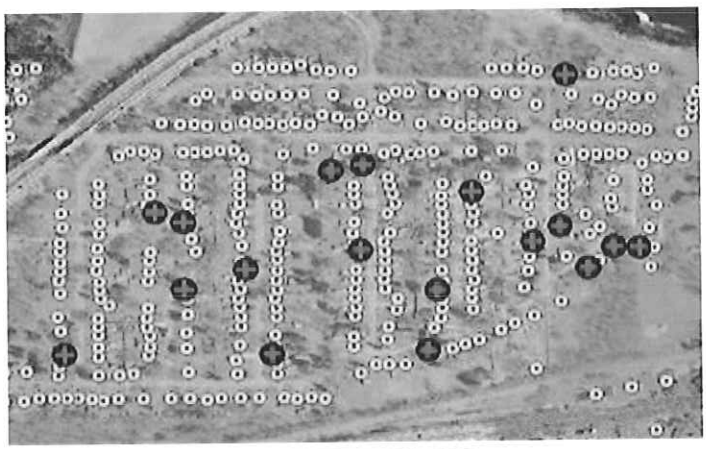
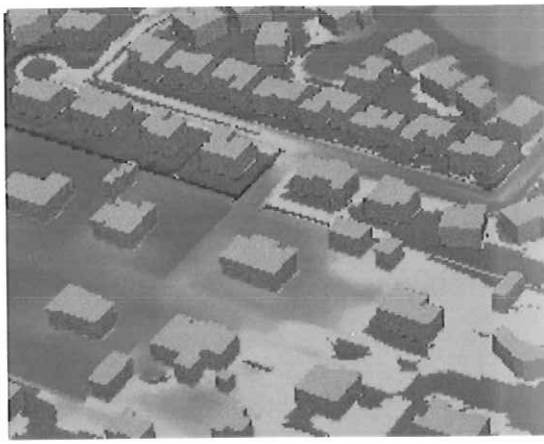
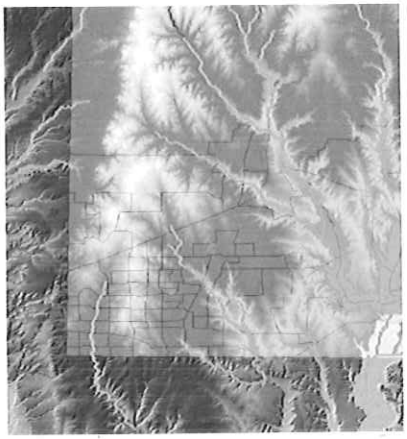
Dewberry

ARCHITECTS ENGINEERS CONSULTANTS

Applying Innovation to Manage Risk







HAZUS MH Analysis Phase II

West Virginia (Division of Homeland Security and Emergency Management)

HSE01232

April 18, 2012

SUBMITTED BY:

Dewberry
8401 Arlington Boulevard
Fairfax, Virginia 22031-4666
703.849.0100

Dewberry

8401 Arlington Boulevard
Fairfax, VA 22031-4666
703.849.0100
703.849.0118 fax
www.dewberry.com

April 16, 2012

VIA FEDERAL EXPRESS
West Virginia Division of Homeland Security
and Emergency Management
Department of Administration
Purchasing Division
Building 15
2019 Washington St., East
P.O. Box 50130
Charleston, WV 25305-0130

RE: Expression of Interest Request for Quotation # HSE-01232
Professional A/E Design Services for HAZUS MH Analysis Phase II

Dear Division of Homeland Security and Emergency Management:

Dewberry & Davis LLC ("Dewberry") is pleased to submit the attached proposal in response to Expression of Interest Request for Quotation #HSE-01232. As part of Dewberry's solution, the State of West Virginia will receive comprehensive HAZUS analysis, data and mapping products packaged in formats that will easily integrate into state and local planning and mitigation efforts. Our approach features real-world experience and tested solutions that will better position West Virginia to assess future risk factors and develop proactive, deliberate actions to increase resiliency of your communities. We are the go-to team for the State of West Virginia for this project because:

1. Having worked with the West Virginia Division of Homeland Security and Emergency Management to develop the 2010 Hazard Mitigation Plan, the Dewberry Team understands the needs and goals of the State.
2. Our team of nationally-recognized HAZUS experts has successfully completed similar projects to the complete satisfaction of our clients.
3. As a value-added service, the Dewberry Team, which includes The Polis Center, offers qualified training to the State and local communities to help explain the HAZUS analysis results and application of these results to mitigation initiatives.
4. Our proposed project schedule is mindful of the need to incorporate results of HAZUS MH Analysis Phase II into the 2013 Hazard Mitigation Plan Update; we will work closely with that contractor and the West Virginia Division of Homeland Security and Emergency Management to ensure seamless integration.

Dewberry submits this response to RFQ #HSE-01232 with the assumption that the issues raised in our Inquiries of Specification Clarification, initially submitted to you via e-mail on April 9, 2012, will be resolved by applying reasonable risk mitigation methods and contract requirements, West Virginia statutory and case law precedent, and historical performance safeguards proven effective for substantially the same work. These issues include (i) the necessity of a performance bond for non-construction work when the State previously has not required one for other A/E solicitations (and we understand that the Purchasing Director recently agreed to remove the performance bond requirement from sister solicitation HSE-01255); and (ii) the crafting of the indemnity clauses so that the work will be insurable.

If you have any questions, please do not hesitate to contract me at tmccormick@dewberry.com or at 703.849.0243 (tel.)/703.849.0648 (fax).

Sincerely,

Tim McCormick, P.E., CFM
Senior Vice President

Dewberry

State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
HSE01232	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
TARA LYLE
304-558-2544

RFQ COPY

VENDOR

Dewberry
8401 Arlington Boulevard
Fairfax, VA 22031-4666

SHIP TO
HOMELAND SECURITY & EMERGENCY MANAGEMENT, DIVISION OF
BUILDING 1, ROOM EB80
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0360 304-558-5380

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
03/09/2012				

BID OPENING DATE: 04/03/2012 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	LS		906-00-00-001		

ARCHITECT & ENGINEERING/CONSULTING

EXPRESSION OF INTEREST (EOI)

THE WEST VIRGINIA PURCHASING DIVISION, FOR THE AGENCY, WV DIVISION OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT, IS SOLICITING EXPRESSIONS OF INTEREST FOR PROFESSIONAL ARCHITECTURAL ENGINEERING DESIGN SERVICES FOR THE HAZUS MH ANALYSIS PHASE II, PER THE FOLLOWING BID REQUIREMENTS AND THE ATTACHED SPECIFICATIONS.

CANCELLATION: THE DIRECTOR OF PURCHASING RESERVES THE RIGHT TO CANCEL THIS CONTRACT IMMEDIATELY UPON WRITTEN NOTICE TO THE VENDOR IF THE COMMODITIES AND/OR SERVICES SUPPLIED ARE OF AN INFERIOR QUALITY OR DO NOT CONFORM TO THE SPECIFICATIONS OF THE BID AND CONTRACT HEREIN.

BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THE STATE MAY DEEM THE CONTRACT NULL AND VOID, AND TERMINATE SUCH CONTRACT WITHOUT FURTHER ORDER.

TECHNICAL QUESTIONS CONCERNING THIS SOLICIIATION MUST BE SUBMITTED IN WRITING TO TARA LYLE VIA MAIL AT THE ADDRESS SHOWN IN THE BODY OF THIS EOI, VIA FAX AT 304-558-4115, OR VIA EMAIL AT TARA.L.LYLE@WV.GOV.

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
[signature]	(703) 849-0243	4-16-12

TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
Senior Vice President	54-0604420	

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.

2. The State may accept or reject in part, or in whole, any bid.

3. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required $125 fee.

4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods this Purchase Order/Contract becomes void and of no effect after June 30.

5. Payment may only be made after the delivery and acceptance of goods or services.

6. Interest may be paid for late payment in accordance with the ***West Virginia Code.***

7. Vendor preference will be granted upon written request in accordance with the ***West Virginia Code.***

8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.

10. The laws of the State of West Virginia and the ***Legislative Rules*** of the Purchasing Division shall govern the purchasing process.

11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.

12. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.

13. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at **www.state.wv.us/admin/purchase/vrc/hipaa.html** and is hereby made part of the agreement provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.

14. **CONFIDENTIALITY:** The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf.

15. **LICENSING:** Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, and the West Virginia Insurance Commission. The vendor must provide all necessary releases to obtain information to enable the director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

16. **ANTITRUST:** In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or Fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.

2. Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.

3. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.

4. All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130

5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).

State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
HSE01232	2

ADDRESS CORRESPONDENCE TO ATTENTION OF:
TARA LYLE
304-558-2544

VENDOR

RFQ COPY

Dewberry

8401 Arlington Boulevard
Fairfax, VA 22031-4666

SHIP TO

HOMELAND SECURITY & EMERGENCY
MANAGEMENT, DIVISION OF
BUILDING 1, ROOM EB80
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0360 304-558-5380

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
03/09/2012				

BID OPENING DATE: 04/03/2012 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT

DEADLINE FOR ALL TECHNICAL QUESTIONS IS 03/23/2012 AT THE CLOSE OF BUSINESS. ANY TECHNICAL QUESTIONS RECEIVED WILL BE ANSWERED BY FORMAL ADDENDUM ISSUED BY THE PURCHASING DIVISION AFTER THE DEADLINE HAS LAPSED.

NOTICE

A SIGNED BID MUST BE SUBMITTED TO:

DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
BUILDING 15
2019 WASHINGTON STREET, EAST
CHARLESTON, WV 25305-0130

THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:

SEALED BID

BUYER:----------TL/32----------

RFQ. NO.:----------HSE01232----------

BID OPENING DATE:-------04/03/2012----------

BID OPENING TIME:--------1:30 PM----------

PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
[signature]	(703) 849-0243	4-16-12
TITLE: Senior Vice President	FEIN: 54-0604420	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
HSE01232	3

ADDRESS CORRESPONDENCE TO ATTENTION OF:
TARA LYLE
304-558-2544

RFQ COPY

VENDOR

Dewberry
8401 Arlington Boulevard
Fairfax, VA 22031-4666

SHIP TO
HOMELAND SECURITY & EMERGENCY MANAGEMENT, DIVISION OF
BUILDING 1, ROOM EB80
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0360 304-558-5380

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
03/09/2012				

BID OPENING DATE: 04/03/2012 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT

TO CONTACT YOU REGARDING YOUR BID:

CONTACT PERSON (PLEASE PRINT CLEARLY):

****** THIS IS THE END OF RFQ HSE01232 ****** TOTAL: N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
[signature]	(703) 849-0243	4-16-12

TITLE	FEIN	
Senior Vice President	54-0604420	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
HSE01232	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
TARA LYLE
304-558-2544

VENDOR

RFQ COPY

Dewberry
8401 Arlington Boulevard
Fairfax, VA 22031-4666

SHIP TO

HOMELAND SECURITY & EMERGENCY MANAGEMENT, DIVISION OF
BUILDING 1, ROOM EB80
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0360 304-558-5380

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
04/04/2012				

BID OPENING DATE: 04/18/2012 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 2 1. QUESTIONS AND ANSWERS ARE ATTACHED. 2. TO MOVE THE BID OPENING FROM 04/12/2012 TO 04/18/2012. 3. ADDENDUM ACKNOWLEDGEMENT IS ATTACHED. THIS DOCUMENT SHOULD BE SIGNED AND RETURNED WITH YOUR BID. FAILURE TO SIGN AND DATE MAY RESULT IN DISQUALIFICATION OF YOUR BID. END OF ADDENDUM NO. 2		
0001	1	LS		906-00-00-001 ARCHITECT & ENGINEERING/CONSULTING		
				****** THIS IS THE END OF RFQ HSE01232 ****** TOTAL:		N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE (703) 849-0243 DATE 4-16-12

TITLE Senior Vice President FEIN 54-0604420 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
HSE01232	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
TARA LYLE
304-558-2544

VENDOR

RFQ COPY

Dewberry
8401 Arlington Boulevard
Fairfax, VA 22031-4666

SHIP TO

HOMELAND SECURITY & EMERGENCY MANAGEMENT, DIVISION OF
BUILDING 1, ROOM EB80
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0360 304-558-5380

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
03/29/2012				

BID OPENING DATE: 04/12/2012 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT

ADDENDUM NO. 1

1. TO MOVE THE BID OPENING DATE FROM 04/03/2012 TO 04/12/2012.

2. ADDENDUM ACKNOWLEDGEMENT IS ATTACHED. THIS DOCUMENT SHOULD BE SIGNED AND RETURNED WITH YOUR BID. FAILURE TO SIGN AND RETURN MAY RESULT IN DISQUALIFICATION OF YOUR BID.

END OF ADDENDUM NO. 1

0001	1	LS		906-00-00-001		

ARCHITECT & ENGINEERING/CONSULTING

****** THIS IS THE END OF RFQ HSE01232 ****** TOTAL: N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE (703)849-0243 DATE 4-16-12

TITLE Senior Vice President FEIN 54-0604420 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

EXHIBIT 10

REQUISITION NO.: HSE-01232

ADDENDUM ACKNOWLEDGEMENT

I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.

ADDENDUM NO.'S:

NO. 1 X

NO. 2 X

NO. 3 .....

NO. 4 .....

NO. 5 .....

I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS. VENDOR MUST CLEARLY 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.

.....
SIGNATURE

DEWBERRY
.....
COMPANY

4/16/12
.....
DATE

REV. 11/96

Expression of Interest
HSE01232 – HAZUS MH Analysis Phase II

Dewberry
8401 Arlington Boulevard
Fairfax, Virginia 22031-4666
703.849.0100

Authorized Contact:
Timothy C. McCormick, PE, CFM
Senior Vice President

Date: 4/16/12

Table of Contents

1.0 Qualifications of Firm

The Dewberry Team

In business for 56 years, Dewberry is a respected national professional services firm with expertise in architecture, engineering and specialty service consulting. Dewberry serves public- and private-sector clients across the country with projects that range from designing and building municipal infrastructure to managing hazard mitigation, disaster and emergency programs – in other words –projects that lead to safer, more resilient communities. Our team of nationally-recognized HAZUS experts is the backbone of our hazard identification and risk assessment service line.

For this project, we have teamed with The Polis Center, a nationally-known provider of HAZUS and geospatial technology training for over 20 years. The Polis Center has successfully trained thousands of individuals from government, commercial and not-for-profit organizations and is committed to playing an instrumental role in this project's HAZUS training efforts as a value-added service.

This project will draw from a deep bench of highly-qualified staff having expertise in a wide range of disciplines including:

- Hazard Identification, Mitigation and Emergency Management
- Geospatial Technology & Geographic Science
- Education training and facilitation
- Flood Risk Management
- Quality Management
- Climate Change
- Strategic Consulting

Dewberry & Davis LLC
(Dewberry)

Years in Operation: 56

Location of Company Offices: 40+ locations throughout the United States

Headquarters:
8401 Arlington Blvd.
Fairfax, VA 22031
703.849.0100 phone
703.206.0103 fax

www.dewberry.com

Dewberry is the "go-to" team for the public and private sector when it comes to flood risk analysis and subsequent activities required of this project; for example mapping, data dissemination, staff training and mitigation planning activities. We have an existing professional relationship with the West Virginia Division of Homeland Security and Emergency Management (the Agency) having successfully completed the West Virginia 2010 Hazard Mitigation Plan Update. We truly understand the needs and goals of the State. It is our project design philosophy to work closely with the Agency every step of the way to ensure our project approach fits their needs.

To this end, it is our intent to help the Selection Committee understand why the Dewberry Team is in-fact the "go-to" team for the WV Statewide Phase II HAZUS analysis. In the narrative that follows, we demonstrate our technical competency, commitment to practical results and our understanding of the needs of this project, not just through our proposed methodology but also

in the words of our clientele. Below we describe how the team met the needs, goals and technical requirements of similar projects, including work performed for:

- ***West Virginia 2010 Hazard Mitigation Plan Update (HAZUS Earthquake)***
- ***Maryland 2011 State Hazard Mitigation Plan Update***
- ***Northern Virginia 2011 Hazard Mitigation Plan Update***
- ***Middle Peninsula HAZUS-MH MR4 Analysis to support Hazard Mitigation Plan***
- ***Tri-County 2011 Hazard Mitigation Plan Update (HAZUS Coaching)***
- ***Maricopa County, Arizona Hazard and Drainage Regulation Analysis***
- ***Broome County, NY HAZUS Pilot Project***

Dewberry Project References

Dewberry has led dozens of similar projects of varying complexity which all produced one result: satisfied clients. What follows is just a small sampling of our extensive portfolio and associated references in the words of our clients.

West Virginia State Hazard Mitigation Plan 2010 Update

Client: WV Division of Homeland Security and Emergency Management
Client contact: Tim Keaton, State Hazard Mitigation Officer; telephone: 304.957.2572; email: tim.w.keaton@wv.gov

"West Virginia is very pleased with the work performed and would definitely engage Dewberry for future endeavors."

– Roger Jefferson State Hazard Mitigation Planner

The Challenge

The State of West Virginia needed project management and technical assistance in updating their Hazard Mitigation Plan within a compressed time frame.

Our Solution

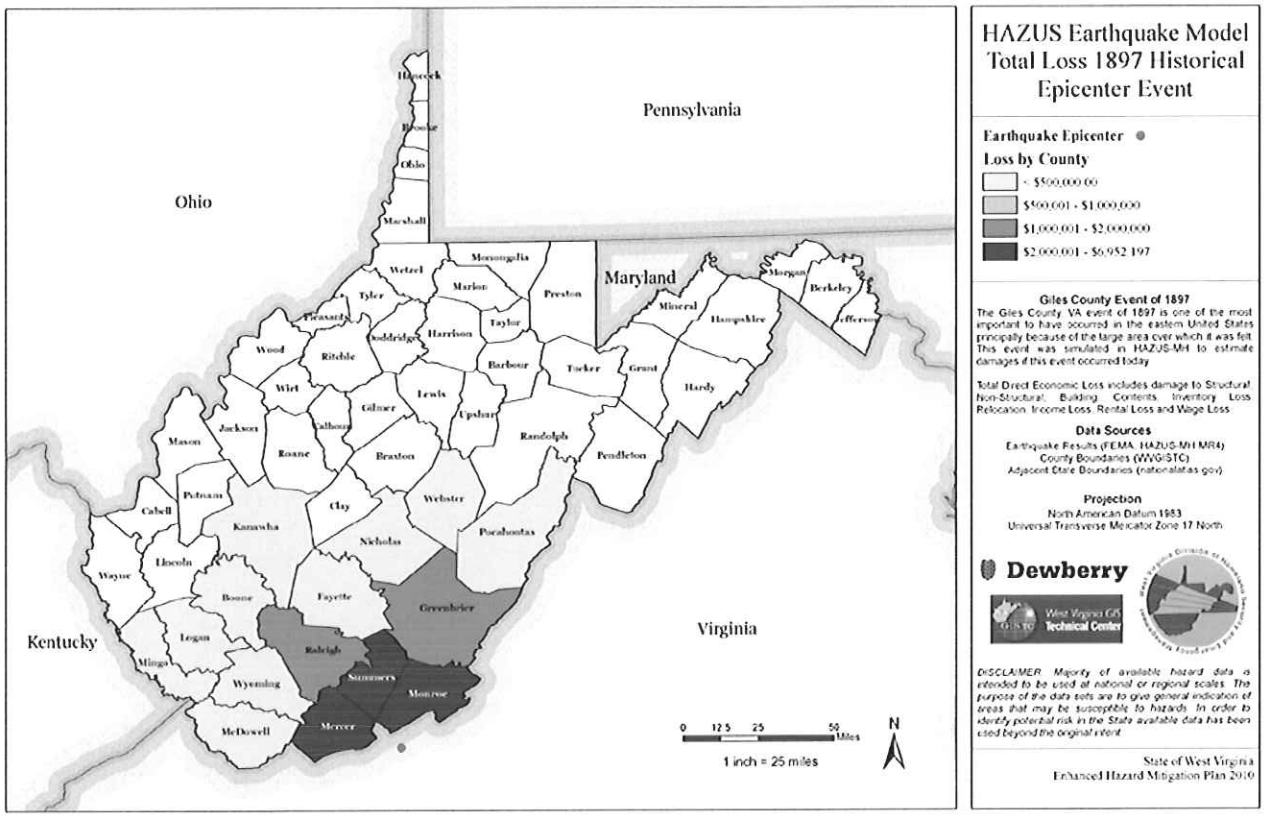
Dewberry's hazard mitigation specialists completed the third State of West Virginia Hazard Mitigation Plan. This plan was updated on an accelerated six-month schedule and was approved by FEMA October 15, 2010. The update process included a thorough review and update of the hazard identification and risk assessment to include both natural and human-caused hazards. As part of this robust analysis, Dewberry ran the **HAZUS earthquake module**. In addition to analyzing annualized earthquake losses, Dewberry also modeled a **historically significant** earthquake to gauge potential loss from a realistic event. In 1897, a magnitude 5.8 earthquake centered in Giles County, VA had a significant impact on WV with damage occurring in a scattered fashion across the State. Dewberry modeled this event to determine what potential losses of a similar event would look like in today's dollars.

Accomplishments

Dewberry provided WV with HAZUS earthquake analysis that includes:

- Mapping and tables showing potential annualized earthquake-related loss by county.
- Mapping and tables indicating potential earthquake-related loss by county for a realistic scenario similar to the 1897 Giles County, VA earthquake.

- Tables indicating the number and value of WV critical facilities potentially impacted by an earthquake scenario similar to the Giles County, VA event.



Sample: Dewberry ran and mapped HAZUS results showing losses associated with an earthquake similar to the 1897 Giles County, VA event.

