base flood Elevation Maps (aBFE), Project Manager. Mr. Rubenstein worked with FEMA, under the Risk MAP program, to Acquire ongoing Risk MAP study data and relevant Hurricane Sandy technical data. Perform coastal analysis and floodplain mapping for the impacted geographies in New York and New Jersey. Provide documentation of methodologies, assumptions, and data sources. Participate in coordination meetings with FEMA staff. Develop advisory maps and data layers. Provide innovative data dissemination methods via web-based or GIS-based solutions and support advisory product usability with outreach and communication staff.

Task Manager, Delaware Department of Natural Resources and Environmental Control (DNREC). Task manager for two counties in Delaware. These two counties are only having specific county areas mapped. DNREC also has specific requests that data be provided in a work map form. This request was initiated so the community can determine how they will be affected by the flooding before the maps become effective.

AECOM

Amelia Vincent, PE, CFM

Topographic Data Development Lead

Areas of Expertise

Riverine and Coastal Modeling

Risk MAP Discovery for Coastal Communities

Terrain Analysis

Geographic Information Systems

Floodplain Structure Inventory

Hurricane Evacuation and Coastal Planning

Education

MS, Biological Systems Engineering, Virginia Polytechnic Institute and State University

BS, Biological Engineering, Louisiana State University

Years of Experience

18 years

Licenses/Registrations

Professional Engineer: Virginia

Professional Associations

Association of State Flood Plain Managers (ASFPM)

Virginia Lakes and Watershed Association (VLWA)

West Virginia Floodplain Management Association (WVFMA)

Kansas Association of Floodplain Managers (KAFM)

Training and Certifications

2007, Certified Floodplain Manager

Summary

Ms. Vincent is a project water resources engineer with experience in terrain analysis, riverine and coastal modeling, and Risk MAP Discovery. She has extensive experience with ArcGIS, WISE, and HEC-RAS software and Light Detection and Ranging (LiDAR) data processing. Ms. Vincent has performed a variety of tasks for U.S. Army Corps of Engineers (USACE) projects such as structure inventories, post-flood damage surveys, documenting coastal planning meetings, economic analyses, GIS, and database management. Her Federal Emergency Management Agency (FEMA) expertise involves development of digital terrain models for hydraulic and hydrologic analyses, ADCIRC grid development, riverine and coastal modeling, hurricane planning and development of training materials for hurricane related software.

Experience

FEMA Risk MAP. Technical Specialist. Subject Matter Expert for Terrain Development. Ms. Vincent is one of the joint venture Subject Matter Experts for terrain analysis and development. She helped develop terrain workflow and review procedures for terrain tasks and answers technical questions relating to elevation data, vertical and horizontal datums, and terrain processing software.

Terrain Developer; HUC-8 Watershed Studies; Lower Sabine Watershed, LA and TX; Grand Lake O' The Cherokees, OK; Seneca Watershed, SC; and Wateree Watershed, SC. Project Engineer. Ms. Vincent developed digital terrain models (DTMs) for these HUC-8 watersheds. Topographic data sources used for terrain development include LiDAR, USGS National Elevation Dataset rasters, mass points, breaklines, and contours. The DTMs were developed using ArcGIS and consists of ESRI terrains used for hydraulic analysis and floodplain mapping in support of Digital Flood Insurance Rate Map (DFIRM) development. Ms. Vincent also prepared the Technical Support Data Notebooks (TSDNs) for these studies.

FEMA Regions II, III, IV, and VI. Technical Reviewer. Ms. Vincent has performed detail checks and independent technical reviews of DTMs, seamless topographic and bathymetric terrains, base maps, survey data, field reconnaissance, DFIRM databases and TSDNs for counties / parishes in these states.

Terrain Developer. Ms. Vincent developed digital terrain models (DTMs) for counties/parishes nationwide, including West Virginia.

Topographic data sources used for terrain development include LiDAR, USGS National Elevation Dataset rasters, mass points, breaklines, and contours. The DTMs were developed using WISE or ArcGIS and consists of TINs or ESRI terrains used for hydraulic analysis and floodplain mapping in support of DFIRM development. Hydro-correct DTMs were developed for some counties and were used during the hydrologic analysis to delineate basins and calculate time of concentration. Technical Support Data Notebooks (TSDNs) were also prepared for these studies. In addition, Ms. Vincent developed DTMs in support of the Kansas High Water Marks Project, HMTAP Task Order 42 in West Virginia, HMTAP Task Order 65 in New York, South River in Virginia, and the Iowa Loss Avoidance Study.

Durham and Orange Counties, NC. Project Engineer. Ms. Vincent assisted in the transfer of the WISE terrain project to the URS Germantown network to make sure terrain was usable and accessible to the project team performing the detailed hydraulics modeling. She helped troubleshoot terrain issues to help the project team move forward with the modeling.

Great Lakes Early Demonstration for Discovery Project for Oak Orchard-Twelvemile Watershed, New York Counties of Monroe, Orleans, and Niagara. Project Engineer. The purpose of the Early Demonstration Project was to help FEMA better understand the costs for developing and delivering the Discovery products to State, local, and tribal stakeholders and to create a refined process for developing and delivering the products that account for new activities, eliminate unnecessary steps, demonstrate efficiencies, and standardize best practices across all FEMA Regions. Ms. Vincent assisted with State, Federal, and local stakeholder coordination; preparation of meeting agendas, presentations, and evaluation forms; data gathering and collection; and Discovery report and map development.

WISE Terrain and Approximate Hydraulic Modeling Trainer. Ms. Vincent has provided training on the WISE terrain and hydraulics modules for other offices. She presented an overview on the modeling process and provided hands-on training. Ms. Vincent also provides technical support to other AECOM offices using this software.

AECOM

Jae G. Park, PhD, CFM

Hazard Mitigation Planning Lead

Areas of Expertise

Hazard Mitigation Program and Planning

Sustainable Disaster Recovery

Risk Analysis and Management

Disaster Management Policy Analysis

Grant Programs

Education

PhD, Urban and Regional Science, Texas A&M University

MS, Community and Regional Planning, Iowa State University, Ames

Years of Experience

25 years

Professional Associations

American Planning Association

Association of State Floodplain Managers

National Emergency Management Association (NEMA)

Advisory Board Member of DHS Center of Excellence – Natural Disasters, Coastal Infrastructure and Emergency Management, University of North Carolina, Chapel Hill

Training and Certifications

Certified Floodplain Manager (CFM)

Summary

Dr. Park has more than 25 years of experience and expertise in the areas of risk management, hazard mitigation, and sustainable disaster recovery from Hurricane Fran, Floyd, Isabel, Katrina, Sandy and other declared disasters. He has been involved in hazard mitigation/recovery policy/program development, risk assessment and benefit cost analysis, mitigation planning, needs assessments, housing recovery program development and implementation, risk perception, and communication research at the Federal, regional, state, and municipal level as well as with private clients. Prior to joining AECOM, Dr. Park was the Assistant Director for the Division of Emergency Management, State of North Carolina.