Maryland State Hazard Mitigation Plan 2011 Update

Client: Maryland Emergency Management Agency
Client contact: Mark James, State Hazard Mitigation Officer; telephone: 410.517.3649; email: mjames@mema.state.md.us

The Challenge
The State of Maryland needed project management and technical assistance in updating their Hazard Mitigation Plan within a time frame of less than four months. While the flood risk analysis work from the previous plans met minimum FEMA requirements, review of previous versions of the plan from both 2005 and 2008 revealed that HAZUS-MH had not been used to assess flooding damage, which is Maryland's most critical hazard in terms of property damage and dollar-loss.

Our Solution
Despite the compressed nature of the project, Dewberry saw tremendous value in delivering a **comprehensive solution** for the State that included **Level II HAZUS flood risk analysis** as well as HAZUS analysis for hurricane, and earthquake.

Dewberry's HAZUS-MH solution provided the State with:

1.) A single repository for the storage of updated Essential Facility inventory and hazard data;
2.) A FEMA-approved standard for the analysis of flood risks;
3.) A framework within which to disseminate GIS-based data and easy-to-understand, plain-language results to the State and all jurisdictions that can be incorporated into respective local and State mitigation plans.

"...in the interest of all citizens and businesses in Maryland, let this 2011 Maryland State Hazard Mitigation Plan Update continue to serve as an impetus for improved mitigation and recovery from disasters in the State of Maryland."

- Governor Martin O'Malley, in the adoption letter to the FEMA Regional Administrator

Although Dewberry could have performed the minimum with respect to HAZUS-MH Flood Model analysis (known as a Level 1 analysis), the team decided it was not in the best interest of the State or its communities. Through its work with FEMA and the National Flood Insurance Program (NFIP), Dewberry staff was aware of and decided to leverage the State's new digital flood mapping. Consequently, **the 2011 Hazard Mitigation Plan Update includes the use of digital FIRM floodplain data for both the 100-year and 500-year flood return frequency, resulting in an effort unmatched by any other State-level Hazard Mitigation Plan to date.**

The Dewberry initiative to incorporate the new NFIP flood hazard studies in HAZUS-MH puts into action new initiatives under FEMA's Risk MAP Program. Dewberry wanted to make certain that funds available for the State of Maryland 2011 Hazard Mitigation Plan Update would leverage the many benefits of HAZUS, FIRM data, and the means of communicating and sharing data.

The work included coordination with various agencies and organizations in collecting and cataloging all of the FIRM flood hazard and related data to produce digital depth grids – the data required of HAZUS to analyze potential flooding damages. Some of the digital data (and notably depth grids) came from academia. Dewberry ultimately performed flood damage analysis on each jurisdiction for both 100-year and 500-year flood return frequency and produced export files that the State has **made available to the jurisdictions.**

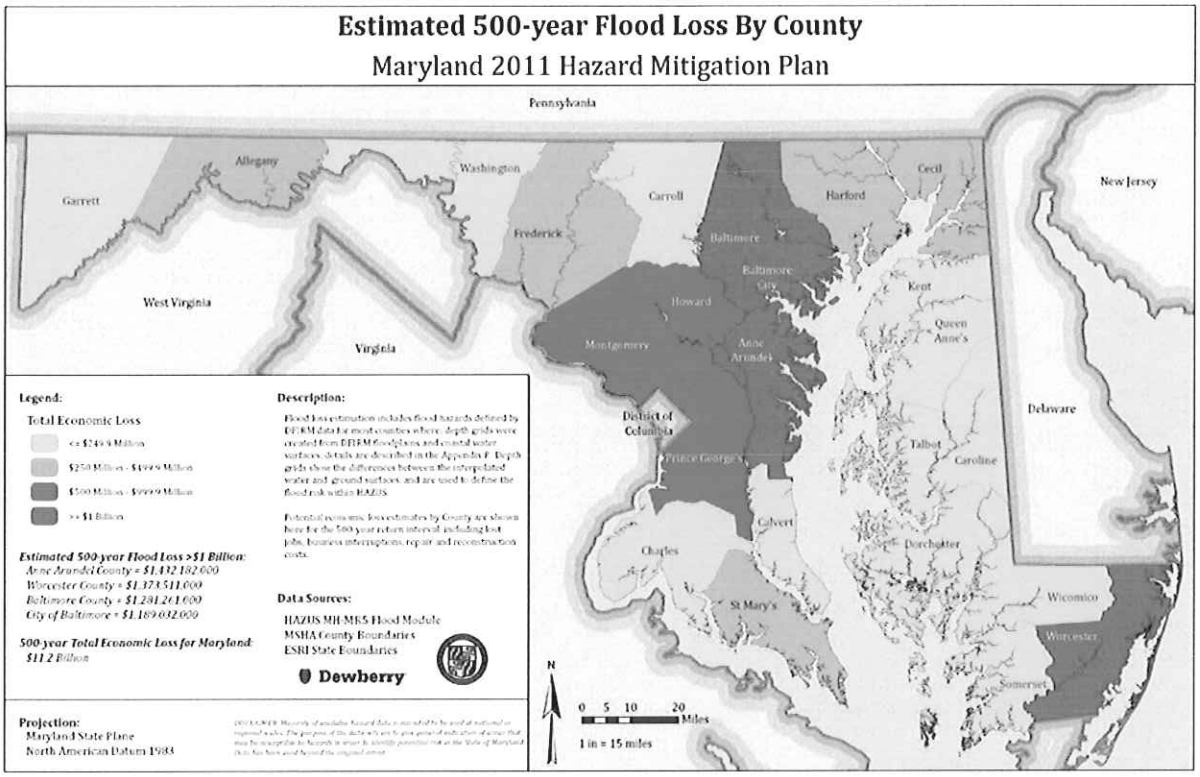
Accomplishments

Dewberry provided MD with a comprehensive, Level 2 HAZUS flood analysis for the State in **a very compressed time frame** which included:

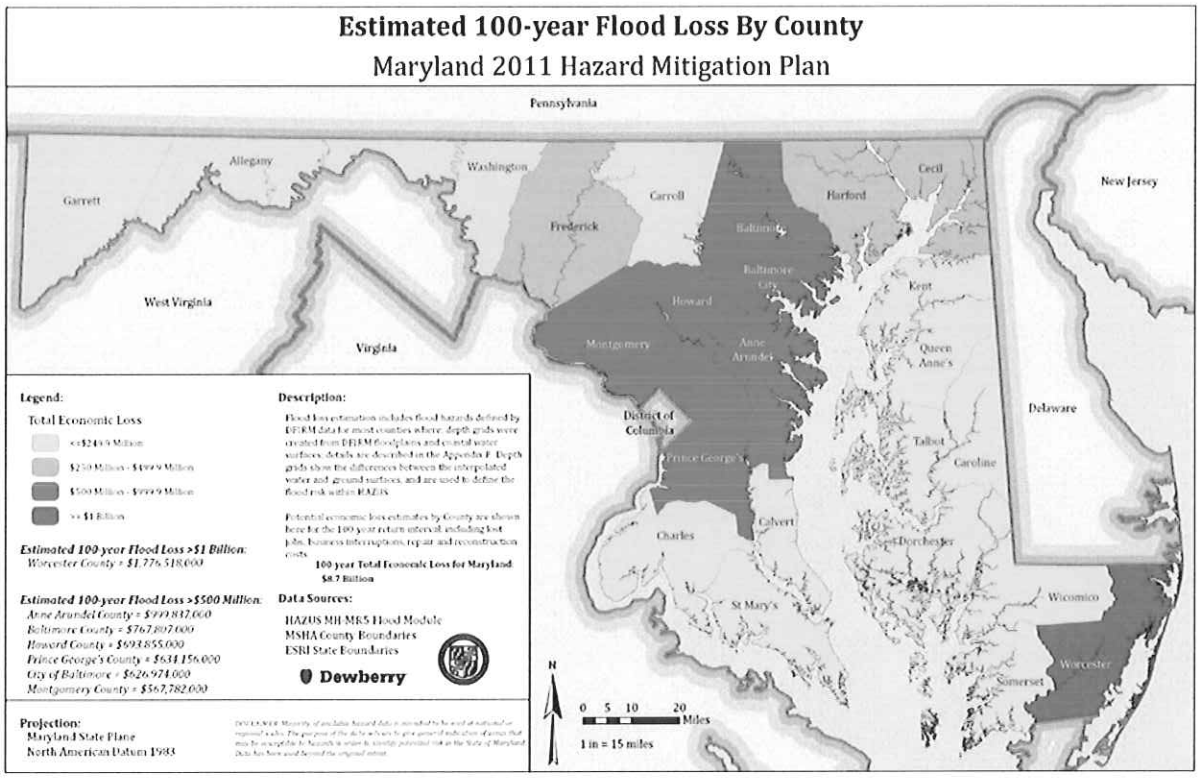
- Creation of FIRM-based depth grids for the majority of the 24 Maryland jurisdictions for both the 100-year and 500-year flood return frequencies and run as User-Defined Depth Grids through HAZUS Level 2 analysis;
- Flood risk results for each jurisdiction for both the 100-year and 500-year flood return frequencies;
- Essential Facility updates from State-wide databases utilizing the HAZUS utility Comprehensive Data Management System (CDMS);
- Earthquake and multiple hurricane HAZUS runs (Deterministic and Probabilistic);
- Export and packaging of data to include both GIS data, standard HAZUS Summary reports (Global Summary and Quick Assessment), and statewide and county mapping of results for dissemination to local jurisdictions;
- HAZUS Project file exports (or HPR's) for the State and all counties.

"In every aspect of plan development the staff of Dewberry were dedicated to the inordinate amount of time and energy needed to assure the plan's accuracy, comprehensiveness and most important, the completion of the project on time."

- Mark James, Maryland State Hazard Mitigation Officer



Sample: Results from Level II HAZUS analysis for Maryland 2011 Hazard Mitigation Plan Update.



Sample: Results from Level II HAZUS analysis for Maryland 2011 Hazard Mitigation Plan Update.

Northern Virginia 2011 Hazard Mitigation Plan Update

Client: Arlington County, VA
Client contact: David Morrison, Regional Planner/Deputy Coordinator; telephone: 410.517.3649; email: dmorrison@arlingtonva.us

The Challenge
An updated flood risk analysis was necessary in order to meet FEMA minimum requirements for this multi-jurisdictional plan update.

Our Solution
The Dewberry flood risk analyses for the plan update included incorporation of Level 1 annualized flood loss analysis to meet basic Plan requirements. The team quickly determined that a Level 1 analysis default 10 sq. mile stream threshold would result in the omission of upstream tributary flooding sources within two Plan jurisdictions. In response, the HAZUS specialist performed additional work in order to more accurately assess potential flood damage in these two communities as well as other parameters throughout the project's study area. The additional work performed included creation of depth grids based on FEMA FIRM and Q3 floodplain data of the 100-year floodplain. The depth grid provided not only the flood hazard to model the two (2) aforementioned jurisdictions, but also enabled the team to analyze additional HAZUS parameters against the SFHA; including transportation, utility, agriculture, shelter requirements, displaced population, and debris. **The client gained a more complete picture of flood risk and vulnerability as a result of this effort.** Dewberry's innovative solution to this issue provided content for a presentation titled "Best Practices – Flood Model in Hazard Mitigation Planning" presented by the proposed HAZUS Team Lead (James Mawby) at the 2010 Annual HAZUS Conference in Indianapolis, IN.

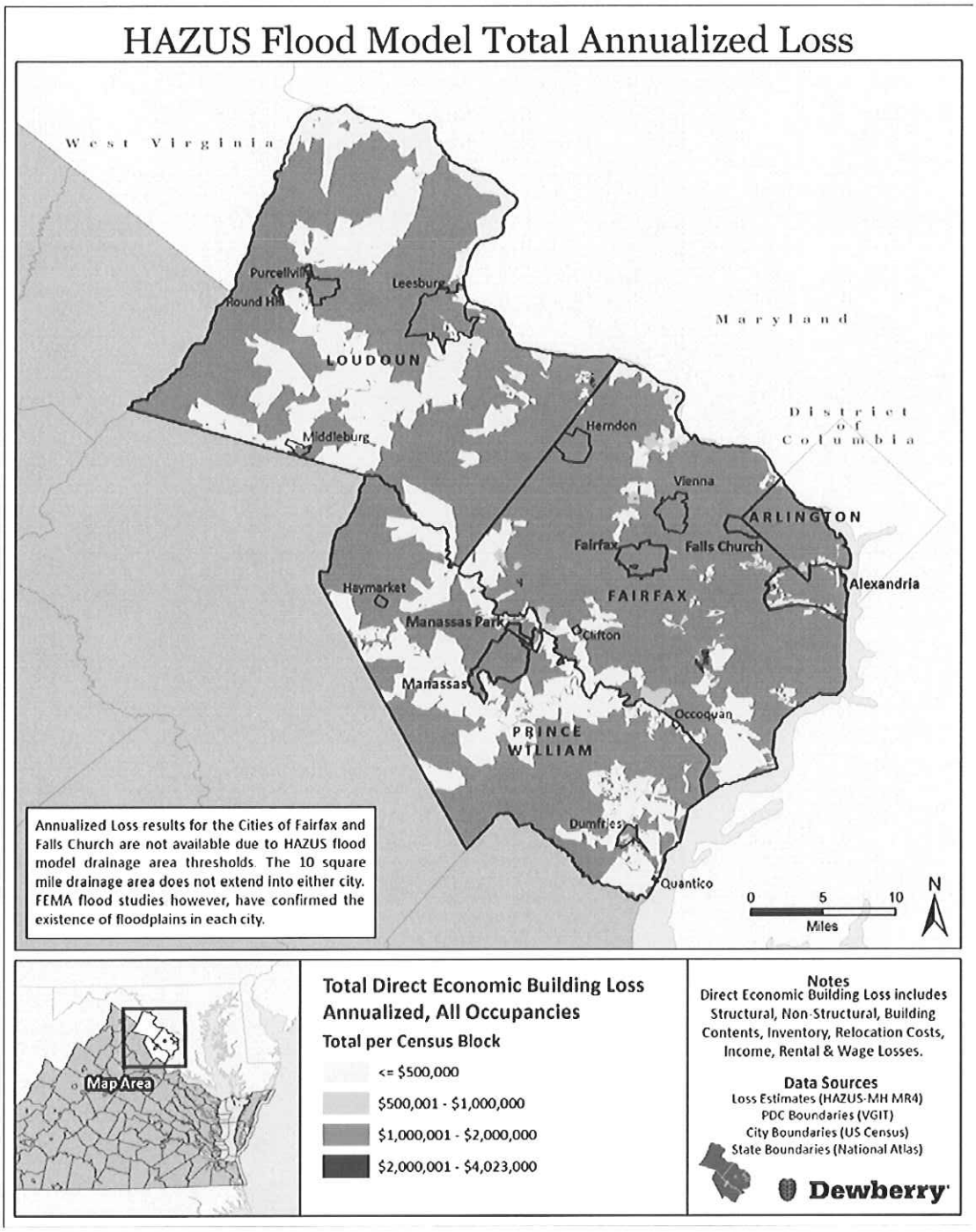
In our Earthquake analysis for the plan, Dewberry followed FEMA guidance and best practice by running a deterministic HAZUS scenario in addition to the more typical probabilistic earthquake analysis. Dewberry contacted Dr. Martin Chapman of the Virginia Tech Seismological Observatory to seek expert input for choosing a likely earthquake scenario given local seismic activity. Nearly a year after completing our HAZUS analysis, a magnitude 5.8 earthquake occurred in central Virginia on August 23, 2011. This earthquake was centered 7 to 8 miles from the deterministic epicenter chosen for our HAZUS analysis. **As a result of our analysis and its favorable comparison against this earthquake event, Dewberry was recognized by the client for the team's analysis (see client quote), the result of its due diligence.**

> ***"...after the earthquake we looked back through the <HMP> to see what was included and it was pretty much in line with what actually occurred. We are confident in the data!"."***
>
> - David Morrison, Regional Planner/ Deputy Coordinator at Arlington County Office of Emergency Management (OEM) regarding the 5.8 August 23, 2011 Virginia Earthquake

The HAZUS and GIS team that performed this analysis, are the same staff that will be working on this project.

Accomplishments

- Work beyond just an out-of-the box Level I analysis that gave the client and the plan's stakeholders a more accurate and complete picture of flood risk;
- The team's comprehensive analysis led to results that were verified during actual hazard events.



Sample: Annualized HAZUS flood loss developed by Dewberry for the Northern Virginia 2011 Hazard Mitigation Plan Update.

Sample: Depth grids created for the HAZUS flood loss developed for the Northern Virginia 2011 Hazard Mitigation Plan Update. By performing this additional work, the team was able to deliver a more comprehensive analysis for the client.

Middle Peninsula Virginia HAZUS-MH MR4 Analysis to support Hazard Mitigation Plan

Client: Middle Peninsula Planning District Commission
Client contact: Lewis Lawrence III, Acting Director, Middle Peninsula Planning District Commission (VA); telephone: 804.758.2311; email: LLawrence@mppdc.com

"Dewberry's [HAZUS] work was reviewed and put through the ringer. The work Dewberry completed stands for itself."

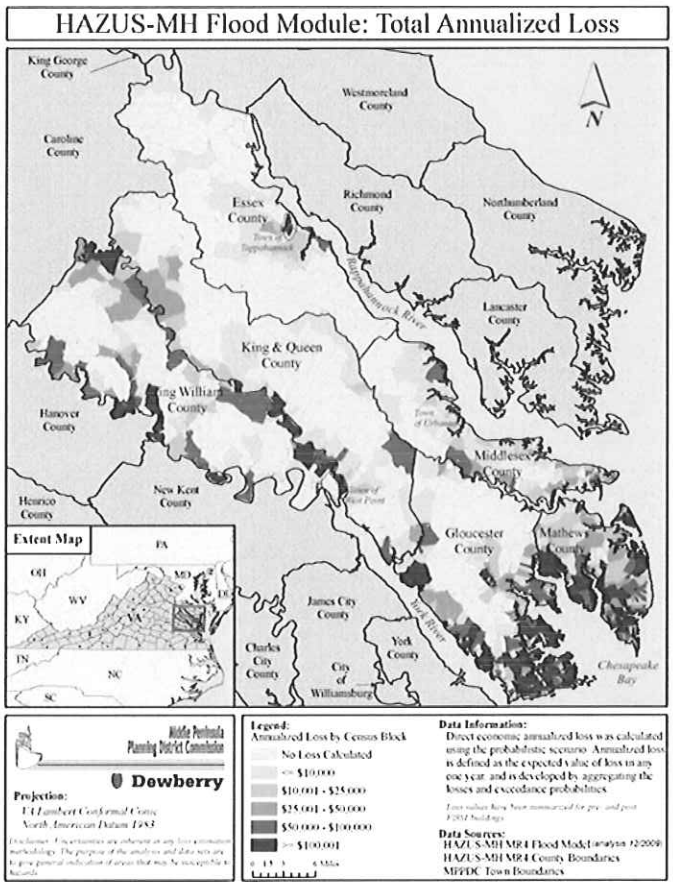
- Lewis Lawrence III, Acting Director, Middle Peninsula (Virginia) Planning District Commission

The Challenge

Creation of new and robust analysis of flooding and hurricane hazards, from which the region is susceptible.

Our Solution

Dewberry performed **HAZUS analysis for hurricane and created depth grids as part of a comprehensive HAZUS analysis of flood.** The assessment estimated potential losses with special emphasis on physical damage to buildings, critical facilities and infrastructure. The analysis was performed using data at the census block level.



Sample: Dewberry performed HAZUS Level 1 analysis for flood and hurricane wind. The analysis helps emergency managers pin-point ares of highest risk.

A Level I annualized loss run was performed for one county at the one sq. mile drainage area in an attempt to best-match or mirror the drainage threshold of FIRM work. Analyses for the remainder of the counties in the region was run at 10 sq. mile. The team created depth grids for all counties, generated from the FEMA digital FIRM and Q3 data.

Accomplishments

- Dewberry provided Level 1 flood analysis, using a one (1) sq. mile drainage area for a portion of the region's flood analysis; the results of which capture upstream tributaries that might have otherwise be missed.
- The team's hurricane wind analysis (Level 1) provided emergency managers and planners with information critical in mitigating the hazard.

Tri-County Regional Hazard Mitigation Plan -Illinois

Client: Tri-County Regional Planning Commission
Client contact: Greg K. Sachau, GIS Manager, Tri-County Regional Planning Commission; telephone: 309.673.9796 ext. 259

"...Glad that HAZUS stuff is done! Matt did a good job of adjusting on the fly to that quirky program. We appreciate all the assistance you provided!"."

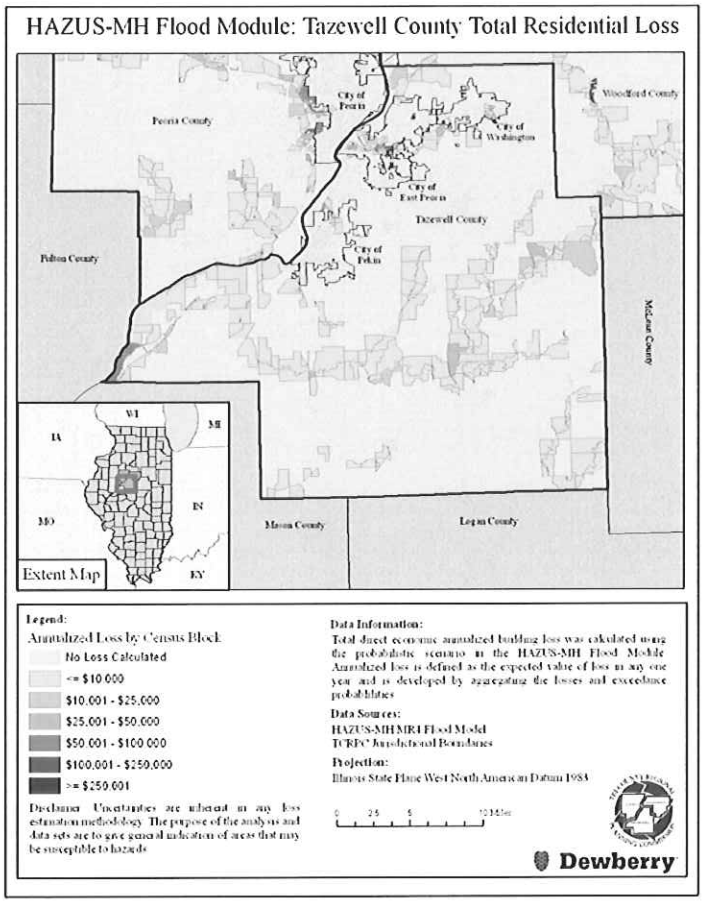
- Greg K. Sachau, GIS Manager
Tri-County Regional Planning Commission

The Challenge

The client had a desire to learn and perform HAZUS analyses for inclusion in its Hazard Mitigation Plan Update.

Our Solution

Dewberry was contracted to facilitate and assist the Tri-County Regional Planning Commission complete its 2010 Hazard Mitigation Plan Update. The Commission specifically wanted to have its own staff perform the necessary and appropriate HAZUS modeling that would feed the Hazard Identification and Risk Assessment (HIRA) element of the Plan. A significant challenge to the shared nature of the project included the fact that Commission staff had never used HAZUS.



Sample: With Dewberry's expert guidance and support, our client was able to run HAZUS and map the results.

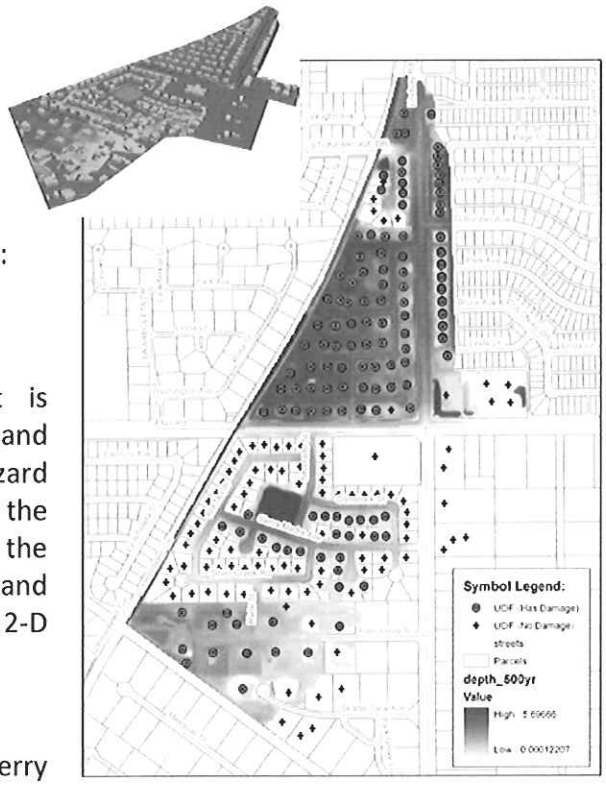
Dewberry's step-by-step HAZUS guidance gave the Commission a workable solution given the limited appropriated funds available. In this case, HAZUS lead James Mawby was able to instruct and guide the Commission staff in successfully completing the runs and understanding the results of the HAZUS modeling.

Accomplishments

- Dewberry offered the client an innovative solution consisting of providing expert, step-by-step guidance that fit the client's limited budget;
- By providing this guidance and support, Dewberry helped the client complete HAZUS analysis and to understand the results, thereby benefiting the communities they support.

Flood Control District of Maricopa County - Hazard and Drainage Regulation Analysis

Client: Flood Control District of Maricopa County
Client contact: Farhad Tavassoli, Floodplain Planning Specialist, Flood Control District of Maricopa County; Telephone: 602.506.8773; email: farhadtavassoli@mail.maricopa.gov



Sample: Dewberry performed UDF analysis to further visualize multiple scenario risks.

The Challenge

The Maricopa County Flood Control District is responsible for overseeing the development and implementation of comprehensive flood hazard control measures within the County. Sparked by the process of a typical FEMA flood hazard analysis the District was interested in understanding and visualizing levels of risk beyond traditional 2-D floodplain mapping.

Our Solution

In response to the client's needs, Dewberry performed a pilot project in three distinctly different neighborhoods using HAZUS stock data and three additional scenarios which modified this data. The scenarios included varying the first floor heights of structures to determine the impact that various floodplain management regulations might have.

The Flood District realized that regulations had changed over the years based on floodplain mapping and available data and that some structures were built prior to any regulation and not to current standards. In response, **Dewberry proposed an innovative project methodology that included HAZUS analyses of individual structures (HAZUS User-Defined Facilities or UDF) in order to evaluate the relative flood risk given multiple building scenarios.**

The first scenario utilized first-floor heights based on Elevation Certificates. Where structures did not have Elevation Certificates, Dewberry utilized field observations from the field data collection effort that was built into the project methodology. Notably, the Dewberry Team built a customized HAZUS UDF data collection tool called GeoWISH (Geospatial Windshield Survey for HAZUS) that is fully integrated with ESRI's ArcGIS and meets HAZUS database requirements. The second scenario assumed there was no regulation and all structures were built at grade. The third scenario assumed all structures were built to the current drainage regulation which is one-foot above the Base Flood Elevation (BFE). The final and fourth scenario examined an increased building requirement of two feet above the BFE – to further evaluate the potential for loss reduction.

Given the four scenarios the project clearly showed which structures should be targeted for a FEMA Benefit-Cost Analysis (BCA) to determine whether a given mitigation project meets

minimum FEMA grant-funding specifications. The final aspect of the project included performing BCA on eight of the near 2,500 structures within the project.

Accomplishments

- Through a scenarios-based approach, Dewberry performed a complex analysis to determine structure flood vulnerability based on modifying regulation assumptions;
- Dewberry developed a customized tool (GeoWISH) to allow easy import of User Defined Facilities into HAZUS;
- Dewberry's unique methodology resulted in an analysis that clearly identified the impact of varying regulations on structure flood vulnerability.

FEMA Risk MAP Early Demonstration Projects - Broome County, NY

Client: FEMA Region II
Client contact: Alan Springett, Senior Engineer, FEMA Region II; Telephone: 347.633.4342; email: Alan.Springett@dhs.gov

The Challenge

Potential flood losses related to levee failure in Broome County, NY was not well-known.

Our Solution

In response to new mapping (preliminary FIRM issued in 2008) and significant flooding in 2006 coupled with evolving FEMA levee standards, **Dewberry proposed that a HAZUS analysis of the areas behind the levees would shed light on potential flood losses associated with a levee failure.**

"...We have a chance here [Tropical Storm Lee Flooding Disaster] to provide clear rationale as to the utility of HAZUS and several of the Risk MAP products in relation to Response and Recovery related to flood disasters. This has game changing potential, in my view..."

- Alan Springett
Region II Senior Engineer
Hazards and Performance Analysis

Accordingly, Dewberry planned and executed this project as a member of Risk Assessment, Mapping, and Planning Partners (RAMPP), a joint venture of Dewberry, URS, and ESP, which is one of three Production and Technical Services (PTS) contractors. Dewberry performed all of the HAZUS-specific work for the project.

HAZUS-MH Results (Stock

Levee Comparison

	Total Inventory – GBS intersecting & UDF in Areas Protected by Levee		Estimated P Facil 1% (10 MR-5 GBS Prote
	Estimated Value	Percent of Total	Dollar Losses
Residential Building/Contents	$1,982,628,000 (GBS) & $916,049,420 (UDF)	49.7% & 36.9%	$ 245,575,000
Commercial Building/Contents	$1,286,252,000 (GBS) & $1,113,868,334 (UDF)	32.3% & 44.9%	$ 215,796,000
Other Building/Contents	$718,914,000 (GBS) & $451,618,486 (UDF)	18% & 18.2%	$ 85,677,000
Total Building/Contents	$3,987,794,000 (GBS) & $2,481,536,240 (UDF)	100% & 100%	$ 547,048,000
Business Disruption	N/A	N/A	$13,765,000
TOTAL	$3,987,794,000 (GBS) & $2,481,536,240 (UDF)	N/A	$560,813,000

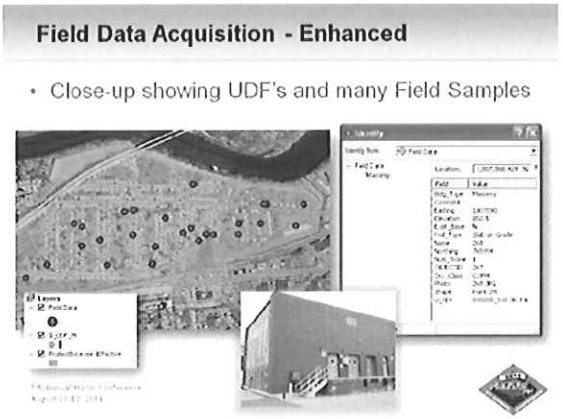
Sample: Dewberry-produced HAZUS flood risk results in the Broome County Risk MAP Flood Risk Report.

The project was completed to include creation of depth grids for the 100-year flood return frequency, field data collection of building-specific attributes for a representative sample of structures, HAZUS User-Defined Facility (UDF) data development, multiple HAZUS scenarios, and ultimately, a FEMA Risk MAP, Flood Risk Database, Flood Risk MAP and Flood Risk Report.

Nearly 9,300 UDF structures were developed, of which nearly 4,700 were in areas protected by levees and 405 of these structures were field surveyed. The UDF data development allowed us to update the stock HAZUS data inventory via the HAZUS utility CDMS. HAZUS Level 2 runs were then

completed; these included a run with stock HAZUS data and also a comparative run with the updated General Building Stock (GBS) for all census blocks that intersected the areas protected by levee.

The comparative nature of the Level 1 and Level 2 HAZUS allowed for a better understanding of the true risk associated with levee decertification as opposed to just running a Level 1 analysis that used stock HAZUS census data. This was done to help the County understand the importance of enhancing a levee's ability to protect against catastrophic floods, possibly by using Hazard Mitigation Grant Program funds to fortify the levees where they did not meet FEMA criteria. The results of the UDF as compared to the stock HAZUS data gave FEMA the means of understanding the cost and relative return achievable through such analyses. More importantly, it also highlighted for locals the need for action and it helped them understand the impact of FIRM revisions showing the levee decertified. **FEMA Region II has used the project data and results as a means for proof-of-concept in providing near real-time temporary housing needs, both short- and long-term recovery needs and, as a means of establishing a database that offers a single and maintainable repository of structure information for all emergency response data.**



Dewberry presented results of the project at the 2011 Annual HAZUS User Conference in Seattle, WA. The proposed HAZUS Team Leader, James Mawby was awarded "Best Overall Use of the HAZUS Model" for his work on this important project.

Accomplishments

- As part of the RAMPP joint-venture, Dewberry proposed and then led a HAZUS analysis that quantified potential losses associated with potential levee failure in the County.
- By completing a Level II HAZUS analysis, Dewberry was able to provide the client a comparison of loss analyses using out-of-the-box Level 1 HAZUS data versus using Level 2 protocols including the infusion of user-defined structure data.

The Polis Center Project References

Georgia HAZUS-MH Education Program

Client: Georgia Department of Community Affairs
Client contact: Terry D. Jackson, Director, Office of Mapping and Decision Support Systems, Georgia Department of Community Affairs; telephone: 404.679.4946; email: terry.jackson@dca.ga.gov

The Challenge
Georgia saw a need to better equip agencies in the state to understand and apply HAZUS in support of emergency management and hazard mitigation planning activities.

The Polis Center Solution
In February 2012, **The Polis Center developed and initiated a HAZUS-MH education program with the objective of empowering state, federal, and local agencies in the state with the skills necessary to use HAZUS-MH in support of emergency management with emphasis on mitigation planning.** As part of this ongoing program, The Polis Center will deliver a total of five introductory through advanced FEMA certified HAZUS-MH courses. The courses offered under this program apply virtual as well as traditional classroom techniques in order to simultaneously deliver live lectures and instructional support to dozens of participants at three separate locations across the state. The Polis Center is also facilitating a focus group with key stakeholders for the purpose of identifying strategic objectives and collaborative opportunities that will support the implementation of the HAZUS-MH technology.

Accomplishments
- A start-to-finish training solution geared toward practical application of HAZUS
- The program's close coordination with stakeholders is expected to result in a higher rate of implementation of HAZUS.

Indiana HAZUS-MH Education Program

Client: Indiana Department of Homeland Security (INDHS)
Client contact: Jan Crider, State Hazard Mitigation Officer, Indiana Department of Homeland Security; telephone: 317.232.3833; email: jcrider@idhs.state.in.us

The Challenge

INDHS identified a need to ensure that the HAZUS-MH was made available and implemented by the widest possible range of local users.

The Polis Center Solution

The Indiana Department of Homeland Security (IDHS) and The Polis Center at Indiana University Purdue University Indianapolis have engaged in a multi-year collaboration, starting in 2002 and continuing for the foreseeable future, that has enabled emergency managers and other related professionals in Indiana to obtain training in the HAZUS-MH application.

As a local training provider, The Polis Center provides examples of HAZUS-MH applications that are relevant to the Indiana GIS user community. In addition, by introducing counties, cities, and towns in Indiana that may not be technologically sophisticated to GIS applications through the HAZUS-MH program, they have also become aware of the much broader potential of this technology as a tool for information collection and analysis that could positively impact efforts not only in emergency management but also infrastructure planning and management, economic development, and many other areas as well.

Accomplishments

- A start-to-finish training solution geared toward practical application of HAZUS
- By providing easy-to-understand training, The Polis Center ensures a higher rate of implementation of HAZUS by emergency management and planning officials.

Project Team Members

Organization Structure - Meet Our Team

Dewberry will use many of the same team members that produced the 2010 West Virginia State HMP. The team developed deep relationships with the Agency as well state and local agencies and understands the importance of **integrating the HAZUS products** in planning and the need to present them in a way that is meaningful to the State and its communities.

Each of the project components will be led by an **experienced practitioner** who understands the unique context of each assignment and the associated technical requirements. They will be supported by subject matter experts responsible for performing the work associated with each task. By using a **team approach**, we are able to **quickly and efficiently** work various pieces of the project in parallel in order to arrive at a comprehensive and timely solution.

- The team will be led by Project Manager, **Mr. Ryan Towell.** Mr. Towell, a meteorologist, is intimately familiar with West Virginia's vulnerability to flooding and worked closely with the Agency when he served as the Hazard Identification and Risk Assessment Deputy Lead for the 2010 Hazard Mitigation Plan Update. He will oversee all aspects of the project, including the work performed by The Polis Center, to ensure that the project remains on schedule, stays within budget, and is performed in the most cost efficient way possible.

- **Mr. Jim Filson**, a West Virginia licensed Professional Engineer will serve as the Principle-in-Charge to assure that company business procedures are followed.

- **Mr. Steve Kalaf**, CFM and a quality services professional will work to ensure that all client standards are clearly codified and understood; processes are established and documented that enable compliance with client standards, and validation protocols are in place the enable early detection of potentially non-compliant deliverables and that include a provision for root cause analysis and subsequent process improvement.

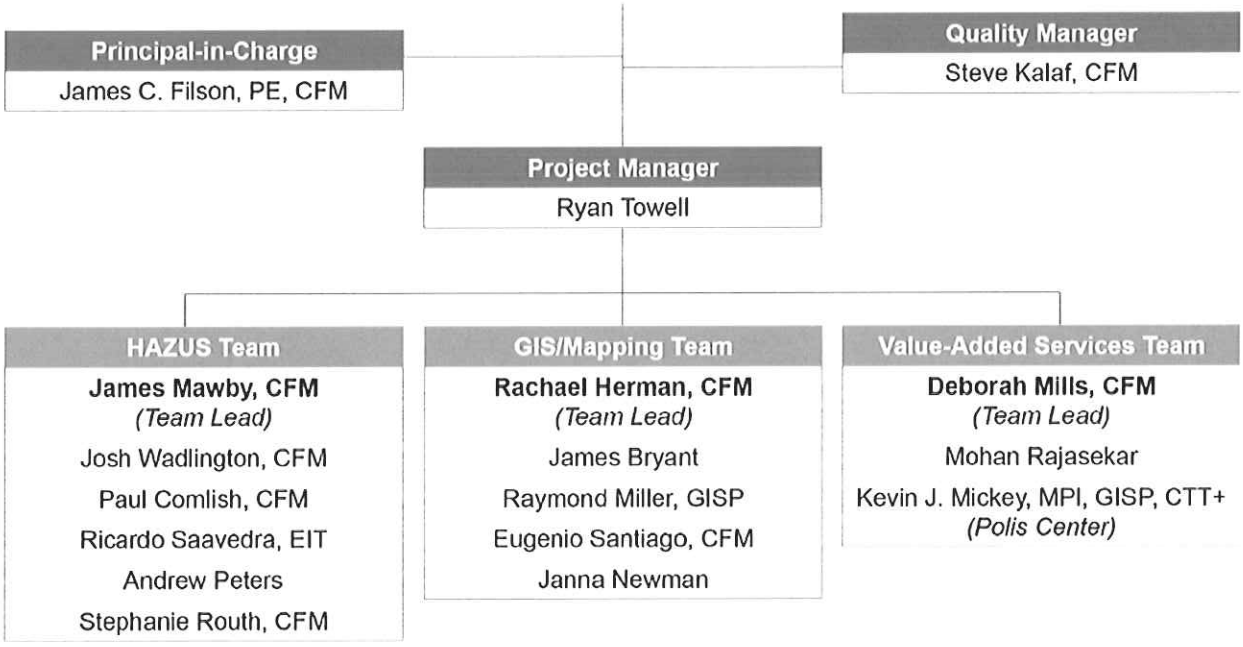
- **Mr. James Mawby**, CFM a nationally-recognized HAZUS expert performed the HAZUS earthquake analysis for the WV 2010 Hazard Mitigation Plan Update and will lead the HAZUS Team in performing all Phase II analysis for the State.

- **Ms. Rachael Herman**, CFM will serve as the GIS/Mapping Team Lead. Working closely with the Agency to determine its preferences for the look and feel of final products, as she did on the 2010 West Virginia Hazard Mitigation Plan Update. Ms. Herman will coordinate the production of all project mapping products to ensure that the client receives crisp, clear and meaningful mapped results of the analysis performed.

- **Ms. Deborah Mills**, CFM will lead the Value-Added Services Team. Having served as the Project Manager on the 2010 West Virginia Hazard Mitigation Plan Update, she is uniquely qualified to guide the team in tailoring services to help the Agency understand, use, and disseminate the Phase II HAZUS results to the widest possible audience with a goal of reducing flood risk across the State. She will work closely with **The Polis Center** in

developing training that helps the Agency and the State's communities understand the project's results and ways to apply them.

The table that follows details the personnel assigned to this project, their roles and responsibilities as well as the percentage of their time dedicated to this effort. Additional detailed information about each staff member is presented in Section II of this proposal.



The table that follows identifies key project personnel, their roles and responsibilities in the project and the percentage of time each staff member will participate in the project. Percentage of time is defined as the anticipated level of daily involvement for which they will be devoted exclusively to this project. In addition to the key personnel, we have identified additional subject matter experts and emergency management professionals who will execute the approach defined in this proposal.