Experience

FEMA, Unified Hazard Mitigation Assistance Program Guidance Development and Update, Nationwide. Task Lead. Task is to develop Unified Hazard Mitigation Assistance Program guidance for five hazard mitigation funding programs: PDM, FMA, RFC, SRL, and the Hazard Mitigation Grant Program (HMGP). The intent of this alignment is to enhance the quality and speed of grant awards on an allocation and competitive basis to State, local, and Tribal entities for worthwhile, cost-beneficial activities designed to reduce the risks of future damage in hazard-prone areas. At the same time, unification yields new opportunities to expand national outreach for all types of mitigation.

FEMA, Pre-Disaster Mitigation Joint Explanatory Statement Grant Program (PDM-JES) Technical Support, Nationwide. Benefit Cost Analysis Lead. Provided technical support to FEMA Headquarters, regions, and states in identifying eligible mitigation projects, cost-effectiveness and feasibility review of sub applications, and data collection. The technical assistance also involved a remote sub application review, on-site training, and one-on-one meetings with local government officials to provide comments for lacking information and revise the project application scope that is more aligned with the PDM-JES guidance.

South Carolina Emergency Preparedness Division, South Carolina Hazard Mitigation Plan, West Columbia, SC. Task Manager. Development of a hazard mitigation plan for the State, including conducting a planning process, assessing risks, and developing a mitigation strategy. A draft was approved by FEMA. Updated elements will include an evaluation of recent hazard events, identification of

changes in hazard vulnerability, and a review and update of the proposed mitigation actions. Mr. Park was responsible for conducting hazard analysis and vulnerability assessments of all natural hazards identified in the state.

New York State Governor's Office of Storm Recovery, State of New York Rising Community Reconstruction. Project Manager. Provided recovery planning assistances to the communities severely damaged by Hurricanes Sandy and Irene and Tropical Storm Lee for facilitating resilient and sustainable community reconstruction. As a Project Manager, led a team of public outreach specialist; subject matter experts in housing, economic development, structural engineering, stormwater management, risk analysis, GIS, and planning to perform risk assessment, public engagement and consensus building, benefit cost analysis, recovery projects identification and development and plan writing.

New England Regional Catastrophic Planning Initiative, MA, RI, NH. Technical Lead. Assessed regional capabilities and identify gaps in existing disaster housing planning efforts based on housing stock analysis using a catastrophic event scenario. Based on the gap analysis, AECOM developed a Regional Disaster Housing Annex, including concept of operation, pre-and post- actions, and lists of housing solutions. An Executive Playbook was also created to provide guidance and decision support tools to promote orchestrated recovery efforts among the impacted communities. In addition Commonwealth of Massachusetts Disaster Housing Recovery Plan and local planning toolkits were developed based on the NERCPI planning template.

FEMA, Task Order to Develop Methodology for Determining the Losses Avoided as a Result of Adopting Hazard-Resistant Building Codes, Nationwide. Technical Lead. Developed a first generation method of calculating building code adoption losses avoided estimates derived from existing data and analyses and propose implementation strategy of the methodology nationwide. The major components to the methodology include the selection of the pilot sites, data collection and screening, calculation of losses avoided using an analysis tool such as Hazus, review and validation of results.

New Castle County Flood Mitigation Education and Outreach Project, New Castle County, DE. Project Manager. Evaluating mitigation techniques for 33 repetitive flooded properties and developing education materials for local repetitive loss reduction strategies. With assistance from state officials, conducted a workshop for the benefit of local officials with the goal of identifying roadblocks to implementing flood mitigation projects at the local level, and identifying local project priorities.

FEMA Hazard Mitigation Technical Assistance Program. Analyst. Providing post-disaster technical support and programmatic assistance to the agency's mitigation program in response to floods, hurricanes, earthquakes, and terrorist attacks throughout the U.S. Support services included engineering, mitigation planning, benefit-cost analysis and training, and a Multihazards-US (HAZUS-MH) analysis.

AECOM

Ann Terranova, CFM

Community Outreach Lead

Areas of Expertise

FEMA Project and Program Management

Community Engagement and Outreach

Risk and Crisis Communications

Facilitation

Education

BS, Man/Environment Relations, Urban Planning Emphasis, Pennsylvania State University

Years of Experience

31 years

Training and Certifications

AECOM Certified Project Manager

Certified Floodplain Manager, Association of State Floodplain Managers

Summary

For more than 30 years, Ann Terranova, Senior Program Manager and Senior Communications Specialist, has created, managed, and implemented strategic training, facilitation, and communications programs to assist clients solve highly controversial and complex technical and environmental problems. Ms. Terranova served as the Risk Communications and Outreach Lead for former URS participation as a joint venture member company in the Federal Emergency Management Agency's Risk Mapping, Assessment, and Planning Program (Risk MAP). Ms. Terranova also served as the Task Leader and Senior Community Planner for FEMA's Long Term Community Recovery program conducting needs assessments for coastal communities in Mississippi and Texas impacted by Hurricane Katrina. She identified long term community recovery planning needs through a highly interactive process with key stakeholders, including local elected officials, community leaders, state planning agencies and the Mississippi Governor's Commission on Recovery, Rebuilding and Renewal and the City of Galveston, Texas Long Term Recovery Committee.

Relevant Experience

FEMA Risk MAP PTS, FEMA Regions II, III, IV, V, VI, Community Engagement and Risk Communications Lead, Strategic, Communications Services/Key Account Program Management. Ms. Terranova served as the Community Engagement and Risk Communication Lead for PTS Provider RAMPP on the Federal Emergency Management Agency's Risk Mapping, Assessment, and Planning Program (Risk MAP). This involved a high degree of coordination with communities affected by FEMA's initiative to communicate about the risks of living and working in high flood hazard areas. Ms. Terranova provided community engagement and risk communication support in the Advisory Base Flood Elevation and Preliminary Work Map rollout in New York and New Jersey in the aftermath of Hurricane Sandy. She worked closely with FEMA Regional and Headquarters staff in developing communications materials for New York City and New Jersey Governor-hosted meetings with community officials, Congressional staff, and the media.

HMTAP Floodplain Management Technical Assistance Task Order Manager, Communications Services/Key Account Program Management. Ms. Terranova leads a team of strategic communications and NFIP experts in the execution of FEMA's Floodplain Management

Branch Technical Assistance Contract under the URS HMTAP Contract. She has been responsible for all aspects of Task Order administration as well as directing qualified staff in providing support to the Community Rating System efforts, the development of a FPM Accomplishments document showcasing important program achievements, preparation of four higher standards one-pagers, and the development of Web content recommendations for enhancing FPM presence on FEMA.gov.