Key Personnel	Functions & Responsibilities	% of Time
OVERSIGHT & MANAGEMENT		
Ryan Towell ***Project Manager*** **Education:** • MBA, Finance • BS, Meteorology **Certifications/Affiliations:** • American Meteorological Society	• Monitors budget, schedules, and quality of each assigned task • Acts as primary vendor contact, working closely with the Agency through each step of the project • Coordinates with the Agency and the 2013 HMP update contractor to communicate schedule of deliverables. • Develops monthly and quarterly reports	15%
Steve Kalaf, CFM ***Quality Manager*** **Education:** • BS, Geography **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM) • Certified ISO 9001:2000 Auditor • American Society for Quality	• Develops QA/QC protocols, including the establishment of compliance validation checkpoints • Reviews draft and final products for compliance with codified standards • Oversees corrective action and process improvement activities • Contributes to monthly reports	6%
Jim Filson, PE ***Principal-in-Charge*** **Education:** • BS, Civil Engineering **Registrations:** • Professional Engineer, West Virginia 1999, Virginia 1997, North Carolina 1999, and Maryland 2009 **Certifications/Affiliations:** • American Society of Civil Engineers • Association of State Dam Safety Officials	• Provides linkages between Dewberry corporate business practices and the project as defined by the contractual agreement and task order. • Professional Engineer, licensed in the State of West Virginia	2%
HAZUS TEAM		
James Mawby, CFM ***HAZUS Team Lead*** **Education:** • BS, Environmental Science • Training, HAZUS Multi-Hazard for Flood **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM) **Awards:** • 2011 Annual HAZUS Conference – Best Overall Use of the HAZUS Model	• Oversees personnel assigned to HAZUS Team • Provides task specific guidance on HAZUS runs and leads task quality plan implementation • Coordinates with Project Manager and the Agency to develop Value Added Services • Compiles draft and final HAZUS products • Submits all draft and final products to Project Manager and Quality Manager for review • Monitors budget, schedule and quality efforts for assigned HAZUS tasks • Provides assistance to the Project Manager for budget oversight, managing technical staff, resource allocation and monthly reports	40%

Key Personnel	Functions & Responsibilities	% of Time
Josh Wadlington, CFM ***HAZUS Team*** **Education:** • BLS, Environmental Science **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM)	• Executes HAZUS analysis assigned by HAZUS Team Lead , including: o Performing HAZUS upgrade from MR3 to current version o Complete Level 1 analysis for 500-yr Flood Frequency & Annualized Loss o Create HAZUS digital data products (KML & GIS files) • Submits all draft and final products to HAZUS Team Lead for review • Provide data files to GIS/Mapping Team • Provide data files to Value-Added Services Team • Assists Value-Added Services Team in providing examples for training materials • Value-Added Tasks may include: o Level 2 Essential Facility analysis o Refined Level 2 Flood Hazard (depth-grids) o Average Annualized Loss (AAL)	30%
Paul Comlish, CFM ***HAZUS Team*** **Education:** • BA, Philosophy • BS, GIS and Computer Cartography **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM)		30%
Ricardo Saavedra, EIT ***HAZUS Team*** **Education:** • MS, Civil Engineering • BS, Civil Engineering **Registrations:** • Engineer-in-Training		30%
Andrew Peters ***HAZUS Team*** **Education:** • BA, Geography		30%
Stephanie Routh, CFM ***HAZUS Team*** **Education:** • MA, Geography • BA, Geology and Anthropology **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM)		10%
GIS/MAPPING TEAM		
Rachael Herman, CFM ***GIS/Mapping Team Lead*** **Education:** • BS, Environmental Science **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM) • NYS Floodplain and Stormwater Managers Association • NYS GIS Association	• Oversees personnel assigned to GIS/ Mapping Team and coordinates tasking efforts between HAZUS team and GIS/Mapping Team • Compiles draft and final GIS and mapping products and submits products to Project Manager and Quality Manager for review • Coordinates with 2013 HMP update contractor to incorporate HAZUS results into HIRA and mitigation strategies • Monitors budget, schedule and quality efforts for assigned GIS/Mapping tasks • Provides assistance to the Project Manager for budget oversight, managing technical staff, resource allocation and monthly reports	30%

Key Personnel	Functions & Responsibilities	% of Time
Ray Miller, GISP ***GIS/Mapping Team*** **Education:** • MA, Geography • BA, Geography **Certifications/Affiliations:** • Geographic Information Systems Professional • American Society of Photogrammetry & Remote Sensing • Association of American Geographers	• Assists HAZUS Team, as needed, to complete data processing and HAZUS runs • Develops mapping template • Executes mapping and GIS data compilation as assigned by GIS/Mapping Team Lead, including: o County-specific maps o 2013 HMP mapping needs • Submits all draft and final products to GIS/Mapping Team Lead for review	15%
Jimmy Bryant ***GIS/Mapping Team*** **Education:** • MS, Geography (in progress) • BS, Geography		15%
Janna Newman ***GIS/Mapping Team*** **Education:** • BA, Geography & Policy Studies **Certifications/Affiliations:** • Community Environmental Studies		15%
Eugenio Santiago, CFM ***GIS/Mapping Team*** **Education:** • BA, Geography **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM)		15%
VALUE-ADDED SERVICES TEAM		
Deborah Mills, CFM ***Value-Added Services Team Lead*** **Education:** • BS, Forest Management **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM) • Co-Chair, Flood Mitigation Committee ASFPM	• Works with the Polis Center to assure practical application training of HAZUS deliverables and incorporation into mitigation planning efforts • Oversees personnel assigned to Value-Added Services Team and coordinates tasking efforts between Value-Added Services Team and the HAZUS team and GIS/Mapping Team • Provides assistance to the Project Manager for budget oversight, managing technical staff, resource allocation and monthly reports	10%
Mohan Rajasekar ***Value Added Services*** **Education:** • MS, Civil and Environmental Engineering • BS, Civil Engineer **Certifications/Affiliations:** • Certified Floodplain Manager (ASFPM)	• Coordinates with Project Manager and the Agency to develop Value-Added Services • Integrate data into existing web portals • Investigation of additional web-based applications	30%

Key Personnel	Functions & Responsibilities	% of Time
Kevin Mickey **POLIS CENTER** ***Value-Added Services (Training)*** **Education:** • MS, Planning • BA, Geography	• Practical application training of HAZUS deliverables for planning regions to incorporate HAZUS results into mitigation planning efforts • In-depth training of HAZUS for the Agency and planning regions interested in utilizing HPR and GIS files	40%

2.0 Qualifications of Staff

Our team brings nationally-recognized experts in HAZUS and mitigation planning to the Agency. The members of the project team have specific experience with and knowledge of HAZUS as well as requirements and guidance for hazard mitigation planning. We have developed and facilitated HAZUS training sessions for folks with varying levels of technical sophistication in using the software or applying the products derived from its analysis. In addition, we are skilled at educating our clients on potential uses of the HAZUS analysis results, including ideas for incorporation into existing planning mechanisms and strategies.

Ryan Towell - Project Manager

EDUCATION
- MBA, Finance
- BS, Meteorology

CERTIFICATIONS
- American Meteorological Society

PROJECT RELEVANCY
- Management of project tasks and budget
- Review of draft and final deliverables

As a Meteorologist, Mr. Towell is experienced performing hazard identification and risk assessments for state and local clients. He has proven expertise analyzing scientific data and communicating findings in an easy-to-understand manner, and is successful at managing complex projects and staff in order to achieve and exceed company goals. Mr. Towell has over thirteen years' experience researching, interviewing, writing, editing, marketing, presenting and speaking on technical topics such as severe local storms and climate change.

SELECTED EXPERIENCE

West Virginia 2010 Hazard Mitigation Plan Update, WVDHSEM. Mr. Towell co-led updating the plan's hazard identification and risk analysis including HAZUS earthquake scenarios. Analysis of the state's severe repetitive loss and repetitive loss mitigated properties allowed WV to gain increased federal cost share for the FMA and SRL grant programs. Mitigation actions responded to the state's high hazard areas.

Maryland 2011 Hazard Mitigation Plan Update, Maryland Emergency Management Agency, Reisterstown, MD. Mr. Towell co-led a comprehensive re-analysis natural hazards as well as emerging and non-traditional hazards such as mining, inundation from dam failures, sea level rise and climate change. HAZUS-MH vs. Level 2 analysis was performed to predict the impacts of riverine flooding on the more than 7,000 state and local critical facilities for the 100-year and 500-year predicted floods. Following completion of the risk analysis, more than 100 mitigation actions and strategies were developed.

AWS Convergence Technologies/WeatherBug.com - Germantown, Maryland. Project management and new product development including implementation, issue resolution, feature testing and intra-departmental coordination across Engineering, Sales, Marketing, Information Technology and Operations. Ensured quality, accuracy and timeliness of products and services by developing and documenting business rules, engineering specifications, internal policies, procedures and performance measurements. Hired, trained and managed staff of four full time and two per diem meteorologists.

James C. Filson,CFM, PE – Principal-in-Charge

EDUCATION
- BS, Civil Engineering

CERTIFICATIONS
- Certified Floodplain Manager

REGISTRATIONS
- Professional Engineer, West Virginia 1999
- Professional Engineer, Virginia 1997
- Professional Engineer, North Carolina 1999
- Professional Engineer, Maryland 2009

AFFILIATIONS
- American Society of Civil Engineers
- Association of State Floodplain Managers
- Association of State Dam Safety Officials

PROJECT RELEVANCY
- Business procedures and contractual linkages

Mr. Filson has more than 20 years of professional experience in transportation and hydraulic engineering. He has drainage and river mechanics experience in Maryland, Virginia, Washington D.C, West Virginia, Tennessee, Maine, North Carolina and South Carolina. He has been involved with a variety of individual roadway and hydraulic design projects and has experience with stream restoration assessment and design. Also, Mr. Filson's knowledge of hydrology and hydraulics, river mechanics, scour analysis and preparing FEMA CLOMR's and LOMR's has provided our clients with a global view on unique situations and condition to address issue to their benefit and need.

SELECTED EXPERIENCE

PD Coal Combustion Waste, Statewide. Dewberry assessed Coal Combustion Waste (CCW) Management units at coal-fired power plants for US EPA to determine the stability and hazard potential for each unit The reports described and analyzed physical structure of the CCW MU, down gradient structures and topography, relevant report and permits, previous releases concerning the MU, construction design and history, operational history, field observations, hydrologic and hydraulic safety, structural stability, maintenance of the MU and monitoring of the MU. Responsible engineer for the John Amos and Phillip Sporn site assessments in West Virginia.

I-64 Widening Project – Institute to South Charleston, WV. The project has various bridge structures and one major crossing over the Kanawha River. A hydrology and hydraulics analysis was conducted to establish the 100 years water surface elevation and scour calculation were performed to determine the bridge foundation depths. As Deputy Manager, was responsible for the project scheduling, progress and task deadlines, coordination with three Offices and WVDOT. Also preformed the drainage design and preliminary roadway alignment that was presented to the WVDOT/DOH as a study for alternatives and design issues.

James Mawby, CFM - HAZUS Team Lead

EDUCATION
- BS, Environmental Science

CERTIFICATIONS
- Certified Floodplain Manager

TRAINING
- HAZUS Multi-Hazard for Flood, FEMA's Emergency Management Institute (EMI)

AFFILIATIONS
- Association of State Floodplain Managers

PROJECT RELEVANCY
- HAZUS Expert
- HAZUS task guidance for team
- Functional use of results in mitigation planning and web-applications

Mr. Mawby has 14 years of experience as a Geographer/GIS professional supporting a variety of projects to include natural hazard identification, land use and environmental planning, permitting, and regulatory compliance Much of Mr. Mawby's recent project work has been focused on the practical use and application of HAZUS for FEMA's Risk Map program and other county-specific User Defined Analysis. Previous Dewberry work has included floodplain hazard identification to include GIS-based H&H modeling of the approximate (Zone A) flood map zone. Mr. Mawby has also performed a variety of flood depth grid development projects in support of FEMA Regional Risk-Map initiatives. Notably, providing technical support and review for the FEMA Region IX Pilot, Guidelines for the Implementation of Essential Facilities Risk Assessments Using HAZUS for southern California counties which was showcased at the 2009 HAZUS Conference. Mr. Mawby has been integrally involved or has been the lead for multiple other HAZUS-specific projects.

James has received the 2011 Annual HAZUS Conference Award for "Best Overall Use of the HAZUS Model".

SELECTED EXPERIENCE

Gwinnett County GA, Risk Map Assessments including User Defined Facility (UDF). Gwinnett GA FY09 Flood Insurance Study included new Risk Map loss analyses for the new multi-frequency flood modeling. In addition, Dewberry included a HAZUS User-Defined analysis of points representing the building footprints throughout the floodplain. Building footprints and tax assessor records were assembled and developed for HAZUS. Mr. Mawby ran UDF's in the HAZUS Flood model along with the various multi-frequency depth grids from the Flood Study. Results were presented to the community following FEMA's newly established protocol for community resiliency.

State of Maryland, 2011 HMP Update. Mr. Mawby led and performed data collection, archiving and processing of HAZUS Flood Model runs of the 100-year and 500-year flood return frequencies for each of the MD jurisdictions. This effort included the collection of digital floodplain mapping and topographic models used in the production of depth grids. Mr. Mawby also offered technical oversight to staff running each of the HAZUS models and producing back-end GIS outputs utilized in the HIRA analyses and mapping.

Southeast Virginia/Northeast North Carolina Regional Catastrophic Planning Project. Mr. Mawby assisted planners and engineers in quantifying the effects of a design Category 3+ hurricane by creating user-defined inputs to HAZUS and adjustments to stock HAZUS data. Mr. Mawby developed the storm surge depth grid required to run the HAZUS Flood model by converting from SLOSH model outputs. Census data for 2010 replaced the stock HAZUS attributes of total population and households. Hurricane and flood models were both run to estimate regional damage and loss, the number of displaced households, physical impacts on shelters, and short-

term shelter needs. Each of the HAZUS outputs were utilized to help the project team understand and plan for the potential demand on emergency services in a catastrophic event - to include mass care, sheltering, commodities distribution (e.g., water), and other critical short-term emergency functions.

Maricopa County, AZ. Dewberry produced pilot studies in Maricopa County to examine hazard implications beyond traditional floodplain mapping. Data was developed and analyzed to quantify the flood hazard risk in terms of depth of flooding and flood frequency within the pilot areas. Building footprints were captured for the pilot area and enhanced with information from elevation certificates, county assessor data, imagery, and windshield survey site inspection to create data to be used by FEMA's HAZUS software for the valuation of direct and indirect economic impacts. Structures were run in HAZUS against depth grids developed for several return periods. HAZUS was also run against the 100-year flood return frequency for structures in the pilot areas simulating an additional 1-ft elevation in freeboard as a "what-if" scenario to see if reduction in economic dollar exposure can be realized with changes to freeboard requirements in a community's ordinance. With the project results, several structures were identified as having potential for a Benefit Cost Analysis (BCA) for further mitigation activities and a BCA analysis was simulated.

FEMA Region II Risk Map Early Demonstration (Binghamton, NY). Creation of 100-year depth grids for new preliminary DFIRM. HAZUS UDF development from local Tax Assessor records and parcels. Performed HAZUS UDF analysis and also re-aggregated HAZUS General Building Stock for comparative results.

FEMA Region VI HAZUS Pilot Study (Tulsa, OK). Creation of 100-year depth grids for both effective and new preliminary DFIRM. Provided technical support and review for the GBS re-aggregation and performed Level 2 loss comparative analyses.

San Bernardino County, CA HAZUS Flood and EQ Scenarios, Mapping Partner Alliance IX. The Federal Emergency Management Agency (FEMA) is conducting earthquake and flood scenario risk assessment projects for essential facilities in Orange, Riverside and San Bernardino Counties using FEMA's HAZUS-MH natural hazard loss estimation software. Dewberry oversaw scope, schedule and budget for flood and earthquake HAZUS scenarios using DFIRM and USGS data. Managed sub-consultants.

Guidelines for the Implementation of Essential Facilities Risk Assessments Using HAZUS, FEMA Region IX. Provided technical support and review for the FEMA Region IX Pilot Project including, Task Manager and Lead Analyst for developing county-wide depth grids for Honolulu County, HI including Level 2 HAZUS runs for three flood return frequency scenarios.

HAZUS Depth Grid Creation and Level 2 Analysis. Technical Lead for a variety of HAZUS Level 2 analyses in Georgia, Hawaii, and Oklahoma; all including creation of user-defined depth grid from FEMA DFIRM data.

Rachael Herman, CFM - GIS/Mapping Team Lead

EDUCATION
- BS, Environmental Science

CERTIFICATIONS
- Certified Floodplain Manager

AFFILIATIONS
- Association of State Floodplain Managers
- NYS Floodplain and Stormwater Managers Association
- NYS GIS Association

PROJECT RELEVANCY
- Integration with 2013 mitigation plan update
- Interpretative map products

Ms. Herman has more than nine years of professional experience in planning and GIS. She has a broad range of knowledge and expertise in geospatial information technology (ArcView 3.2 to 10.0 and HAZUS MH MR1 to MR5) as it applies to natural hazards and mitigation planning. She joined Dewberry after serving as the Environmental GIS Manager at the Center for Geospatial Information Technology at Virginia Tech. Ms. Herman has contributed to local, state and regional hazard mitigation plans in West, Virginia, Virginia, and Maryland. She has been involved in the entire process of developing approved mitigation plans with a focus on the Hazard Identification and Risk Assessment (HIRA) sections for three State Mitigation Plans, including the 2010 update of the State of West Virginia Hazard Mitigation Plan, thirteen local or regional mitigation plans and three Disaster Resistant University (DRU) plans per Stafford Act and *44CFRPart201* requirements. In addition, she led Map Modernization contracts that improved FEMA Flood Insurance Rate Maps and Flood Insurance Studies for Virginia counties and hosted the state's Map Modernization website.

Most recently, she led the complete revision of the 2011 Maryland State Mitigation Plan HIRA that focused on incorporating local plan results, state-owned critical facilities and mapping HAZUS –MH MR5 flood results for annualized loss as well as the 100-year, 500-year return frequencies. Currently, Ms. Herman is helping to draft the FEMA State Plan Review Tool and Guidance that will replace the current FEMA Hazard Mitigation Plan crosswalk.

SELECTED EXPERIENCE

FEMA Risk MAP Standard Operations Task Order. Developing guidelines and standards for the new program including: Users' Guidance for Risk MAP Products; Mitigation Planning Technical Assistance Guidance; Outreach and Communications Tool Kit Guidance.

Disaster Mitigation Act of 2000 (DMA2K)-Compliant Mitigation Plans. Task Lead for the development of multi-hazard Disaster Mitigation Act of 2000 (DMA2K)-compliant mitigation plans. Responsible for plan writing and outreach support, including hazard identification and risk assessment, mitigation strategy and alternatives development, capabilities assessment, and coordination of the plan with local and state mitigation committee and community officials. All of the more recent mitigation plans have utilized some level of HAZUS-MH analysis and mapping:

- West Virginia Hazard Mitigation Plan Update (2010), HAZUS-MH MR4 Earthquake
- Maryland Hazard Mitigation Plan Update (2011), HAZUS-MH MR5 Flood and Earthquake
- City of Lawton, Oklahoma Hazard Mitigation Plan (2012), HAZUS-MH MR5 Earthquake
- Tri-County Regional Planning Commission Hazard Mitigation Plan (2010), Coaching HAZUS-MH MR4 Flood and Earthquake
- Commonwealth of Virginia Emergency Operations Plan: Standard and Enhanced Hazard Mitigation Plan (2004 and 2010), HAZUS-MH MR3 Hurricane, Earthquake and pilot Flood
- Middle Peninsula HAZUS-MH MR4 Riverine and Coastal Analysis to support the plan update

Steve Kalaf, CFM - Quality Manager

EDUCATION
- BS, Geography

CERTIFICATIONS
- Certified Floodplain Manager
- ISO 9001:2000 Auditor

AFFILIATIONS
- American Society for Quality
- Association of State Floodplain Managers

PROJECT RELEVANCY
- Development and supervision of Quality Control Plan

Mr. Kalaf has a broad range of experience in QA/QC processes, digital mapping techniques, production requirements, multi-disciplinary staff management, continuous process improvement protocols, technical writing and editing, knowledge management systems, and development of training programs. Steve has been a member of the American Society for Quality since 1991. Experience in developing training programs for knowledge management systems, digital mapping, FEMA Guidelines and Standards (G&S) and special investigations associated with FEMA and the US Fish and Wildlife Service (USFWS). Steve has received the Dewberry Client Focus Award, Technology Achievement Award, and the Entrepreneur Award for Excellence.

SELECTED EXPERIENCE

FEMA, Risk MAP Production and Technical Services Contract (PTS), Nationwide. Quality Manager for one of the largest flood mapping programs in the U.S., providing program management, production and technical services to include flood insurance studies, FIRM and LOMC production, coastal/riverine H&H; hazard risk assessment and mitigation production, outreach, and post-preliminary processing and evaluation services. As a member of the FEMA G&S Steering Committee, Steve participates in weekly meetings with FEMA to scope and execute proposed changes to their G&S to address standards for the evolving Risk MAP program. Authored a comprehensive Quality Management Plan for the JV RAMPP and provides program execution oversight.

FEMA Guidelines and Standards. Led the creation of multiple elements of the FEMA G&S for Flood Risk Analysis and Mapping. Actively engaged in a comprehensive overhaul of the entire set of guidelines used by Mapping Partners nationwide. Most recently led the development of Appendix N of the FEMA G&S (Flood Risk Data Development) as well as multiple Operating Guidance documents. Among other flood risk data development standards, Appendix N provides FEMA standards for creation of datasets that feed into the HAZUS application.

Flood Hazard Assessment and Mapping, Various FEMA Regional Offices and CTP Clients. Quality Manager for establishing quality standards and protocols for all FEMA-related flood mapping contracts. Directs Quality Control Specialists, who provide day-to-day guidance and assistance on quality assurance and quality control activities. Created a Web-based knowledge management system (HELPR) that provides all Dewberry staff with instant access to all flood-mapping related documents, procedures, and resources.

FEMA Quality Working Group. Standing member of FEMA's collaborative Quality Working Group. Mr. Kalaf helps craft and implement national Quality management protocols and tools for use by FEMA's Mapping Partners nationwide. Establishes quality standards and associated validation protocols with a goal of raising product and data quality program-wide. Co-authored several QA/QC processes, and plays a key role in coordinating activities between the FEMA G&S Steering Committee and the FEMA Quality Working Group.

Deborah Mills, CFM - Value Added Services Team Lead

EDUCATION
- BS, Forest Management

CERTIFICATIONS
- Certified Floodplain Manager

AFFILIATIONS
- Association of State Floodplain Managers
- Co-Chair, Flood Mitigation Committee ASFPM
- Virginia Lakes & Watersheds Association

PROJECT RELEVANCY
- Meaningful deliverables and training
- Development of applicable mitigation strategies

Prior to joining Dewberry, Ms. Mills served the Commonwealth of Virginia in a variety of emergency management and environmental leadership capacities. During her tenure years at Dewberry, she has managed numerous hazard mitigation plan update projects that incorporated HAZUS into vulnerability assessments as well as three FEMA HMTAP task orders. Mills served as the State Hazard Mitigation Officer for Virginia, where she managed more than $40M in mitigation grant program funds as an Enhanced State, including the development of the approved 2004 Standard Mitigation Plan and Region III's only Enhanced Hazard Mitigation Plan in 2007. She has served on 16 Federal declared disasters, including the Katrina Biloxi AFO. As Virginia's Recovery and Mitigation Division Director, she supervised closure of 90% of open Isabel project worksheets. She managed development of 35 local/regional all-hazard mitigation plans and Disaster Resistant University plans.