FEMA National Levee Outreach Task Order Manager, Communications Services/Key Account Program Management. Ms. Terranova provided to support to FEMA in the development of a National levee outreach program to increase awareness and understanding of risks associated with living with levees. The Task Order was a complex, multi-task project which required close coordination with FEMA's FloodSmart program to ensure consistency of levee-related materials promoted on both the FEMA and FloodSmart websites.

TARC National Dam Safety Program Task Order Manager, Communications Services/Key Account Program Management. Ms. Terranova led a team of strategic communications specialists in the development of a multi-dimensional strategy to enhance the visibility of FEMA's National Dam Safety Program. Through the development of the strategy, Ms. Terranova helped to create the overarching theme regarding shared responsibility for dam safety awareness and actions to reduce associated risks when living and working in areas affected by dams. Discrete elements of the program included development and implementation of the 2013 National Dam Safety Awareness Day, the development of the NDSP 2012 Annual Year in Review, establishing the NDSP presence on FEMA.gov and the preparation of multiple updates to important NDSP publications.

U.S. Army Corps of Engineers National Levee Database Outreach Task Order Manager, Communications Services/Key Account Program Management. AECOM is providing support to the U.S. Army Corps of Engineers (USACE) in developing and implementing a comprehensive communications and outreach strategy to raise awareness about the USACE National Levee Database (NLD) and increase usership by important internal and external audiences. Ms. Terranova is leading a team of strategic communications and public relations specialists in the development and implementation of a multi-faceted, multi-media communications strategy to meet USACE NLD communications goals and objectives. A cornerstone of the strategy is conducting stakeholder interviews to gather information about the current level of NLD use and how the USACE can enhance communications to raise awareness and increase its use. An important component of the work provided by AECOM is the development and delivery of NLD training and the development of information materials about the NLD database. To garner support, URS is providing meeting facilitation services with key internal and external stakeholders to obtain important feedback on the efficacy of the NLD.

AECOM

Jeffrey Sengebusch

Quality Control Lead

Areas of Expertise

Floodplain Management
National Flood Insurance Program
DFIRM and FIS QA/QC
FIS Production
Post Preliminary Processing

Education

BS, Geography and Environmental Planning, Towson University

Years of Experience

15 years

Training and Certifications

AECOM Project Manager Certification, 2009

Summary

Mr. Sengebusch has 14 years' experience working with the National Flood Insurance Program (NFIP), including all aspects of Post-Preliminary Processing, QA/QC reviews of Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study Reports, and DFIRM and FIS production. He possesses Extensive knowledge of FEMA G&S, and has completed FEMA training for MIP Workflow and FHDs on the Web Publication. Mr. Sengebusch is the Project Manager for several NFIP Flood Insurance Studies for which he manages the financial and production aspects.

Experience

FEMA, Risk Map Contract, FIRM Processing. Project Manager. Mr. Sengebusch is the Project Manager for several Flood Insurance Studies in FEMA Regions III and VI, where he is responsible for all aspects of the studies including production, QC, financial, and coordination. Mr. Sengebusch is also the RAMPP QR3 and QR7 Coordinator for this contract, as well as the Post Preliminary Team Leader for the AECOM Germantown office. He conducts reviews and manages the workflow for QR3 and QR7 Reviews in Regions II and III on behalf of FEMA. He manages post preliminary schedules, and production for all AECOM Germantown projects. Mr. Sengebusch coordinates all applicable internal and external quality reviews.

FEMA, Risk Map Contract, FEMA Region III QA/Post Preliminary Processing Lead. Mr. Sengebusch is the QA/Post Preliminary Lead for FEMA Region III. He coordinates all quality reviews on behalf of FEMA Region III for the Compass Joint Venture. He is responsible for the coordination of docket approvals, reporting of Joint Venture metrics, and serves as a liaison between regional mapping partners and the Regional Service Center. Other responsibilities include approving tasks in the Mapping Information Platform, coordinating Federal Register publications and performing quality reviews on behalf of FEMA Region III.

FEMA, South Carolina Flood Mapping CTP Contract. Project Manager for QA/QC Task Orders. He is also the Post-Preliminary Processing Lead. He manages the independent QA/QC work of engineering analysis and mapping that is required under this contract. He conducts the post-

preliminary processing for all AECOM (URS) flood studies under this contract, conducting PDCC meetings with communities, initiation of appeal periods, addressing appeals and protests, preparing the LFD, and submitting final GPO packages. He has coordinated with FEMA Region IV, RMC IV, SCDNR, and the NSP for these tasks. Mr. Sengebusch also leads the QA/QC reviews of DFIRMs and Flood Insurance Studies for all AECOM counties under this contract.

FEMA Region IV, ID/IQ Contract, FIRM Processing. Assistant Project Manager for QA/QC Task Orders. He was also the Post-Preliminary Processing Lead. He conducted the post-preliminary processing for all flood studies under this contract, conducting PDCC meetings with communities, initiation of appeal periods, addressing appeals and protests, preparing the LFD, and submitting final GPO packages. Mr. Sengebusch also led the QA/QC reviews of DFIRMs and Flood Insurance Studies, and production of large countywide Flood Insurance Studies under this contract. He has overseen the post-preliminary processing of 8 countywide studies, and the external QA/QC efforts for 43 countywide studies.

FEMA Region IX, ID/IQ Contract FIRM Processing. Assistant Project Manager for QA/QC Task Orders. He was also the Post-Preliminary Processing Lead. He conducted the post-preliminary processing for all flood studies under this contract, preparing the LFD, and submitting final GPO packages. Mr. Sengebusch also led the QA/QC reviews of DFIRMs and Flood Insurance Studies, and production of large countywide Flood Insurance Studies under this contract. He oversaw the post-preliminary processing of two countywide studies, and the external QA/QC efforts for 23 countywide studies.

FEMA, Alabama Flood Mapping CTP Contract, FIRM Processing. Peer Reviewer. Primary roles include QA/QC reviews of DFIRM panels, and Flood Insurance Studies. He also provides training and technical support for team members.

FEMA Region VI, ID/IQ Contract, FIRM Processing. Peer Reviewer. Primary roles include QA/QC reviews of DFIRM panels, and Flood Insurance Studies.

FEMA, Flood Map Production Coordination Contract, Fairfax, VA. Peer Reviewer. Mr. Sengebusch provided technical assistance, mapping support, and quality control reviews in support of the NFIP. Activities included production of DFIRMs, processing of Flood Insurance Study Reports, and QA/QC reviews to ensure a high quality product to the client.

Contents

B. Approach and Methodology 1

Introduction 1

1. Technical Approach 3
2. Communication with the State 9
3. Quality Management 10
4. Summary 10

B. Approach and Methodology

AECOM has completed over 135,000 miles of hydrologic and hydraulic analysis and floodplain mapping for FEMA studies nationwide.

Introduction

AECOM's comprehensive technical capabilities, combined with up-to-date Risk MAP program knowledge and vast national expertise, provide the West Virginia DHSEM with a team that can serve as a true partner in accomplishing your CTP program objectives, maximizing funding available to the State for these activities, and creating long-term flood hazard resilience in West Virginia communities. We are prepared to provide the State with flood hazard analysis and mapping services that are as simple and cost-effective as possible, such as only producing advisory floodplains that will not be incorporated into FEMA's FIRMs. We are also ready to provide more robust flood risk assessment products to the State if requested.

We understand West Virginia's geography, land use, and growth patterns as they pertain to flood map challenges. We would be honored to assist you in assessing, communicating, and mitigating your flood risk hazards and updating West Virginia's floodplain maps to provide accurate flood risk information in an accessible, digital format that will benefit both State and local entities and enhance your State's resilience against natural hazards.

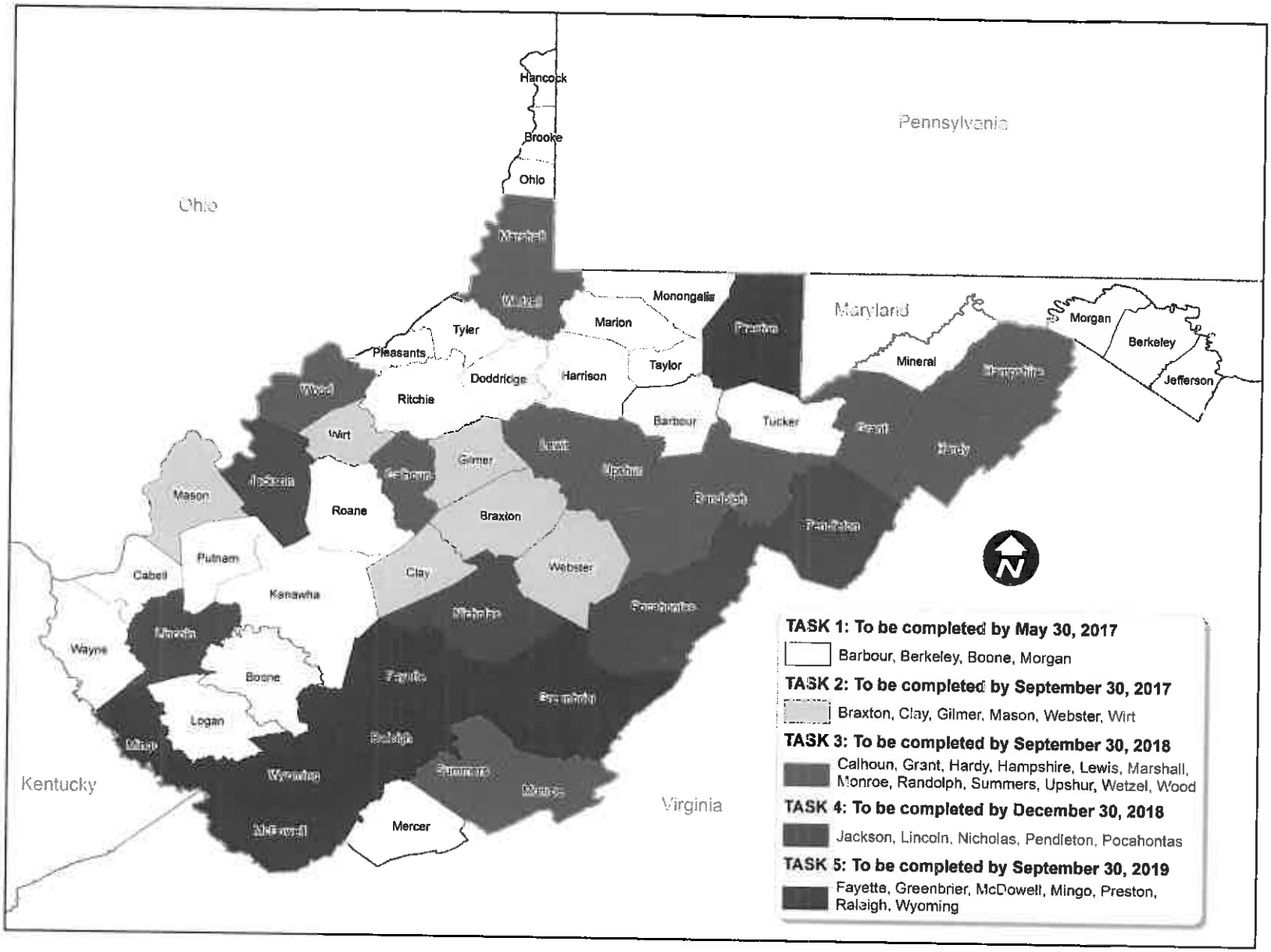
AECOM understands from DHSEM's Centralized Expression of Interest (CEOI) that the State is looking to produce approximate floodplains for approximately 6,325 miles of effective Zone A streams for 34 counties throughout the State of West Virginia over the next two and a half years. AECOM has the not only the experience to model this large amount of Zone A, but also the personnel and efficient tools available to meet the desired deadlines that the State of West Virginia has set forth in the CEOI.

Many AECOM staff that will be working on this contract live and work in the State of West Virginia. These individuals know what it is to be a resident of the State of West Virginia and have specific knowledge of many of the local community leaders throughout the state.

Good communication and adherence to high quality will be guiding principles in our work for the State. We will work with DHSEM at the start of the program to outline a communication plan that suits your needs. We will also develop a program-specific quality work plan that we will apply to all flood study projects for DHSEM.

Through the many years of experience that AECOM brings to the State of West Virginia, AECOM is well prepared to provide the deliverables, outlined in the Expression of Interest HSE1700000003, not only on schedule but within budget.

The following sections discuss how we will apply our proven technical approaches and methodologies for floodplain hazard analysis and mapping for studies selected by DHSEM. Our project approach to flood studies and technical methodologies to complete them have been tested and refined over our decades' worth of experience.



Proposed study areas and dates

1. Technical Approach

AECOM has unparalleled expertise in conducting FEMA floodplain studies using automated GIS-based H&H analyses, and delivering projects in both countywide and HUC 8 watershed formats. AECOM is a leader in integrating GIS into the floodplain mapping and management process through customized tools, and has continuously implemented innovative procedures.

AECOM has a dedicated full-time Research and Development Team that focuses solely on enhancing and improving efficiency to FEMA's programs and deliverables. For example, AECOM has used our WISE software for H&H analysis, coastal analysis, and FIRM production for more than 15 years and has seen a reduction in costs over time.

The focus in the Risk MAP program and most CTP programs is to produce credible studies and to reduce flood risks by developing the ability of stakeholders to take appropriate actions. AECOM is committed to continuous improvement in all aspects of our projects, and has a widespread reputation of producing credible products. We will bring our commitment to continuous improvement to all studies produced for DHSEM.

AECOM will produce model-backed 1-percent-annual-chance-event floodplains for West Virginia that will improve the accuracy of current Zone A floodplains and deliver quality data to areas currently unmapped. Based on DHSEM's CEOI, we anticipate there will be approximately 6,325 miles of Zone A stream miles to restudy.