SELECTED EXPERIENCE

Disaster Mitigation Act of 2000 (DMA2K)-Compliant Mitigation Plans. *Project Manager* for the development of multi-hazard Disaster Mitigation Act of 2000 (DMA2K)-compliant mitigation plans. Responsible for plan writing and outreach support for the development of multi-hazard regional DMA2K-compliant mitigation plans, including hazard identification and risk assessment, mitigation strategy and alternatives development, capabilities assessment, and coordination of the plan with local mitigation committee and community officials. Hazard mitigation plans that included HAZUS:

- West Virginia State Standard Plan 2010 Update
- Maryland State Standard Plan 2011 Update
- Northern Virginia Hazard Mitigation Plan Update
- Peninsula Hazard Mitigation Plan Update
- Middle Peninsula HAZUS-MH Riverine and Coastal Analysis to support the plan update
- Tri-County Regional Planning Commission Plan Update (Peoria IL)

Virginia Department of Emergency Management. State Hazard Mitigation Officer for Virginia, where she managed more than $40M in mitigation grant program funds as an Enhanced State, including the development of the approved 2004 Standard Mitigation Plan and Region III's only Enhanced Hazard Mitigation Plan in 2007. She supervised the development of 35 local and university mitigation plans in the Commonwealth. As Virginia's Recovery and Mitigation Division Director, Deborah supervised closure of 90% of open Isabel project worksheets while managing the state's public assistance, individual assistance and hazard mitigation program as well as long-term recovery planning. Deborah has completed the resident Advanced Incident Command System training courses through ICS400. She has participated in numerous emergency and disaster exercises for scenarios including flood, hurricane, winter storm, terrorism and nuclear events as a participant and an evaluator.

Josh Wadlington, CFM - HAZUS Team

EDUCATION
- BLS, Geography

CERTIFICATIONS
- Certified Floodplain Manager

AFFILIATIONS
- Association of State Floodplain Managers

PROJECT RELEVANCY
- User Defined Facility analysis

Mr. Wadlington has seven years of experience as a Geographer and GIS professional. His work has included a range of projects to include flood hazard mapping, natural resource identification, land use analysis and environmental planning. He is well versed in GIS mapping, production and analysis to create a variety of regulatory and customized spatial deliverable products. These projects have included the creation of FEMA Digital Flood Insurance Rate Map (DFIRM) geodatabases for a number of countywide map modernization and re-study efforts. He also has considerable programmatic experience with the FEMA National Flood Insurance Program (NFIP) which includes technical customer support and the processing of Letters of Map Change (LOMC). Notable projects include the creation of depth grids, performing HAZUS Level 2 analysis and HAZUS User-Defined Facility (UDF) development and analysis.

SELECTED EXPERIENCE

State of Maryland, 2011 HMP Update, HAZUS Specialist Mr. Wadlington was responsible for the creation of depth grids; his effort included the extensive use of digital floodplain mapping and topographic models. Existing FEMA DFIRM data was used in the creation of 100-year and 500-year depth grids to be used in HAZUS Level 2 analysis. The analysis included running of the HAZUS models and producing GIS outputs to be used in final analyses and mapping.

Maricopa County AZ, HAZUS Specialist Responsible for the creation of User-Defined Facility (UDF) development. This included the capture of building footprints that were then enhanced with information from elevation certificates, county assessor data, imagery, and site inspection survey data. These individual structures were then run in HAZUS against depth grids developed for several flood return frequencies.

Risk Map Products Quality Control Checks, HAZUS Specialist Performed independent quality control check on the 100-year and 500-year mosaicked depth grids for Susquehanna County, PA and Baltimore County, MD. The checks included validating the elevation models, performing consistency checks and ensuring complete coverage of the study area.

FEMA DFIRM Mapping Production, Task Manager Served as a task manager to produce FEMA DFIRMs through their entire production cycle from scoping to final deliverables. Notable project areas include county-wide mapping of Alameda County, CA, Ventura County, CA, Riverside County, CA and Humboldt County, CA. This included preparation of DFIRM geodatabases to meet FEMA guidelines and specifications, incorporation of Letters of Map Revision (LOMRs) and other floodplain studies into DFRIM geodatabases. Additional analysis was performed through the identification of floodplain boundaries through H&H re-delineation of existing models. Conducted and coordinated independent quality control of deliverables.

Paul Comlish, CFM - HAZUS Team

EDUCATION
- BA, Philosophy
- BS, GIS and Computer Cartography

CERTIFICATIONS
- Certified Floodplain Manager

AFFILIATIONS
- Association of State Floodplain Managers

PROJECT RELEVANCY
- Customization of Digital Data Products

Mr. Comlish has seven years of experience as a GIS professional of which the last six has been with Dewberry. Prior to Dewberry, Mr. Comlish worked for the Department of Natural Resources for the State of Maryland, where he used GIS to manage the duck blind and shoreline licensing program.

Mr. Comlish joined Dewberry in August of 2005 as a Geographer in the Special Mapping Services Department. Mr. Comlish has performed data development in support of the FEMA flood mapping program, and went on several disaster deployments to collect high water marks for FEMA hazard mitigation program. Currently, Mr. Comlish spends the majority of his time supporting multiple task orders with the United States Fish and Wildlife Service's Coastal Barrier Resources System (CBRS). Mr. Comlish serves as the subject matter expert and task manager on the CBRS contracts and provides the full suite of GIS services to the FWS including GIS analysis, custom cartography, data development, data mining, wetlands delineation, coastal geomorphic change analysis, and build-out analysis. Mr. Comlish was instrumental in using HAZUS for CBRS analysis to determine vulnerability and program savings based on multiple build out scenarios. Mr. Comlish is the task manager for the integration of CBRS data on FIRMs via FEMA procedure memorandum 39, and has developed and coordinated the incorporation of CBRS data for over 100 countywide flood studies.

SELECTED EXPERIENCE

HAZUS analysis of CBRS. As a member of the HAZUS team and the CBRS team, Mr. Comlish was instrumental in developing a process to determine finance losses in CBRS units by using HAZUS. Because Federal expenditures are restricted in the CBRS the losses were used to quantify tax savings. Mr. Comlish helped develop a methodology for build out scenarios using the densities of adjacent and similar coastal communities a template for undeveloped barriers, which involve creating hypothetical structures that were turned into UDFs. Mr. Comlish helped summarize the results and present them to the client.

State of Maryland, 2011 HMP Update, HAZUS Specialist. Mr. Comlish performed data collection processing of HAZUS Flood Model runs of the 100-year and 500-year flood frequencies for several Maryland Counties. Because the project involved legacy DFIRM databases, Mr. Comlish created depth grids using the existing DFIRM with new terrain.

Maricopa County, Arizona, HAZUS Specialist. Mr. Comlish combined field survey data, elevation certificates, and building footprints to build UDFs for input into HAZUS. He also ran HAZUS on multiple frequencies using several scenarios (i.e. raising the BFE by one foot and making UDFs all at grade).

Ricardo Saavedra, EIT - HAZUS Team

Mr. Saavedra is a Civil Engineer in the Climate Changes and Special Initiatives group at Dewberry with several years of experience as an engineer and GIS professional. His work has included a range of projects consisting of Benefit-Cost analysis, HAZUS Level 1, 2 and User Defined Facility (UDF) model, and web applications.

EDUCATION
- MS, Civil Engineerng
- BS, Civil Engineering

REGISTRATIONS
- Engineer-in-Training

PROJECT RELEVANCY
- Web application development (KML)

SELECTED EXPERIENCE

Economic Consequence Assessment and Guidelines Development for Dam Failures, FEMA, Nationwide. Prescribed a multi-tiered approach for analyzing direct and indirect economic consequences resulting from a dam failure. Economic results included estimates for direct losses for building and content damage; indirect losses due to reduced wages and business interruption; and debris removal costs. The methodology leveraged the use of HAZUS-MH and ArcGIS.

Y15 Dam Consequence Assessment, Gwinnett County, GA. Conducted two economic consequence assessments through HAZUS-MH, which included a user-defined facilities model and general building stock model. These results included estimates for both direct and indirect losses and were comparatively assessed to determine the accuracy of HAZUS-MH. Other duties included performing a loss of life and injuries assessment from the simulated dam failure. Altogether, these economic consequence assessments were comprehensively packaged with a social and environmental assessment and will be delivered to the client.

Benefit-Cost Analysis of FEMA's NFIP Coastal Policy, FEMA, Nationwide. Performed a sensitivity test of FEMA's Coastal Policy. This resulted in an optimized depth-damage function that is reflective of various coastal mitigation projects, their respective costs and the commensurate savings they produce.

Northwest Florida Water Management District Web Application Tool, Northwest Florida Water Management District, Northwest Florida. Developed depth grids for riverine special flood hazard areas across nine counties. The resulting data was then used to determine the base flood elevation for all structures and parcels in the inundated area and eventually presented on a web-based communication platform open to the community.

Major-Minor Policy Analysis, FEMA, Nationwide. Analyzed approximately seventy-five Hazard Mitigation Grant Projects across the United States in order to provide an absolute definition for a major flood mitigation project. This definition was based on the parameters reviewed which included project cost, benefit-cost analysis values, flood protection levels, and others.

Puerto Rico Web Application Tool, FEMA – Region II, Puerto Rico. Developed depth grids for riverine special flood hazard areas for the entire island of Puerto Rico. The resulting data was then used to determine the base flood elevation for all structures and parcels in the inundated area and eventually presented on a web-based communication platform open to the community.

Andrew Peters - HAZUS Team

EDUCATION
- BA, Geography

AFFILIATIONS
- American Society of Photogrammetry and Remote Sensing

PROJECT RELEVANCY
- Average Annualized Loss expertise

Mr. Peters is a Production Manager in Dewberry's Geospatial department with five years experience working with GIS and Remote Sensing technologies. He has been a task manager on several large-scale quality assurance and quality control (QA/QC) projects for USGS, FEMA, NOAA, State of Florida, and State of South Carolina. He is experienced in using ESRI's ArcGIS software for geospatial analysis and QT modeler, GeoCue, and TerraSolid for LiDAR processing, analysis, and QA/QC.

SELECTED EXPERIENCE

FEMA AAL Study. Supported the 2009 HAZUS Flood Average Annualized Loss (AAL) study (concluded in June 2010). The Study was performed for the entire continental United States using HAZUS MR4. County-level analysis was performed using Level 1 methodology, and each Production and Technical Services (PTS) contractor performed the work for its FEMA Regions. Mr. Peters was involved in the AAL runs for FEMA Regions II, III and VI in which he helped to improve project workflow by fully documenting the procedures and clarifying the processes for the project team. He performed over 100 county HAZUS runs as part of this study and provided daily reports on progress.

Hazard Mitigation Technical Assistance Project (HMTAP), FEMA, Nationwide. Analyzing the HMA grants database using geospatial technologies to identify trends and provide recommendations for the next iteration of the HMA database. Final deliverable is a report consisting of over 200 maps documenting the trends. Mr. Peters is responsible for ensuring the geospatial production staff produce consistent products and providing monthly reports to FEMA. He developed a checklist of items to make sure every map follows a consistent standard and consolidated the geospatial data.

Florida Water Management Districts. Multiple geospatial and water resource engineering tasks for the St. John's Water Management District. Served as task manager ensuring all internal and external project goals were met with regards to quality performance. For a recent contract with the Suwannee River Water Management District, Andrew served as the task manager for an independent QA/QC of Northern Jefferson County, FL – a joint project between NOAA, the Northwest Florida Water Management District and the Suwannee River Water Management District.

USGS, Geospatial Products and Services Contract (GPSC). Provides a full spectrum of nationwide imaging services and spatial data products including airborne image acquisition, photogrammetric, digital orthophotos, LiDAR, IFSAR, and production of NHDs, DEMs, DLGs, and DRGs. Responsible for creating workflow - consistent and efficient quality assurance of numerous deliverables; LAS, vegetation shapefiles, and DEM's. Quality assurance included full understanding of LiDAR data, ortho-imagery, derived DEM products as well as interpretation and identification of features, such as buildings, trees, and forested areas, with specific size, type, and density requirements. All final products had specific attribution requirements. Our quality assurance program ensured detailed, fully compliant FGDC metadata for each file delivered.

Stephanie Routh, CFM - HAZUS Team

EDUCATION
- MA, Geography
- BA, Geology
- BA, Anthropology

CERTIFICATIONS
- Certified Floodplain Manager

AFFILIATIONS
- Association of State Floodplain Managers

PROJECT RELEVANCY
- Practical applications of HAZUS

Ms. Routh has been in the GIS industry for over 22 years serving in the discipline as an analyst, programmer and as a project manager. Currently, Stephanie is responsible for DFIRM and FIS production, management, and HAZUS projects under FEMA's current Risk MAP program, as well as the prior Map Modernization program. Responsibilities include managing production schedules, QA/QC, Geodatabase review and design, delivery of hard copy and digital products, and project reporting. Stephanie has also led projects to train other contractors in FEMA guidelines and specifications, and has worked with HAZUS product developers to develop guidelines and procedures for analysis of lower frequency flood events using FEMA's FIRM data.

SELECTED EXPERIENCE

Wickenburg Area Drainage Master Study/Plan (ADMS/P), Flood Control District of Maricopa County (FCDMC), AZ. The purpose of this project was re-delineating the study area floodplains using the updated rainfall and land use information. The floodplains will be submitted to FEMA for review and approval. Once the floodplains have been updated, the project team will develop the area drainage master plan. The master plan will develop drainage solutions to the known flooding issues. These solutions will be evaluated by the project team to select recommended alternatives.

HAZUS and Drainage Regulation Analysis, FCDMC, AZ. This project examined hazard implications beyond traditional floodplain mapping and evaluated the current drainage regulations for the District. Three pilot areas were selected for analysis based on their distinctive features and available data. Building footprints and additional information were captured for the pilot areas and used by FEMA's HAZUS software for the valuation of direct and indirect economic impacts for several scenarios. Drainage regulation was also evaluated using the HAZUS program. A Benefit Cost Analysis (BCA) was performed on several structures in the study analyzing the benefits of acquisition to structures with a high probability of flooding.

NFIP FEMA Regions VI & IX. Managed team completing DFIRM products for various counties in FEMA Region 9. Program components included HAZUS work, Limited Detail Studies, Re-Delineation of existing floodplains to new topographic data and digitization of hardcopy information. The program also required compilation of digital floodplain data, production for DFIRM databases, and creation of final map deliverables for the Map Service Center. Results were utilized in HMP updates. Specific HAZUS responsibilities under this program included:

- HAZUS analysis for earthquake and flood events, and Tsunami event scenarios for Orange San Bernardino, and Riverside Counties. Results presented to communities and FEMA along with a detailed step-by-step guidance on how to input community based essential facilities data, run scenarios, and upgrade general building stock countywide.
- HAZUS analysis for earthquake and flood events, and Wind scenario for Honolulu, Hawaii.
- Technical Review and HAZUS flood analysis for Tulsa County, Oklahoma.

Raymond Miller, GISP - GIS/Mapping Team

Mr. Miller has ten years of experience in Geospatial Services. He has developed geospatial solutions for hazard mitigation, environmental, and water resources projects for clients that include the FEMA, the NOAA, and the Florida DEM. He has extensive experience in GIS and Remote Sensing that includes digital terrain modeling, LiDARgrammetry, stereographic aerial photo interpretation, watershed analysis and floodplain mapping, geostatistics, and cartography. His graduate education concentrated on hurricane evacuation modeling and social vulnerability analysis using geospatial applications, especially HAZUS-MH. Furthermore, Mr. Miller has specialized training in HAZUS-MH, Hurrevac, and SLOSH modeling software.

EDUCATION
- MA, Geography
- BA, Geography

CERTIFICATIONS
- Geographic Information Systems Professional

AFFILIATIONS
- American Society of Phtogrammetry & Remote Sensing
- North American Cartographic Information Society
- Florida Urban & Regional Information Systems Association

PROJECT RELEVANCY
- Mapping and data creation for mitigation plans

SELECTED EXPERIENCE

West Virginia Hazard Mitigation Plan Update, WVDHSEM. Responsible for modeling hazard vulnerability for natural hazards and developing a spatial index of vulnerability. Additional responsibilities included map production, technical writing, and project coordination with staff across multiple office locations.

Maryland 2011 State Hazard Mitigation Plan Update, MEMA. Responsible for modeling hazard vulnerability for flooding, hurricane, wildfire, severe storm, tornado, earthquake, and hail and developing a spatial index of vulnerability. Dewberry provided the state with a comprehensive re-analysis natural hazards as well as emerging and non-traditional hazards such as mining, inundation from dam failures, sea level rise and climate change. HAZUS Level 2 analysis was performed to predict the impacts of riverine flooding on the more than 7,000 state and local critical facilities for the 100-year and 500-year flood return frequencies.

USGS Geospatial Products and Services Contract (GPSC). Generation of hydro-enforced digital terrain models at 1-meter and 2-meter resolution. Responsibilities included stereographic extraction of 3D hydrographic breaklines to supplement LiDAR topographic data, QA/QC of breakline data using automated PLTS toolsets, post processing of digital terrain models, and project task management for the fourth consecutive major contract for geospatial services with the USGS – ranging from 1998 to 2014. This contract includes services from geodesy, aerial data acquisition, photogrammetry, orthophoto production, LiDAR collection and processing, IfSAR collection and processing, GIS services and the production of a number of standard USGS products.

NOAA Sea Level Rise Viewer DEM Inventory: US Coastline, NOAA Coastal Services Center. The Center is developing a web-based mapping application that will help the coastal management community visualize the effects of sea level rise in their communities. The application requires high-resolution elevation datasets to build the visualizations. Responsible for compiling and modifying LiDAR elevation data sets and producing digital elevation models for ingestion into the Center's Sea Level Rise viewer internet mapping application.

James (Jimmy) Bryant - GIS/Mapping Team

EDUCATION
- MS, Geography (in progress)
- BS, Geography

PROJECT RELEVANCY
- Experience with intergation of facilities data in HAZUS

Mr. Bryant is a project geographer within the Water Resources Consulting group at Dewberry. Jimmy has 7 years of GIS experience including data management, geodatabase manipulation, feature extraction and analysis. The majority of his experience has stemmed from working on flood insurance studies for the National Flood Insurance Program. In addition to his strong background knowledge in ArcGIS, he has experience in remote sensing and working with Adobe Illustrator.

SELECTED EXPERIENCE

National Flood Insurance Program - FEMA Regions II, III, IV, VI, VII and IX. Project task lead in managing and producing digital flood insurance studies for FEMA's National Flood Insurance Program. Daily use of GIS functions such as topology, advanced editing, georeferencing, spatial analyst and model builder within an SDE environment to create digital GIS deliverables to the client. Participate in client and community meetings to discuss project goals and expectations. Manage project budgets, tasks and resources in order to efficiently meet deadlines.

Maryland 2011 State Hazard Mitigation Plan Update, MEMA. A GIS technical lead in performing several risk assessment analyses on buildings and infrastructure within the state of Maryland. Analyses included examining potential flood, fire, sea level rise, erosion, earthquake, landslide, storm surge and sinkhole risks for over 40,000 structures. Provided technical support in updating HAZUS databases with information provided by the state of Maryland. Provided technical support in combining all GIS data used for the analyses into one comprehensive geodatabase containing location, shape and attribute information of all geographic features.

California Statewide Flood Theme Project. Developed a California statewide seamless flood hazard layer in support of FEMA Region IX. Used various GIS tools and functions to combine county flood datasets provided by the California Department of Water Resources and the National Flood Insurance Program. Documentation of methodologies, lessons learned and future recommendations were detailed in a report provided to the client for use on similar projects in the future.

City of Mesa Interactive GIS Webpage. Provided technical support to update the Planning Department's parcel geodatabase and accompanying ArcGIS interactive map viewer. Input of detailed parcel information from 1970s - 2000s including property values, parcel descriptions and owner information.

Janna Newman - GIS/Mapping Team

EDUCATION
- BA, Geography & Policy Studies

CERTIFICATIONS
- Certificate in Community Environmental Studies

PROJECT RELEVANCY
- Data intergration with mitigation planning efforts

Ms. Newman is a Dewberry GIS Analyst with five years experience with ArcGIS (ArcView 9.0 to 10.0), and experience with HAZUS. She has worked on hazard mitigation projects for the states of Mississippi, South Dakota, and Maryland as well as local hazard mitigation plans from California to Virginia. Ms. Newman manages data from in-house Emergency Management departments or as support to a mitigation planning process. She created hazard identification maps for the University of Mary Washington, Virginia Commonwealth University, and University of Virginia's Hazard Identification and Risk Assessment studies. She helped create a report for the North Carolina Emergency Management senior staff identifying GIS datasets and software needed pre-disaster and post-disaster, and compiled a list of over 300 datasets. Recently, Ms. Newman drafted a FEMA technical report analyzing state hazard mitigation plans and the relationship between state identified hazard rankings, state identified mitigation actions, and HMGP funded projects located in a FEMA database.

SELECTED EXPERIENCE

South Dakota State Threat and Hazard Identification Risk Assessment (THIRA). The analyst responsible for researching manmade hazards and developing hazard specific profiles to present descriptions, potential impacts, mitigating characteristics, exacerbating characteristics. Tasks include performing a vulnerability assessment based on identified critical facilities and developing a comprehensive report which integrates with the State Hazard Mitigation Plan.

South Dakota State Hazard Mitigation Plan. The analyst responsible for leading plan organization and compilation. Tasks include organizing and summarizing new data from the state and local agencies to be incorporated into the Planning Process section of the updated Plan; reviewing and summarizing local hazard mitigation plans for incorporation into the updated State Plan; reviewing the previous plan FEMA crosswalk and ensuring comments are addressed in the new Plan.