Our experience and innovation in model-backed Zone A delineation is reflected in our development of specific GIS tools, such as WISE, SwiftMap, and GeoRAMPP, to make the Zone A floodplain development a more efficient process. We have used these tools to automate some of the GIS-related Zone A processes and we have used them to produce more than 64,000 miles of model-backed, regulatory-quality Zone A streams on published FIRMs. In Region III, specifically, we have modeled over 3,000 Zone A miles. Outputs from our studies are always non-proprietary and the data can be shared with and easily used by states, communities, and others for floodplain management and other purposes.

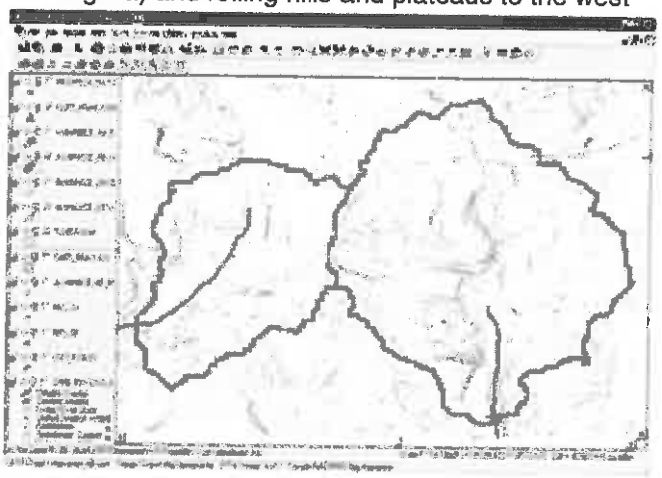
AECOM will use our efficient GIS tools to create HEC-RAS models and map the flooding source. Along with terrain data, our tools allow our engineers to:

- Set flow change locations
- Delineate watershed boundaries
- Delineate stream centerlines and determine flow paths
- Calculate hydrology for all required flood events (from simple regression equations through detailed rainfall-runoff modeling with HEC-HMS)
- Lay out cross sections
- Set Manning's n values in overbanks and channels
- Create all required model inputs for HEC-RAS
- Make model edits
- Map floodplain boundaries
- Create water surface triangulated irregular network TINs that provide water surface elevations (Base Flood Elevations [BFEs]) at any point in the floodplain
- Create flood depth grids

1.1. Hydrologic and Hydraulic Modeling

Hydrologic Watershed Modeling

Expertise conducting hydrologic modeling using methods appropriate for the physiographic and meteorological characteristics of West Virginia is a critical component to correctly assess flood risk. Our project team brings experience relevant to both West Virginia's mountain ranges in the eastern panhandle and central regions (through our studies in West Virginia, Maryland, Pennsylvania, and Virginia) and rolling hills and plateaus to the west



Subbasin delineation using GIS for peak flow calculations

(through our studies in West Virginia, western Pennsylvania, and Kentucky). Our team includes a blend of staff that specializes in hydrologic numerical modeling, rainfall-runoff model development and calibration, and hydrologic post-disaster flood hazard verification.

AECOM's success in hydrologic modeling is a result of our continued use of the newest available technologies, which allows us to provide our clients very cost-effective, high-quality models. The team will use ArcGIS tools and ArcHydro to automate the watershed hydrologic analysis using the best available terrain data. These tools use TINs developed from DTMs to automatically delineate watershed and sub-basin boundaries, determine flow paths, and provide runoff factors based on available soil coverage and land use information.

AECOM has performed hundreds of flood frequency assessments using a variety of methods, including statistical analysis of gage data and USGS regional regression equations. Once watersheds and flow paths are delineated using automated methods, we will use automated tools within ArcHydro to generate drainage area inputs for the latest regional regression equations for West Virginia, USGS' *Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia* dated 2010, and calculate results to determine new peak flow values for selected study areas. Having only one input parameter in the State's regression equations, the drainage area, makes the calculation of peak flow values very simple and cost-efficient. When USGS gages are present, we will use the method described in USGS Technical Bulletin No. 17B, *Guidelines for Determining Flood Flow Frequency*, to determine frequency peak flow discharges based on recorded gage flow data. If drainage areas are smaller than the regression equation limitations (0.1–0.21 square miles depending on region), we will apply the rational method to determine peak flow values. We recently applied these methods to develop new peak 1-percent-annual-chance flow values for Jefferson County, WV.

Hydraulic Stream Analyses and Floodplain Generation

Because of the hilly nature of the terrain, most West Virginia streams can be accurately studied by a 1D model. AECOM will use the USACE's model HEC-RAS to perform 1D steady state hydraulic analysis of all study steams and calculate water surface elevations for desired flood frequencies, such as the 1-percent-annual-chance storm event.

AECOM uses automated modeling techniques where appropriate to improve efficiency. The automated platforms we use include ArcGIS, ArcGIS Server, HEC-GeoRAS, WMS, and automated tools developed in-house, such as WISE, SwiftMAP, and GeoRAMPP. AECOM will use HEC-GeoRAS to create cross sections and import data into hydraulic models for West Virginia study streams, resulting in significant time savings over traditional analytical methods. HEC-GeoRAS can cut an unlimited number of cross sections to best represent the study of rivers and streams and automatically generate the geometric data for input into HEC-RAS, minimizing data entry. We will also use GIS tools to provide automated extraction of Manning's n-values from digital land use coverage.

West Virginia-specific hydraulics expertise is provided by David Weaver in our Morgantown office, which is home to a strong and respected transportation group working with the West Virginia Department of Transportation and other State agencies daily. Our staff routinely addresses bridge hydraulic and floodplain studies associated with roadway crossings of streams in counties around the State.

1.2. Floodplain Identification and Mapping

After the hydraulic model is completed, HEC-GeoRAS will be used to read the water surface elevation results from HEC-RAS and automatically delineate draft floodplains for WV study streams. Because this mapping is done in the GIS environment, electronic deliverables in the FIRM database structure can easily be created. We understand that DHSEM is only requesting advisory floodplains at this time, but the floodplains we produce will be accurate enough to meet FEMA standards. The boundaries will meet FEMA's Guidance for Flood Risk Analysis and Mapping Floodplain Boundary Standards (FBS) (November 2015). AECOM has been creating FBS reports for various FEMA regions since Procedure Memorandum (PM) 38, *Implementation of Floodplain Boundary Standard (FBS)* was implemented on October 17, 2007, when AECOM attended one of the first training sessions. AECOM will create FBS reports that document the accuracy of the floodplains we develop for the State of West

Virginia, so that the boundaries can be incorporated in future FEMA map products if desired.

AECOM is very familiar with FEMA's *Guidelines and Standards for Flood Risk Analysis and Mapping* (*Guidelines and Standards*), as AECOM leadership helped FEMA define what was a Program Standard, Working Standard, Guidance, or Best Practices. This familiarity provides AECOM with an intimate understanding of what FEMA requires in the Risk MAP program for floodplain mapping deliverables.

AECOM will also use our in-house GIS automation tools to efficiently create water surface elevation and depth grids based on the floodplain boundary. The water surface grids can be used to determine the water surface elevation for the 1-percent-annual-chance storm event (BFE) at any point (grid cell) within the floodplain. This information is very useful for submitting Letter of Map Change requests in Zone A floodplains where BFEs are not printed and labeled on the FIRMs. The depth grids can be used to determine the depth of flooding from the 1-percent-annual-chance storm event at any point (grid cell) within the floodplain.

1.3. DFIRM Development

AECOM has developed a series of customized tools that allow us to efficiently produce FIRM panels from production Esri Spatial Database Engine (SDE) Geodatabases. One of these tools is DFIRM.net, which automatically batch generates the panel collar and title block, and subsequently loads and symbolizes each feature class to create the FIRM panels for an entire county in one single step. This reduces the potential for errors introduced in the production process by manually creating the individual FIRM panels. DFIRM.net can be customized to include special CTP border layout specifications if desired.

Our FIRMs are produced using ArcGIS10.x and a spatially enabled relational database management system (RDBMS) engine (ArcSDE 10). The benefits of this tool are that we work in a true relational database environment that provides a scalable and robust solution, ensuring data consistency in a central database accessible to all AECOM offices.

A critical input component to the FIRM is the delineation of the flood hazard boundary. Having conducted hundreds of flood studies covering thousands of stream miles nationwide, AECOM has extensive experience in GIS and we will automate the delineation of West Virginia floodplains in accordance with FEMA standards.

We realize that maximizing available budgets through the optimization of the production process is of vital importance. AECOM's in-house automation tools, such as GeoRAMPP and UMAP, have effectively increased our capacity to conduct flood studies and produce flood maps. Our team members will use GeoRAMPP to create FIRM products that result in a robust geodatabase deliverable to DHSEM. For mapping and database development, UMAP will be used within the GeoRAMPP framework. UMAP uses an ArcGIS-based framework to automate certain steps of the FIRM and database development process and formats the deliverables to FEMA's *Guidelines and Standards* (per FEMA's Technical Reference: *Flood Insurance Rate Map (FIRM) Panel* [November 2016]).

1.4. Data Management

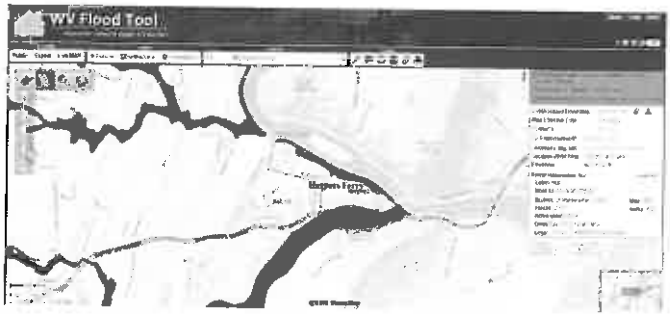
AECOM will actively manage and organize data for DHSEM flood hazard analysis and mapping services, including base map data, large terrain datasets, and all flood study output data (model results, floodplain boundaries, FIRM databases, etc.). We will deliver all data according to FEMA and West Virginia requirements and standards.

If requested, we will upload required data development deliverables to FEMA's MIP according to FEMA's strict specifications. We will prepare metadata for all deliverables and submit data that is formatted according to the latest Data Capture Standards; outlined in FEMA's Technical Reference: *Data Capture* (November 2016). Also, if requested, we will update FEMA's CNMS database to record valid streams at key steps of the study process, and record identified mapping needs that are found during the flood study process; according to FEMA's Technical Reference: *CNMS Database User's Guide* (November 2016).

We will prepare all data for use on West Virginia's Flood Tool. From our experience developing advisory 1-percent-annual-chance storm event (Zone A) floodplains and depth grids for Jefferson County, WV, we understand what deliverables are needed to make the data compatible with existing data and aspects of the West Virginia Flood Tool.

AECOM will consult the State on requested deliverables, but we can use the following guidance

provided by Eric Hopkins at West Virginia GIS Technical Center for our data deliverables:



West Virginia Flood Tool

1) DELIVERABLE 1: **Advisory Flood Height Raster Grid**
   a) Raster Type: Esri grid
   b) Coordinate System and Projection
      i) Universal Transverse Mercator (UTM) Zone 17 North, Horizontal Datum of 1983, Linear Unit: meter
      ii) State Plane West Virginia South FIPS 4702 (or the coordinate system in use by the county GIS system if other than UTM 17 N), Horizontal Datum of 1983, Linear Unit: foot (US)
   c) Resolution
      i) Advisory data production should take advantage of the best available elevation data source
      ii) Current data has a 3-meter (10-foot, approx.) cell size. New data must be 3-meter or finer.
   d) Bit / Pixel Type, Depth
      i) Pixel Type = floating point
      ii) Pixel Depth = 32 bit
   e) Negative values / edge anomalies occur near boundaries and should be investigated and eliminated in order to avoid confusion for users.
2) DELIVERABLE 2: A **Floodplain Polygon** matching the water surface and depth grids must also be submitted.
3) DELIVERABLE 3: **Study Area (County) Boundary** must match existing official county boundary data produced by the West Virginia Department of Environmental Protection in 2002 (http://wvgis.wvu.edu/data/dataset.php?ID=136). If other boundary data are used, then a feature class built in the same coordinates/projection(s) as the GRID data must also be submitted.
4) DELIVERABLE 4: A downloadable **Engineering Data Package** must be submitted with, or as soon as is practicable following submission of the grid and Floodplain data. This data package is highly useful for future modeling and must include the following:
   a) Stream lines with digital FIRM stream name: It is crucial for linking download packages that the stream lines upon which models are based are correctly named and included in the streams feature class provided with other engineering data. Stream names must match attribute field wtr_nm in digital FIRM feature class s_wtr_ln.
   b) Cross Section / cut lines
   c) Digital Elevation Model (DEM) – Countywide, as extracted from statewide, USGS quadrangle based data or similar. Extracted DEM data may be processed further than the source. Inclusion of the specific countywide data set used ensures reproducibility by subsequent users.
   d) DEM Buffer – Subset of DEM used for stream-/reach-based model, again subject to specific processing and essential for future reference and use.
   e) HEC-RAS model .PRJ and associated files, stream-/reach-based.
   f) Metadata, validated to Federal Geographic Data Committee Content Standard for Digital Geospatial Metadata or International Organization for Standardization (ISO) standard, submitted as separate XML files (and optional text files) for each of the following. Avoid unnecessary generic content and focus on a detailed process steps and an explanation of how each data set is produced.
      i) Floodplain
      ii) Hydraulics
      iii) Hydrology
      iv) Cross Sections
      v) DEM
      vi) Streams

1.5. Topographic Data Development

We have advanced terrain processing methods that capitalize on advances in cloud computing technology, partnerships with Amazon Web Services and Esri, and many years of experience in incorporating legacy data into current mapping applications. The AECOM team continually monitors and utilizes the latest advancements in

photogrammetric and mapping technology. We can offer solutions that take advantage of such technologies as LiDAR, or the team can use conventional techniques to create DEM and DTM data sets. Our goal is to apply the appropriate technology to ensure appropriate solutions for our clients.