California – Local Hazard Mitigation Plans. Ms. Newman has supported all aspects of hazard mitigation planning for several local hazard mitigation plans in California. She serves as a GIS Coordinator and Risk Analyst, performing spatial analysis of hazard areas, population, and recent event data using ESRI's GIS software and drafts hazard specific profiles which detail potential impacts and likelihood of occurrence. Ms. Newman is a skilled writer and provides quality support for documenting capabilities assessments, mitigation strategies, planning process, and plan maintenance sections of the plan.

FEMA Deployment to Birmingham, Alabama. GIS Analyst deployed to provide assistance to the FEMA Environmental and Historic Preservation Group. Digitized locations of National and State historic landmarks in the State of Alabama to be used by State EMA and State Historic Preservation Office. The GIS layer was available to the FEMA Region IV web mapping server called STORM, which could be accessed by all employees at the Birmingham Joint Field Office. (June-Sept 2011).

Eugenio Santiago, CFM - GIS/Mapping Team

EDUCATION
- BA, Geography

CERTIFICATIONS
- Certified Floodplain Manager

AFFILIATIONS
- Association of State Floodplain Managers

PROJECT RELEVANCY
- HAZUS depth-grid creation
- HAZUS Essential Facilities

Mr. Santiago is a project geographer within the Water Resources Consulting group at Dewberry with a focus on the production of flood hazard mapping and studies for counties in most of the Northeastern states of the U.S (FEMA Regions II and III).

SELECTED EXPERIENCE

State of Maryland 2011 HMP Update. Mr. Santiago was responsible for the creation of depth grids; his effort included the extensive use of digital floodplain mapping and topographic models. Existing FEMA DFIRM data was used in the creation of 100-year and 500-year depth grids to be used in HAZUS level 2 analysis. The analysis included running of the HAZUS models and producing GIS outputs that were used to generate tables and mapping.

FEMA's Risk Map. Research and coordination to produce Discovery project materials under FEMA's Risk MAP program. Performed different tasks including Discovery Maps and reports preparation to be used as presentation materials in Discovery meetings.

FEMA's Map Modernization. Map Specialist for FEMA's Map Modernization projects in charge of processing Letters of Map Change (LOMC) through the modification of Flood Insurance Rate Maps (FIRM). Communication to the public (homeowners, community officials, surveyors, engineers, and state and federal officials) about the National Flood Insurance Program, the Map Modernization program and flood hazard mitigation efforts for floodplain management in local, state and federal levels. Worked performing analyses for Flood Insurance studies. Digital conversion of flood profiles and database corrections to produce delineation of Flood polygons for the FEMA flood insurance rate maps. Perform quality reviews of preliminary products before delivery to the client (FEMA Region III affected counties) Assisted in the production of post-preliminary materials (DFIRMs, FIS) for final delivery in several Region III county studies.

Mohan Rajasekar, CFM - Value Added Services Team

Mr. Rajasekar takes the lead on designing, developing, and deploying geospatial and data driven web applications and tools for risk communication, data management, data gathering, and customized reporting. He has designed and developed simulation-optimization tools; numerical methods; QA/QC tools; and automation and process optimization tools for solutions in the area of water resources engineering. He also has extensive experience with the NFIP program, the FIS and FEMA's Risk MAP projects both at a programmatic and implementation level.

EDUCATION
- MS, Civil and Environmental Engineering
- BS, Civil Engineering

CERTIFICATIONS
- Certified Floodplain Manager

AFFILIATIONS
- Association of State Floodplain Managers

PROJECT RELEVANCY
- Web applications andinterfacing tools

SELECTED EXPERIENCE

Community Adaptation to Sea Level Rise and Inundation (CASI), Virginia Sea Grant. Led the development of a GIS-based web portal that indicates change in flood risk and sea level rise inundation over time through the end of the century and across three projected sea level rise curves. The easy-to-use portal also displays the number and dollar values affected at the building, neighborhood and county level for Anne Arundel County, Maryland. This toolkit could be implemented across the Mid-Atlantic and United States as a component of a climate change adaptation decision-making framework. The toolkit will consist of an online survey and aggregated local impact data viewer platform, together with a manual instructing groups how to implement deliberative polling events on sea level rise and inundation in their communities.

Coordinated Needs Management Strategy (CNMS), Nationwide, FEMA. Mr. Rajasekar was part of the core development team that lead the effort to create and shape the CNMS database that holds study statuses for FEMA's entire mapped floodplain inventory in the nation. He individually led the design of a CNMS data viewer and decision analysis tool for optimized process and FEMA Inventory management including Risk MAP prioritization activities, and the discovery process. He has also leaded the design of a CNMS decision analysis tool for optimized process and data management.

Susquehanna Inundation Mapping, Multiple Counties in NY, Susquehanna River Basin Commission. Dewberry developed Susquehanna Inundation Mapping Viewer (SIMV), as a web-based geospatial flood risk communication tool to provide emergency managers and the general public the ability to develop structure-specific inundation reports for flooding scenarios throughout the basin. SIMV allows a user to view stage based inundation data for a flooding scenarios using inundation extents (shapefiles) and depth grids developed using high-resolution LiDAR. Users can query the interface and generate custom reports that provide depth of flooding at a specific structure or geographic location (such as highways or local landmarks).

North Carolina Cooperating Technical State Flood Mapping Program, North Carolina Division of Emergency Management. Mr. Rajasekar is currently developing the project website for the NC Sea Level Rise Risk Management Study that assesses the impacts of climate change, sea level rise and changing storm frequency on coastal flooding and erosion.

Kevin J. Mickey, MPl, CTT+, GISP - Value Added Services Team

The Polis Center

Mr. Mickey has over 21 years of geospatial technology project management, analysis and instructional experience. He is experienced in the development and implementation of education programs for a variety of audiences and is an expert in the application of HAZUS-MH for a wide range of purposes. Mr. Mickey is an ArcGIS Certified Desktop Associate and an ESRI certified instructor.

Education

- Master of Planning – *emphasis in environmental planning and applications of GIS to planning*
  Bachelors of Arts in *Geography – emphasis in human geography and cartography*

Selected Experience: *Director Geospatial Technologies Education*

FEMA: Manage development and maintenance of ten HAZUS classroom and sixteen virtual courses, designer of HAZUS training cadre qualification system, senior instructor of all FEMA authorized HAZUS courses, HAZUS Integrated Planning Team member, and analyst for Hurricane Rita and Katrina loss estimations in support of FEMA headquarters. (2002 to current)

Indiana Department of Homeland Security: Managed team of instructors that delivered over 50 GIS and HAZUS courses at locations across Indiana, developed and taught courses on catastrophic earthquake planning and GIS, conducted GIS and HAZUS-MH modeling as part of a seismic study of bridges in southern Indiana, collected and analyzed multiple types of local data as part of mitigation plan development for two Indiana counties, collaborated with Indiana Department of Homeland Security and the United States Geological Survey to develop and implement a pilot project that explored the value of integrating site specific structural data and enhanced hazard data in the HAZUS Flood modeling application. (2003 to current)

National Institute of Building Sciences: Managed a team of experts conducting final testing of multiple versions of HAZUS. Also provided solicited recommendations to NIBS and the HAZUS development teams on the strategic direction of the HAZUS product development. (2005 to 2009)

PBS&J Consulting: Developed and conducted multiple workshops in Florida and South Carolina in support of implementation of HAZUS data management web portals, developed and taught vendor and instructor certification courses in support of FEMA private sector initiative. (2006 to 2008)

United States Department of Education: Managed all GIS data development and education related activities under three Teaching American History Grants. Project activities included development and testing of multiple approaches for integrating geospatial technologies into the social studies curriculum of K-12 classrooms. (2006 to 2009)

CTE Consulting: Member of a multi-hazard mitigation planning team that developed an all-hazards mitigation plan for the City of Chicago. Specific responsibilities included conducting HAZUS modeling of area hazards and providing input on the planning process. (2005)

3.0 Work Plan and Schedule

Project Understanding and Approach

Executive Summary of Understanding

We understand that the Agency wishes to continue the efforts of the HAZUS Phase I project and the Dewberry Team will be a partner in accomplishing this important goal. Because the HAZUS results will be used in the 2013 Hazard Mitigation Plan (HMP), our approach will ensure that HAZUS runs and data will be completed in a time-frame conducive to incorporation in the HMP. Also, in support of the HMP, the Dewberry Team will ensure damage and loss estimates are run for all standard HAZUS parameters to include General Building Stock (GBS) and Essential Facilities (EF) – two primary items included in an HMP. This dictates a certain level of parallel work between these two initiatives, which is described throughout this proposal. In addition, it is our belief that the project deliverables defined by the Agency are specifically designed to provide digital data and mapping products that may support a variety of flood hazard mitigation planning initiatives throughout the State to include (but not limited to) data dissemination to local jurisdictions and raising public awareness.

An initial Kick-off meeting will establish a common understanding of the project between our Team and the Agency- e.g., communication protocols, work practices, project schedule, deliverables, Quality Management Plan, etc. Thereafter, we will begin with transition from Phase I which requires that the HAZUS MR3 projects be converted to the current HAZUS release (Version 2.1). After the HAZUS projects have been converted, both a 500-year single-frequency and Average Annualized Loss (AAL) flood risk analyses will be performed. The HAZUS damage and loss results of these analyses will be converted to digital data and mapping products. Digital data products will include:

- Keyhole Markup Language (KML) files and Geographic Information System (GIS) files;
- HAZUS project Global Summary Reports and analysis log sheets for each HAZUS run will also be generated.

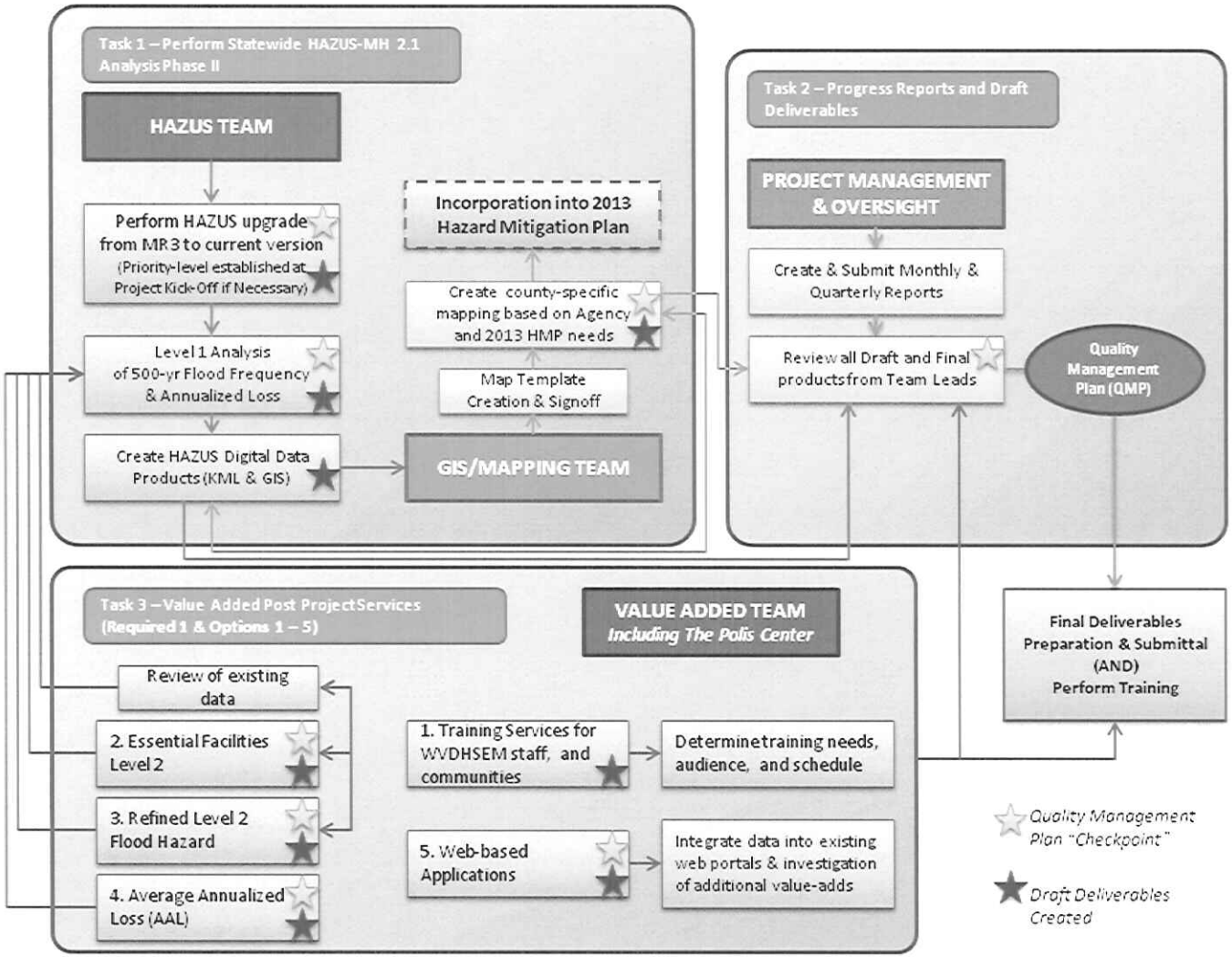
Digital mapping products will include:

- Maps of the 500-year and AAL losses at the county-level for each county in the State;
- Exported digital data and mapping products will be assembled and given to the Agency for distribution; these will include the updated HAZUS Version 2.1 HPR's that contain the new 500-year and AAL risk analyses.

Upon conclusion of the work performed, the Dewberry Team, which includes The Polis Center, will provide qualified training services to the Agency. The content of the training sessions will be determined through coordination with the Agency and will likely include explanation of the HAZUS program and the benefits of and potential uses for the project deliverables.

Our understanding of the project is displayed in the following chart -

Project Flow Chart & Diagram



7

Quality Management Plan (QMP)

Quality Management will be conducted in an integrated fashion throughout the project lifecycle. Integration will include both internal controls and specific checkpoints in which we will engage the Agency. It is our intent that the Agency is offered a review of our work at the ten-percent completion mark for any given task and/or specific work product. In addition, we will ask for Agency approval of the map template(s) developed before proceeding to map production.

We will ensure that all data development dependencies (predecessors and successors) are clearly identified and validation checkpoints are established. Internal validations will be resourced by skilled subject matter experts to ensure compliance with project standards.

To facilitate effective Quality Management, we will make sure all client standards are clearly codified; processes are established that enable compliance with client standards, and validation protocols are in place that facilitate early detection of non-compliant deliverables. This includes root cause analysis and subsequent best-practice development and associated process improvements.

Internal quality control will include the following:

- *Dependency Identification*: each interim product that precedes other work will be validated prior to the successive work task.

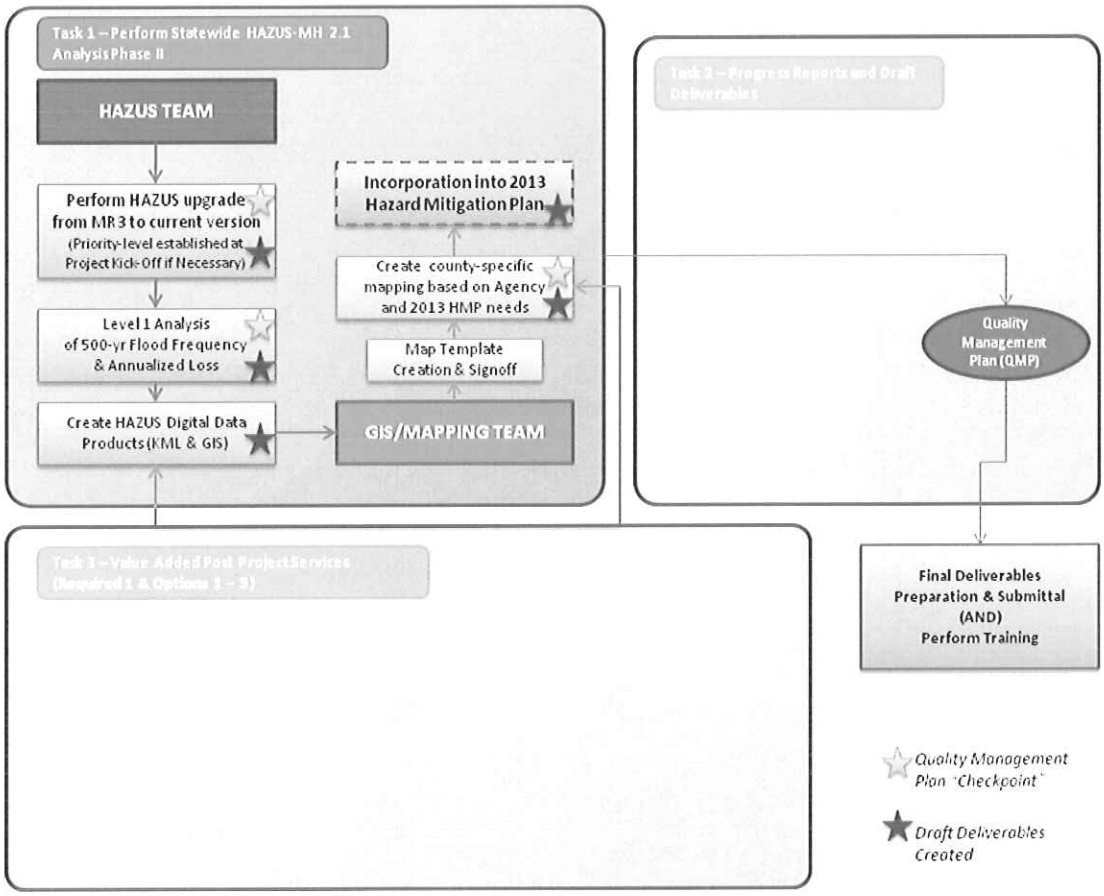
- *Validation Checkpoints Established*: where dependencies are identified, the Quality Manager along with Team Leaders will establish appropriate items to be validated and create documents that will be utilized to record quality verifications. For example, the conversion of the MR3 HPR files to Version 2.1 involves an iterative process; each iterative step will be back-checked against the MR3 project. This check would include validating loss values by census block for the frequencies previously completed under Phase I; namely the 10-, 25-, 50- and 100-year runs.

- *Qualified Reviewers*: Our Team Leaders have already been identified as professionals having both the necessary skills and knowledge to manage the project tasks. It is for this reason our QMP includes each of our Team Leaders performing the appropriate internal reviews along with the Quality Manager.

External quality control will include the following:

- *10% Checkpoints*: offering the Agency an opportunity to review all draft work products, the Project Manager, along with Team Leaders will engage Agency designees to verify that end products meet client standards and requirements before significant work has been completed. This will ensure that our processes are yielding compliant results and will give the client an opportunity to comment on a representative sampling of the final product early in the process. Agency designees will be identified at the Project Kick-Off Meeting.

Understanding by Task (Task 1 - Chart)



Task 1: Perform Statewide HAZUS-MH 2.1 Analysis Phase II

Perform HAZUS upgrade from MR3 to current version

It is understood that Phase I of the HAZUS Project includes 55 HAZUS projects; one HAZUS project for each county within the State created using HAZUS Version 1 – Maintenance Release 3 (MR3). Phase II requires the MR3 projects be converted to the current release of HAZUS or HAZUS Version 2.1. Dewberry expects to perform this task by incrementally moving the MR3 projects forward through an iterative process.

Dewberry will use all HAZUS patches previously released for the respective Maintenance Releases; for example MR4 - Patch 3 will be used and not just the core or major MR4 release.

As part of the conversion effort, Dewberry will work with the Agency to determine if there is a preference for prioritizing the order in which county project files are converted.

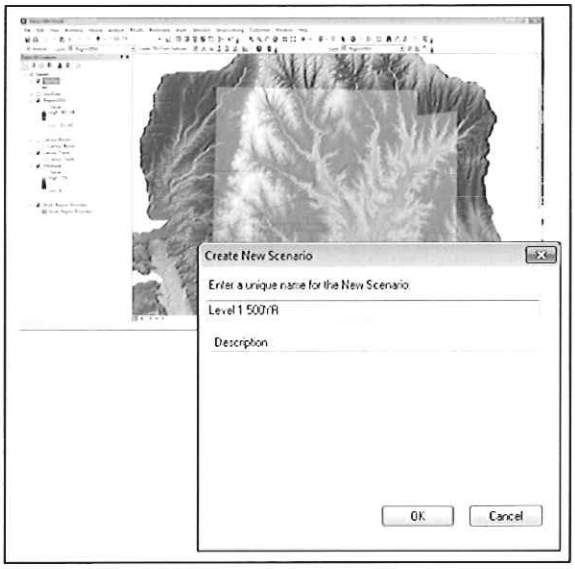
Sub-Task Deliverables:

- ✓ HAZUS HPR files in MH4, MH5, Version 2.0 & Version 2.1 for each county
  - *10% Agency Checkpoint* - Quality Control HPR files provided to the Agency for six counties. Internal QMP checklists will be packaged with the delivery.
    - NOTE: Version 2.1 HPR files in this delivery will NOT have the new scenarios for 500-year frequency runs and Annualized runs. This is a check to make sure the Agency is satisfied with the conversions.
    - If the conversion check is satisfactory, we will convert the remaining HPR files (49 Counties) which will be delivered in the final delivery package (see Task 2).

Level 1 Analysis of 500-year flood frequency

The Dewberry Team will complete Level 1 analysis of the 500-year flood frequency for each county. A new scenario for the 500-year frequency run will be created in each project and will be named consistent with the previous work performed under Phase I. Within the new scenario, Level 1 hydrology and hydraulics will be run using the 10 sq. mile stream threshold and the loss damage analysis will be run for all standard parameters to include:

- General Building Stock Damage and Loss
- Essential Facilities
- Transportation Systems
- Utility Systems
- Agricultural Products
- Vehicles
- Debris
- Direct Social Loss (Shelter)
- Indirect Economic Loss

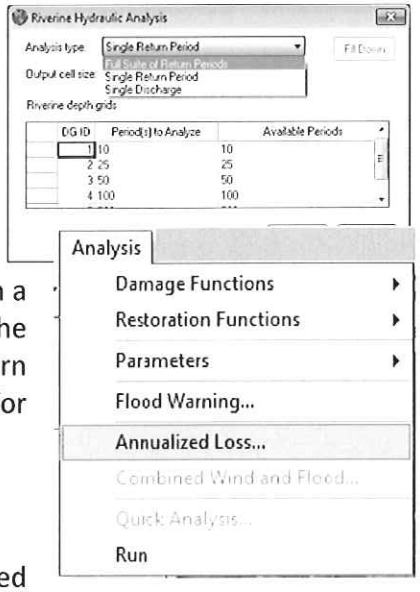


Sample: HAZUS views – adding a new scenario.

Sub-Task Deliverables:

- ✓ County-by-county HAZUS projects with a new 500-year frequency scenario run for standard damage and loss parameters
  - *10% Agency Checkpoint* - Quality Control HPR files provided to the Agency for six Counties. Internal QMP checklists will be packaged with the delivery.
    - NOTE: Version 2.1 HPR files in this delivery will include the new scenarios for 500-year and the Annualized Loss. This is a check to make sure the Agency is satisfied with the loss analyses.
    - If the analyses are satisfactory, we will move forward with the remaining counties which will be delivered in the final delivery package (see Task 2).

Level 1 Analysis of Annualized Loss or Average Annualized Loss (AAL)



The Dewberry Team will complete Level 1 annualized loss – also known as the Average Annualized Loss analysis to include the frequencies from Phase I (10-, 25-, 50- and 100-year) along with the new 500-year frequency from this Phase II project. This will be completed by importing each individual frequency depth grid into the HAZUS Project as a User-defined depth grid in a new scenario. Once the new scenario has been created the imported depth grids will be analyzed for the suite of return periods and finally the annualized loss option using the option for direct economic loss of buildings.

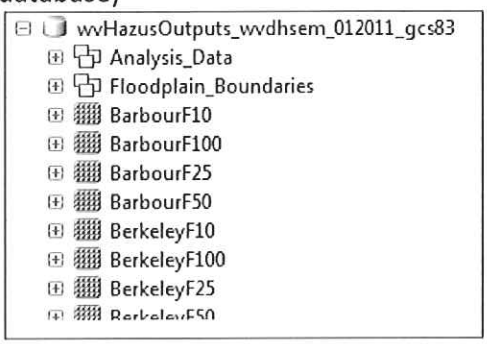
Sub-Task Deliverables:

- ✓ County-by-county HAZUS projects with a new Annualized Scenario run for direct economic loss of buildings
  - *10% Agency Checkpoint* - Quality Control HPR files provided to the Agency for six counties. Internal QMP checklists will be packaged with the delivery.
    - NOTE: Version 2.1 HPR files in this delivery will include the new scenarios for 500-year and the Annualized Loss. This is a check to make sure the Agency is satisfied with the loss analyses.
    - If the analyses are satisfactory, we will move forward with the remaining Counties which will be delivered in the final delivery package (see Task 2).

Digital Data Outputs (Various)

The Agency has specifically designed digital data products that will support a variety of flood hazard mitigation planning initiatives throughout the State. Our understanding is that these digital data products are meant to be exports of HAZUS damage and loss values produced in the following primary formats:

- Keyhole Markup Language (KML) files (i.e., files compatible with Google Earth)
- GIS files (e.g., Data loaded into ESRI ArcGIS File Geodatabase)
    - We are aware that the State has an ESRI ArcGIS File Geodatabase that includes exports of the Phase I results, floodplain boundaries and HAZUS depth grids. We will work with the Agency to identify if the same data files from Phase II are to be loaded in the same manner.



The data exported to both KML and GIS files will include the following items:

- 500 Year Frequency – Total Loss, Building Loss, Debris and Shelter Needs
- AAL – Total Average Annualized Loss

In addition to the primary KML and GIS digital files described above, and keeping_with Phase I efforts, Dewberry will provide the following items (examples provided below):

- HAZUS Level 1 Analysis Log Spreadsheets – we will edit a copy of the Excel Spreadsheets utilized to record Phase I HAZUS Process Log information. This will include edits in which we will add a row to capture pertinent observations during the 500-year and annualized scenarios.
- HAZUS Global Summary Reports (GSR) – we will export the GSR for each 500-year and Annualized Scenario created during Phase II

Please see next page for Samples of Analysis Log Spreadsheets and Global Summary Reports.

HAZUS LEVEL I ANALYSIS LOG
Marion COUNTY

Criteria and Assumptions:

1 County Level Study Region
2 10 Sq. Mile Drainage Area - Using USGS 10m DEM (dem 8040, dem 8140) - NAVD 88, Z Units in meter
3 Using ArcGIS 9.2 SP5 - HAZUS MH MR 3 PATCH 3

Event	Description	Observation Notes and Errors
	DEM Processing in HAZUS - User Data	dem 8040, dem 8140
100YR	Delineate Flood Plain	No Failed Reaches
10YR	Delineate Flood Plain	No Failed Reaches
25YR	Delineate Flood Plain	No Failed Reaches
50YR	Delineate Flood Plain	No Failed Reaches
500YR	To Be Determined...	To Be Determined...
ANN	To Be Determined...	To Be Determined...

Summary:

The analysis was completed without any failed reaches in any of the flow events

Sample: Analysis Log Spreadsheet showing additional rows for Phase II Scenarios.

HAZUS-MH: Flood Event Report

Region Name: Cecil500yr_MDHMP2011

Flood Scenario: DFIRM based 500yr

Print Date: Thursday, July 14, 2011

Disclaimer:

Tabular only refers data for those census tracts/blocks included in the user's study region

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social

Sample Cover Sheet of a Hazus Global Summary Report (GSR).

Sub-Task Deliverables:

- ✓ Keyhole Markup Language (KML) files and GIS files for the 500-Year and Annualized Scenario's of the following:
  - Total Loss
  - Total Building Loss
  - Total Debris
  - Total Shelter <Needs>
  - Annualized Loss

  Consistent with data needs of "WV Flood Tool" or Other Web Applications

- ✓ GIS update of Phase I Geodatabase files for the 500-Year and Annualized Scenarios:
  - Update attribution of the fields pertinent to the 500-Year and Annualized Scenarios in the attribute table of each county Feature Class
  - Addition of the 500-Year HAZUS floodplain polygons
  - Addition of the 500-Year HAZUS 10 meter depth grids

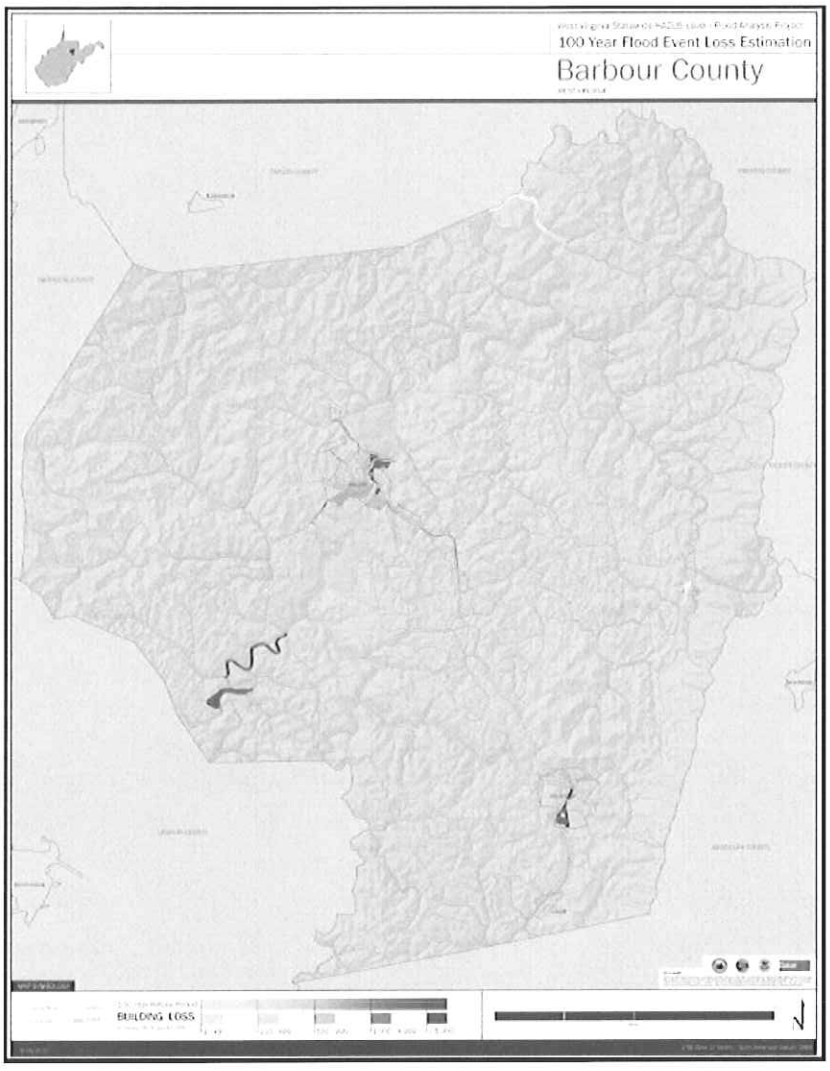
- ✓ HAZUS Process Log Excel Spreadsheets
  - Update of log sheets for the 500-Year and Annualized Scenarios

- ✓ HAZUS Global Summary Reports (GSR)
  - Export to PDF of the 500-Year and Annualized Scenarios for each county

NOTE: for each electronic data element noted above, a 10% Agency Chec***k***point delivery will be made. This checkpoint delivery will be accompanied by a meeting at approximately Week 6 (see Proposed Project Schedule) in which each of the deliverables will be demonstrated and/or viewed. If the Agency is satisfied with the outputs, we will move forward with the remaining counties which will be delivered in the final delivery package (see Task 2).

Mapped output in electronic format

Dewberry will produce electronic mapped results for the new 500-year frequency and the Annualized scenarios and will work with the Agency to ensure the maps meet the needs of the project. In addition, it is expected that mapped results will also be utilized for the 2013 HMP. Dewberry Team will also work with the Agency and the 2013 contractor to develop maps that will meet the needs of that project as well. To best meet the needs of both the Phase II HAZUS and HMP projects, the GIS Team will compile a list of base-map layers that are expected based on layers used for the Phase I mapping. The list will be submitted to the appropriate Agency representative as a mapping and data request. In the request, we will place a priority on the request for ArcGIS ArcMap Documents (*.mxd) and ArcGIS ArcMap templates (*.mxt) which would enable our Team to efficiently continue the work performed under Phase I. In the event such files are not available, Dewberry will request a copy of the Phase I digital map outputs and other State-owned or generated base map files so that we can create an appropriate ArcGIS ArcMap template.



Sample: Phase I mapping template

As part of our QMP, we will seek approval from the Agency for the map template and base map layers prior to proceeding with map production. We will also produce draft digital map outputs for review and comment. We anticipate the final mapped outputs will be produced in PDF format and will work with the Agency to determine if other formats are required.

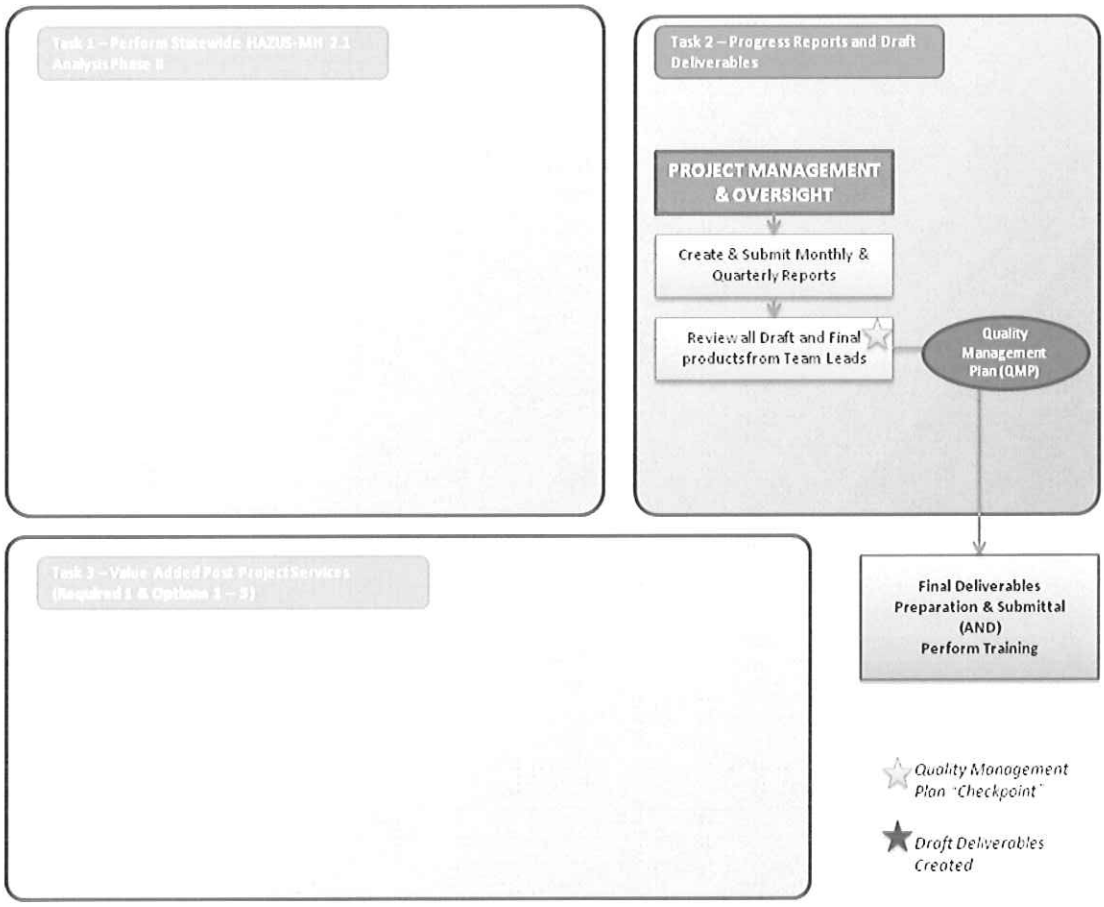
Sub-Task Deliverables:

- ✓ Mapping and Data Request
  - List of expected base-map layers
  - ArcMap Document Request (*.mxd)
  - ArcMap Template Request (*.mxt)
- ✓ Final Map Template and Data Approval
- ✓ Hazard Mitigation Plan Update Mapping Coordination
- ✓ 10% Agency Checkpoint - Quality Control Draft Digital Map PDF Files provided to the Agency for six counties. Internal QMP checklists will be packaged with the delivery.
  - NOTE: PDF files in this delivery will include the new scenarios for 500-year and the Annualized Loss. This is a check to make sure the Agency is satisfied with the mapping.
  - If the PDF maps are satisfactory, we will move forward with the remaining Counties which will be delivered in the final delivery package (see Task 2).

Export files to be relinquished for distribution

All export files will be relinquished to the Agency for distribution. Please see Task 2 – Final Deliverables Preparation for further discussion on delivery.

Understanding by Task (Task 2 Chart)



Task 2: Progress Reports and Draft Deliverables

Monthly Progress Reports

Dewberry will provide monthly progress reports to accompany invoices with detailed milestone accomplishments, deliverables, and task descriptions as directed by the Agency. We have experience with reporting to accommodate a variety of state, local and regional government needs and formats, as well as an experienced Project Manager who has federal and state accomplishment reporting experience.

Quarterly Progress Reports and Applicable Deliverable to FEMA Region III

We will prepare quarterly status reports and all applicable deliverables for FEMA Region III. Quarterly status reports will include milestone reporting, financial summary reports (where appropriate and applicable) and task updates in a timely fashion given the State's status requirements with the FEMA Regional Office.

We will make sure the Phase II HAZUS project work schedule aligns with the HMP update. Early lines of communication will ensure the HAZUS products (Phases I & II) are fully integrated into the 2013 HMP and are useful for local mitigation plan updates.

Final Deliverables Preparation

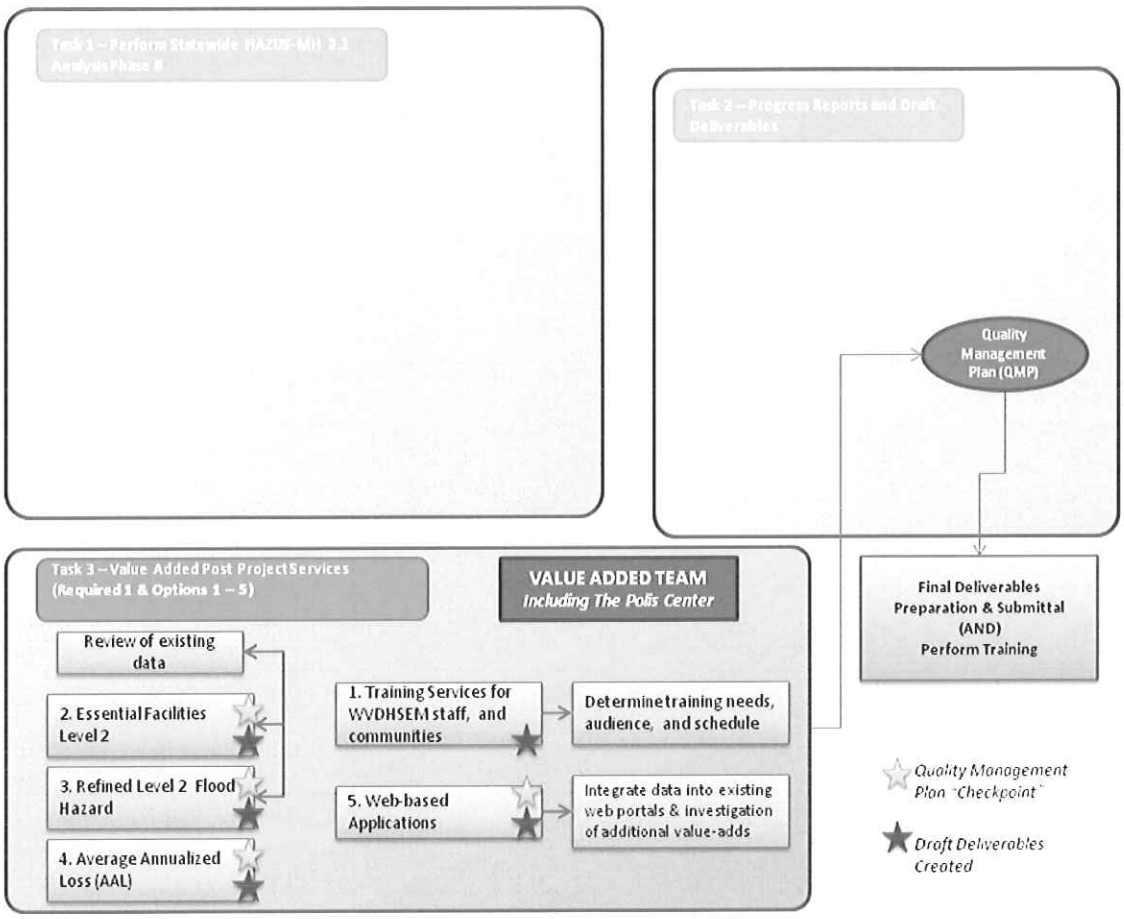
All draft and final deliverable materials, including export files, will be provided to the Agency, and where appropriate to FEMA Region III, in accordance with the EOI based on the final project schedule.

As previously explained, our Quality Management Plan (QMP) established 10% Agency Checkpoints within each Task 1 sub-task. In Task 2, we will assemble all of the Checkpoint data and maps along with all other files into a final delivery package. We will work with the Agency to define all package deliverables as required. In support of the Agency's intent to distribute the data throughout the State, we recognize and note that some thought and discussion on "How" the data is packaged may help increase the understanding and use by other state agencies and local communities. This may include packaging the data and maps by jurisdiction; for example, by county or possibly by Regional Planning & Development Council.

Task 2 Deliverables:

- ✓ Monthly Progress Reports to the Agency
- ✓ Quarterly Progress Reports and Applicable Deliverables to FEMA Region III
- ✓ Final Deliverables Preparation
  - o Based on agreed package needs and associated details

Understanding by Task (Task 3 Chart)



Task 3: Value Added Post Project Services

1. Training Services for the WVDHSEM staff, state agencies and communities

Ms. Deborah Mills, the Value-Added Services Team Lead will work in close coordination with The Polis Center in providing targeted training for the Agency staff that explains the results of this project's analysis and describes potential applications for the deliverables produced. In particular, the Team will describe how the project deliverables can be used to further the State's ongoing efforts to reduce flood loss, particularly repetitive and severe repetitive loss. The Team will also share ideas for integration of the HAZUS products into a variety of planning elements, including, but certainly not limited to the state and local Hazard Mitigation Plans. An agenda for the training will be developed in coordination with the Agency in order to customize the training components so that it provides the most value to the client.