DTMs are the foundation on which hydraulic and hydrologic analyses and subsequent floodplain mapping are based. Therefore, it will be critical for West Virginia riverine flood studies to not only use the best available topographic data, but to also ensure the source data are processed correctly during DTM development. AECOM will ensure that they are. Technology and automation during development of DTMs allows AECOM to work efficiently to deliver accurate topographic mapping for flood studies; these efficiencies will result in controlled costs, high-quality deliverables, and schedules met for DHSEM.

DTM development in West Virginia will require experience and knowledge in working with riverine areas. Topographic data sources may need to be combined to create a seamless DTM for use in modeling and mapping across political boundaries. AECOM's engineers and GIS staff possess these skill sets and have developed DTMs for numerous riverine stream studies. AECOM has produced seamless DTMs for all projects in FEMA Regions II, III, IV, and VI, VIII, *and IX, and for our CTP work in many states.*

Cost Control

Based on project experience, we have designed our DTM workflow to identify issues before proceeding to the next step in the process, eliminating the need for costly rework.

Quality of Work

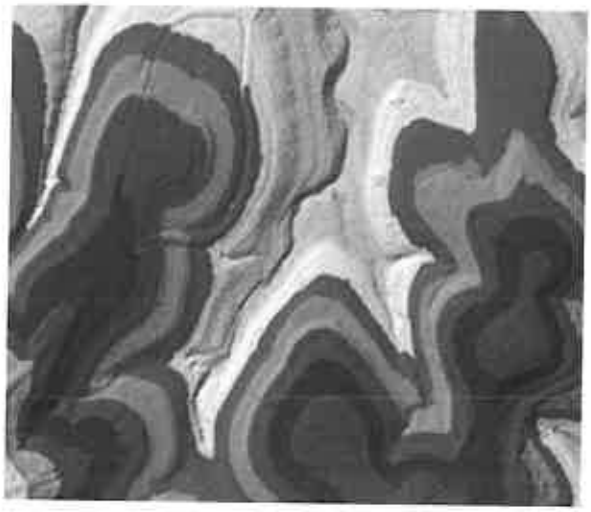
Our high-quality DTMs help streamline the production process and result in high-quality hydraulic products and maps that meet FEMA requirements.

Compliance with Performance Schedules

DTMs are the critical path for all production tasks. AECOM routinely processes multiple concurrent DTMs to meet schedule pressures and eliminate delays.

Processing

AECOM is experienced in using different types of topographic data sources, such as LiDAR, mass points, breaklines, rasters, and contours as source feature classes, and combining them to create a seamless DTM.



AECOM is experienced in using the best available topographic data sources to develop seamless DTMs for studies

We will use ArcGIS and LiDAR editing tools to pre-process data into the correct feature class format and convert the source data into the required study area projections and units. Our engineers and GIS staff are proficient working with topographic data sets in different formats (such as LiDAR las, 2D and 3D shapefiles, File GeoDatabase feature classes, USGS DEMs, rasters, AutoCAD, and MicroStation files), datums, units, and projections. We will use ArcGIS tools to develop DTMs for hydraulic analyses and to develop hydrologically correct DTMs for hydrological analyses. Our staff will develop and use automation methods such Python scripts, model builder tools, and macros to efficiently perform batch routine tasks.

AECOM can effectively manage large amounts of LiDAR data. With increasingly smaller point spacing and increased accuracy of the LiDAR, there is an increase in the density of the data points and file sizes. Countywide LiDAR data sets may range from 50 to 150 GB. AECOM is experienced with working with large data sets within File GeoDatabases and SDEs as a platform for DTMs.

The DTM development workflow includes a QA/QC review process to establish that the data were processed correctly and to identify and address any unnaturally high or low elevations or incorrectly classified LiDAR points to ensure the DTM accurately reflects the bare earth surface.

1.6. Hazard Mitigation Planning

According to Federal regulations, each hazard mitigation plan must identify locations at risk of being affected by natural hazards. Some hazards, such as heavy snowfall, typically affect an entire planning area; other hazards, such as flooding, affect only specific locations within a planning area.

AECOM uses GIS to develop maps that identify locations at risk of experiencing damage. By comparing hazard-prone locations with locations where structures and infrastructure are located, we assist local communities to understand what assets are most at risk of being damaged by a natural hazard.

AECOM uses HAZUS, the FEMA GIS-based software, to estimate economic losses due to earthquakes, floods, and hurricane winds. Hazus estimates the number of buildings in hazard-prone locations, estimates the value of the buildings, and calculates the potential cost of repairing damages. We use HAZUS so that local officials can compare the potential for damages due to hazards of varying magnitudes such as a 3-foot-deep flood and a 6-foot-deep flood.

Maps are included in our hazard mitigation plans and form the basis for making mitigation strategy decisions. AECOM conducted HAZUS analyses for Greene County, NY and Huntingdon County, PA plans within the past year. AECOM also conducted work involving mapping to identify California locations where major wildfires destroyed vegetation and that were subsequently at risk of experiencing erosion or debris-flow and increased flooding.

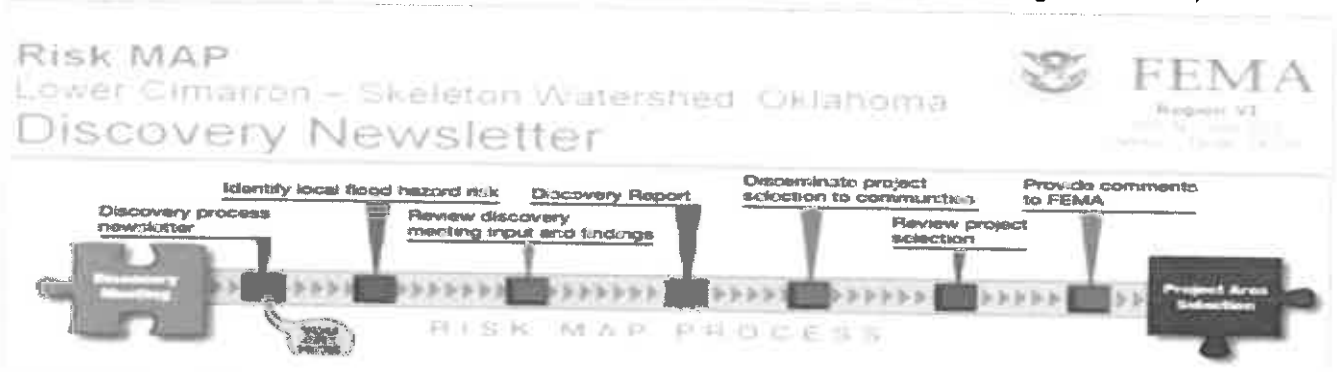
Maps are a useful tool for emergency managers and decision-makers to help them link documented risks with realistic mitigation strategies that use resources effectively and enable them to better manage post-disaster recovery operations. Maps included in AECOM plans also help the general public to better understand how their community may be affected by hazards.

1.7. Community Outreach

AECOM has assembled a team of nationally recognized public relations, flood risk mapping, and insurance experts to work in partnership with DHSEM on its CTP program. AECOM has extensive experience with outreach related to both the FEMA Map Modernization Program and its Risk MAP Program. We assisted FEMA in Louisiana and Mississippi, after Hurricane Katrina, as well as in New York and New Jersey, after Hurricane Sandy, during the controversial roll-out of Advisory and Preliminary FIRMs.

Currently, a typical Risk MAP project includes conducting up to five community engagement meetings throughout the mapping study process. Three of these meetings, including Discovery, Resilience, and Preliminary DFIRM Community Coordination (PDCC)/CCO Meetings, are required under the Risk MAP Program. A Flood Risk Review meeting (designed to allow stakeholders to review new floodplain boundaries) and Open Houses (open to the public and often held in conjunction with the CCO meeting) are desirable to achieve a successful project outcome.

AECOM will support DHSEM during the outreach meetings in presenting the new floodplains and preliminary FIRMs, and answering questions about the analyses. AECOM has provided technical support at outreach meetings throughout the country and has coordinated meeting logistics, including developing meeting agendas and public notices; securing meeting space; coordinating invitations to meeting participants; preparing meeting materials, including presentations, fact sheets, maps, and other handouts; facilitating discussions; and



Risk MAP Newsletters were developed by AECOM, as part of RAMPP, to communicate project details to communities and stakeholders

documenting meeting outcomes. We have also worked extensively with FEMA's Community Engagement Risk Communications provider in Region III and will help the State leverage its support. AECOM has developed an interactive facilitation process for Local Levee Partnership Team meetings that maximizes community input into how levees should be mapped.

Flood Risk Review Meetings Key to Understanding Community Flood Risk

- The Flood Risk Review meeting is technically focused and gives community officials the opportunity to review draft Risk MAP products.
- This meeting is essential in communities where significant changes in the identified flood hazard occur. It allows the project team to highlight the flood risk associated with the changes, and gives communities the opportunity to review the results and begin communicating that risk to affected residents and businesses before formal adoption of hazards.

AECOM has developed a wide array of products and guidance documents to help FEMA, states, and local municipalities communicate the results and implications of the flood studies we perform. For example, AECOM was instrumental in developing FEMA's user guidance for non-regulatory products as well as communications guidance that community officials can use in talking to their constituents about the non-regulatory products: FEMA Operating Guidance No. 3-11, *Communicating Flood Risk with Risk Map Datasets and Products*. AECOM will leverage the important insights gained through our involvement in developing these guidance documents to further enhance our outreach activities.

Well planned outreach activities with targeted audiences can reduce political stress, confrontation in the media, and public controversy that can arise from lack of information, misunderstanding, and/or misinformation. As part of our work conducted for FEMA, local municipalities, and state and county governments, AECOM project team members have attended hundreds of community meetings prior to and subsequent to preliminary map issuance, including several meetings in Region III. Community meetings serve as an outlet to make communities aware of the significant changes in the flood maps for each community, and allow a forum for discussion and feedback.

Our approach for any public meeting is to capitalize on the experience of AECOM's public involvement specialists for the design of the meeting and engage AECOM map specialists and technical experts to field questions and assist individuals in determining changes in flood zone for individual properties. As an effective means to communicate information to property owners, we have conducted "over the shoulder," or Open House meetings, where multiple workstations are set up so that community residents can see their property on a computer and understand the flood hazards in the area. Under our Risk MAP PTS contract, several AECOM team members have had recent experiences with a variety of community meetings throughout Region III.

2. Communication with the State

AECOM will prepare a communication plan for each TO awarded by DHSEM. The plan will outline how communication will occur with the State for that task, such as starting with a kickoff meeting then having regular bi-weekly status calls, monthly status reports, and in-person meetings at key phases of the project. The kickoff meeting with DHSEM will clarify scope items, project approach, deliverables, and schedule. Regular calls and meetings are expected to cover current TO status by discussing outreach needs, deliverables, technical issues, scheduling, invoicing, and budget status. DHSEM will always be kept up to date on all work performed by AECOM.

Our Program Manager will be able to meet with DHSEM as often as needed. Our Germantown, MD office is less than 40 miles from the West Virginia border, and within a 4-hour driving distance of DHSEM's office in Charleston, WV. Our Program Manager will have immediate access to staff with expertise covering almost every conceivable topic related to hazard identification and mitigation (not just flood related). Webinars can be used to allow DHSEM to consult with other offices and experts on a moment's notice. AECOM's management philosophy revolves around proactive planning and accurate, timely, and clear communication between our Program Manager and our client, and key Technical Task Leads.

3. Quality Management

Prior to initiating work on any project, AECOM develops a project-specific work plan. This is a basic requirement mandated by the AECOM Quality Management System. Our project QA/QC work plan establishes the road map for all team members and details the protocols and procedures that will be used to implement the project, including staffing, schedules, project management and technical tools, all key deliverables, QA/QC procedures, and health and safety protocols. AECOM will leverage the QA/QC work plan toward achieving project completion on time, on budget, and to the requirements of the DHSEM.

Quality has been ingrained into the corporate identity of AECOM through the execution and maintenance of a formal policy and procedure.

AECOM has extensive experience in performing QA/QC on both regulatory and non-regulatory products directly for FEMA and state CTPs. We review thousands of draft and final NFIP products annually and have developed a variety of checklists and automated tools to produce high-quality engineering and mapping deliverables. Our checklists and automated tools ensure each component, such as modeling data, FIS report data, and mapping data layers, are in agreement. Our checklists will be tailored for West Virginia to ensure we are meeting all requirements set forth by DHSEM. Many AECOM offices are available for independent QA/QC, if needed, to meet schedule or regulatory requirements of the State and FEMA. Our QA/QC processes have been approved for use in FEMA Region III. Our team has worked extensively with FEMA and Region III PTS reviewers and has successfully limited review times through proactive coordination, discussion, and dispositioning QA/QC calls.

AECOM follows an ISO 9001-certified quality management system.

4. Summary

AECOM has a project team that has procedures in place to communicate with DHSEM and communities throughout the entirety of the projects outlined in the EOI. AECOM has a long history of projects that have met the owners' budget and schedule. AECOM has the qualifications, experience, professional discipline and ability to work hand in hand with the State of West Virginia to assist in meeting their project goals and objectives. We look forward to the opportunity to support the State with flood warning and analysis mapping.