In addition, our Team will also offer on-demand training sessions for communities and state agencies, geared to government personnel, particularly those involved with emergency and floodplain management. To achieve economies of scale, these 'user friendly' training sessions could potentially be offered at one or more of the eleven Regional Planning & Development

Councils (represented in the figure below) and be customized based on the particular needs of the attendees. The Team will work with the Agency and the local communities to determine what those needs may be allowing the trainings to be tailored to provide the most useful and informative content so that the project results are implemented into all aspects of local planning and disseminated to the widest audience possible.

Why The Polis Center? Subcontracting explained:

> *The Polis Center is unmatched in their HAZUS training experience. The Polis Center and its Education Director of Geospatial Technologies, Mr. Kevin Mickey (GISP, CTT+) is undoubtedly the premier partner to turn to when HAZUS training and education is required. As described in Section II – Qualifications of Staff, Mr. Mickey has been involved with testing, product improvement and official FEMA training of HAZUS for many years. Mr. Mickey has managed the development and maintenance of 10 HAZUS classroom courses and 16 virtual courses. The classroom courses are those offered at FEMA's national training center – the Emergency Management Institute (EMI) and many of the virtual courses he has authored are available through ESRI's Virtual Campus.*
>
> *It is for these reasons that we are proud to team with Mr. Mickey and The Polis Center in an effort to provide the Agency with the best training and instructional services available in the HAZUS world.*

Potential Value-Add:

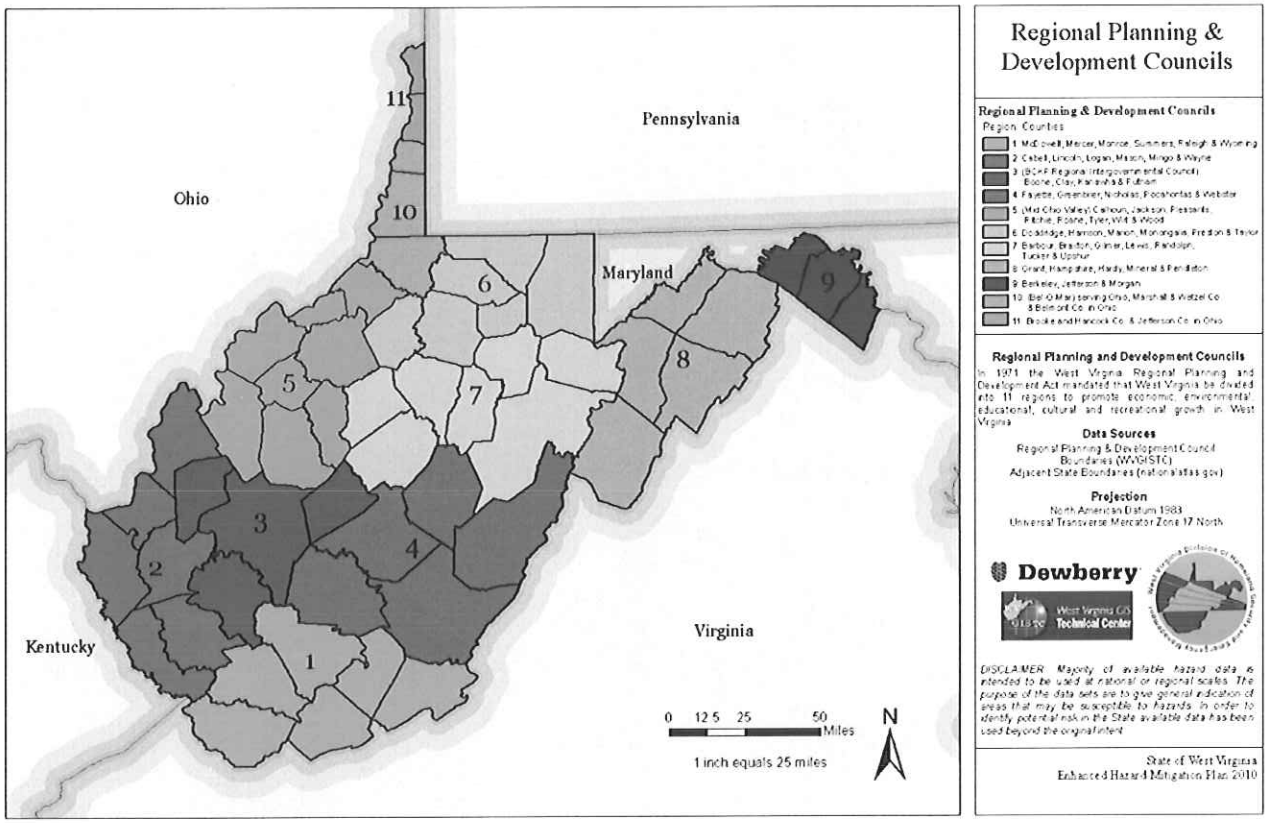
- ✓ Based on the training we provide, the client will have the best possible understanding of the final project deliverables and how they may be applied to all of the State's emergency and floodplain management planning, strategies and activities.
- ✓ Our team is experienced in developing training curriculums targeted to the end-users whose experience and technical sophistication levels vary widely. We will draw from this experience in developing on-demand training for communities and agencies.

Sub-Task Required Deliverables:

- ✓ Qualified training services for the Agency staff on the HAZUS deliverables to include training on the HAZUS program where necessary or applicable to the project deliverables.

Optional Value-Add Deliverables:

- ✓ Specific scope to be determined, but would include tailored training to communities who request it.
  - o We recommend scheduled training sessions at Regional Planning & Development Councils (see image below) so that the effort can be most efficiently scoped, planned, coordinated and scheduled.

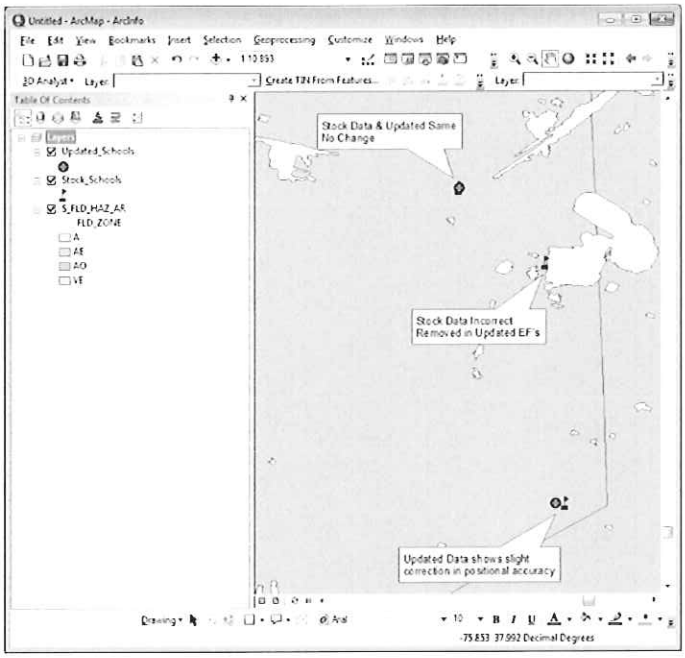


Sample: WV Regional and Planning Development Councils to be used as basis for organizing training, as needed.

2. *Level 2 Analysis of Essential Facilities(focus on Spatial Accuracy of Point Locations)*

A key element of hazard mitigation planning includes how essential facilities (EF) respond to natural disasters. First-responders are better able to perform their duties (response and recovery) if their facilities are less susceptible to natural disasters. One of the primary factors for EF's during flood events is their proximity to floodplains; the farther an EF is from a flood-prone area, in theory, the safer the facility. HAZUS comes pre-packaged with national-level data inventories of EF's and includes:

- Emergency Operation Centers
- Fire Stations
- Police Stations
- Medical Facilities
- Schools (assumed to be shelters)



Sample: Essential Facility data - Maryland Essential Facility Update Effort

While the HAZUS data inventories are known to be a reasonable starting-place for general risk analyses, HAZUS includes functionality that allows for update or replacement of these stock data resources. One of the most highly valued and common enhancements to HAZUS projects are to perform updates (or possibly full replacement) of the stock Essential Facility inventory.

Complete update or replacement of stock EF inventory for an entire state is no small effort. However, update of specific elements does allow for establishing attainable goals efficiently. One cost-effective approach is to update (at minimum and where possible) the spatial location of EF's. The Dewberry Team has demonstrated in our project references (please see Section I – Qualifications of Firm) that we have successfully performed such work. For example, the State of Maryland 2011 Hazard Mitigation Plan Update is a state-wide project that included updates to the spatial location and cost values of many EF's. This was accomplished by parsing through State-provided GIS databases of facilities and then conflating them with the data already included in HAZUS.

The Dewberry Team proposes a similar effort for this project and would request specific WV facilities data for review. Based on our review of that data, we could offer our assessment as to what EF data elements could potentially be updated and the level of effort for doing so.

Potential Value-Add:

- ✓ Potentially more accurate Essential Facility locations
- ✓ Updates to Essential Facility attributes (e.g., cost valuation data)
- ✓ Improved inventories would also feed a more accurate Hazard Mitigation Planning process in the following manner:
  - Facilities that may have previously been erroneously shown as located in floodplains would be removed from damage and loss results
  - Facilities that may have previously been erroneously shown outside of identified floodplains may require a second look for potential flood mitigation measures.
- ✓ When updated EF's are combined with refined flood hazard, a more accurate identification of risk and refined estimates of potential damages to EF's can be generated, as described below.

3. Level 2 HAZUS Analysis with Refined Flood Hazard Data

Floodplains and depth grids in HAZUS and other GIS-based methodologies use the stream threshold definition to create a digital stream layer. Generally accepted for planning purposes, the WV HAZUS Phase I and II projects use the 10 sq. mile drainage threshold. In contrast, FEMA Flood Insurance Studies (FIS) will often require drainage thresholds of 1-sq. mile as well as other advantages such as having been mapped on more accurate topographic data, far more accurate structure data, etc. Consequently, the Dewberry Team envisions the potential value-add of using data based on a more refined flood hazard.

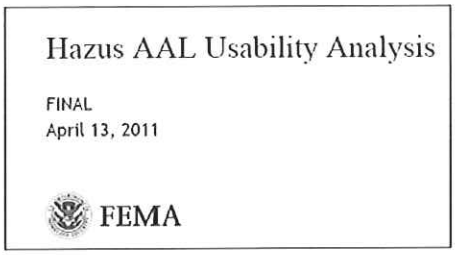
It is understood that the State has HEC-RAS depth grids available for display on the WV Flood Tool mapping web-site (http://www.mapwv.gov/flood/interactiveMap/). If the HEC-RAS depth grids (or other similar depth grids) were based on flood studies having greater refinements than the WV HAZUS Phase I and II projects, we suggest exploring their potential use as a value-added item.

The Dewberry Team has demonstrated the use of flood hazard data based on refined flood studies (please see Section I – Qualifications of Firm). Our staff resumes also demonstrate many projects in which we have created or used refined depth grids (please see Section II – Qualifications of Staff). The experience noted has helped our clients see and understand the relative cost and relative risk associated with refined HAZUS analyses.

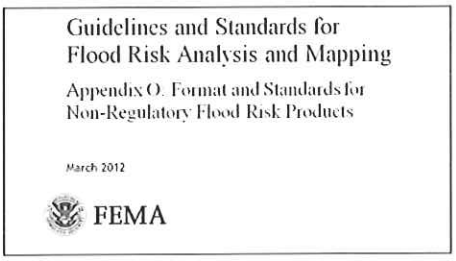
Potential Value-Add:

- ✓ Refined GBS and EF damage and loss estimates – assuming the HEC-RAS or other similar depth grids are usable.
    - NOTES:
        - We would need an opportunity to evaluate the HEC-RAS depth grids for inclusion and appropriate use
        - We will check with the Region III Regional Service Center (RSC) for any depth grids that may exist and evaluate their potential use
- ✓ Demonstration of relative risk given differing flood hazards applied within HAZUS
- ✓ Specifically related to the aforementioned value-add item of updating Essential Facility (EF) features, use of any refined depth grids (i.e., HEC-RAS depth grids) may enable analyses of EF performance - especially in the upper reaches of watersheds if refined depth grids are based on stream thresholds less than 10 sq. mile

4. Average Annualized Loss (AAL Value-add Element)



As a key partner on the Risk MAP Production and Technical Services (PTS) contract for FEMA Region III, Dewberry is responsible for providing various Risk MAP products to communities throughout the Region to help better communicate flood risk. This includes FEMA's Risk MAP Average Annualized Loss (AAL) study. We recognize the advantage that the State of WV HAZUS study has over the FEMA AAL study, particularly the differing DEM cell resolutions – FEMA's AAL utilized 30 meter DEM while the State of WV effort utilizes 10 meter DEM. We understand that the DEM refinement coupled with the appropriate annualized calculation adjustments that have been incorporated in the release of HAZUS Version 2.1 means that the State's efforts are a refinement of the FEMA AAL Study.



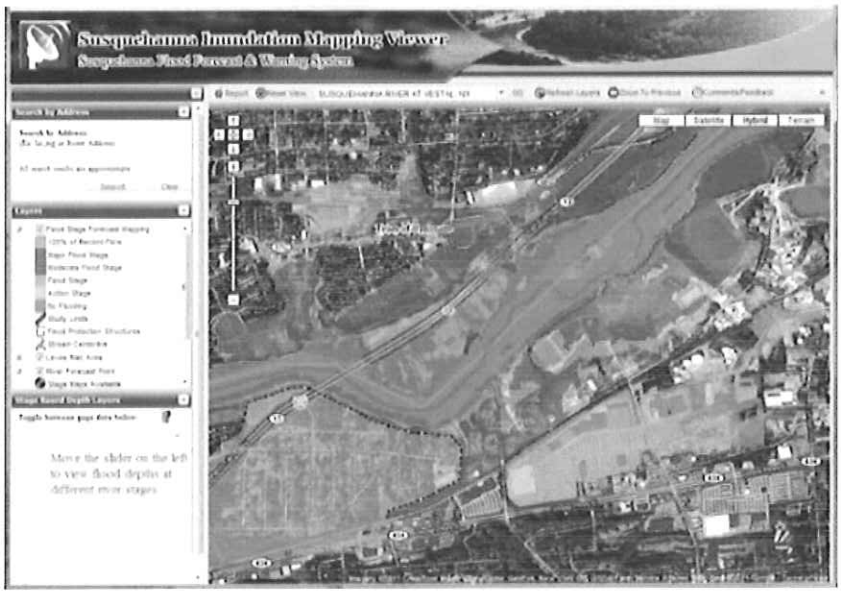
Consequently, as the FEMA Region III PTS contractor, we are uniquely positioned to help coordinate delivery of the WV HAZUS Phase I and II data as part of any Risk MAP products generated by FEMA. Because the Dewberry Team includes staff that are actively participating in the development of FEMA Guidelines and Standards (Appendix O) for Risk MAP products, we understand the process required to incorporate the WV data sets into the standard FEMA Risk MAP product format. Such an effort could be seen as a valuable enhancement to the compatibility of the WV HAZUS Projects and promote usability for associated State, FEMA Region III, and FEMA Headquarters initiatives.

Potential Value-Add:

- ✓ Refined GBS loss estimates provided in appropriate Flood Risk Database format as defined in Draft Appendix O
- ✓ Economies of scale and usability of flood loss data at multiple levels of jurisdiction within the National Flood Insurance Program (NFIP)

5. Web-based Value-Adds

Our team includes Mohan Rajasekar, an experienced web developer with a significant portfolio of web viewers and tools designed to serve flood risk data and mapping in an easy-to-use and simple to understand way. Recent projects include a sea level rise viewer for Virginia SeaGrant and a Susquehanna Inundation Mapping Viewer for the Susquehanna River Basin Commission (SRBC). We will work with WVDHSEM to determine the best solution within the State's budget for presenting the project's results and mapping to the widest possible audience. This could include leveraging open-source tools including Google Fusion tables as a means of disseminating loss data to locals online. We will work with the State to identify the best delivery mechanism for this data, which may include incorporation of the project deliverables into the existing State web platforms such as the WV Flood Tool. Please see http://www.mapwv.gov/flood/interactiveMap.



Sample: Inundation Mapping Viewer Dewberry developed for the SRBC.

Potential Value-Add:

- ✓ Crisp, easy-to-use online options for viewing Phase II HAZUS loss results and mapping
- ✓ Coordination between this effort and existing State web portals to ease integration
- ✓ Our solutions offer the client a way to efficiently distribute the Phase II results to the largest possible audience.

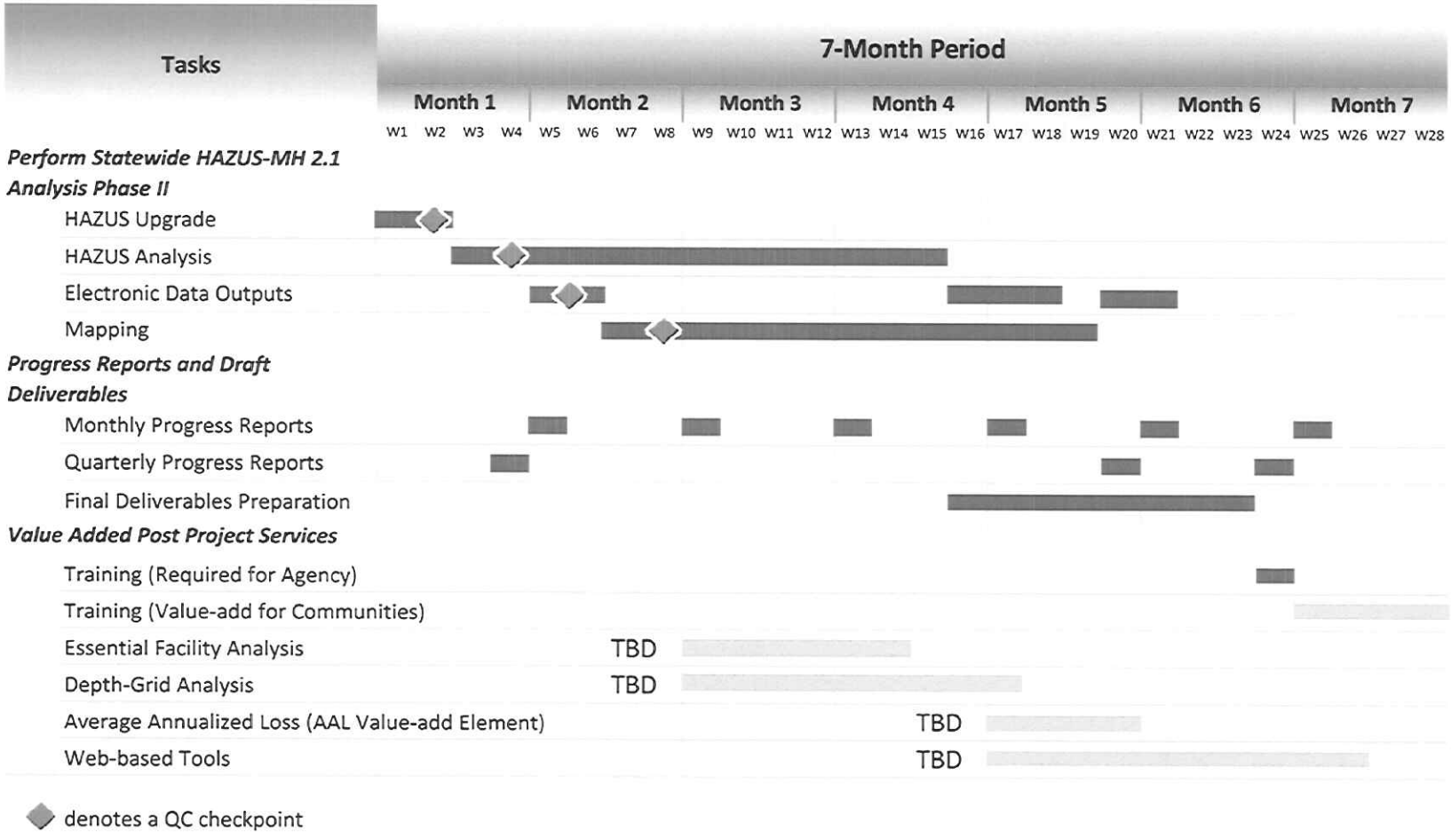
Proposed Project Schedule

The following proposed schedule is based on an estimated 28-week project effort from the Notice To Proceed. Inclusion of the proposed value-added services could potentially extend the overall project schedule. Dewberry is confident that all electronic deliverables will be completed in a timeframe that will enable incorporation into the *West Virginia State All-Hazards Mitigation Plan* 2013 Update. An estimated timeline for each task noted in *Section 3.0 Project Understanding and Approach* is presented below. A final project schedule can be determined once the Agency decides which, if any, of the value-added services proposed here it would like to include.

The Dewberry Team anticipates the following meetings:

- **Notice To Proceed Kick-off Meeting -** Kick-off meeting focusing on establish a common understanding of the project - e.g., communication protocols, work practices, project schedule, deliverables, Quality Management Plan, etc.

  Approximately Week 6 - Quality Control meeting centered on certain electronic deliverables; KML files, AAL, GIS files, Excel Logs and Global Summary Reports. In addition, the meeting would be the time to solidify data and mapping requirements as result of the data and mapping request. Lastly, to discuss the integration of Phase II results with the 2013 Hazard Mitigation Plan Update.


Tasks
7-Month Period
Month 1
Month 2
Month 3
Month 4
Month 5
Month 6
Month 7
W1 W2 W3 W4 W5 W6 W7 W8 W9 W10 W11 W12 W13 W14 W15 W16 W17 W18 W19 W20 W21 W22 W23 W24 W25 W26 W27 W28
Perform Statewide HAZUS-MH 2.1
Analysis Phase II
HAZUS Upgrade
HAZUS Analysis
Electronic Data Outputs
Mapping
Progress Reports and Draft
Deliverables
Monthly Progress Reports
Quarterly Progress Reports
Final Deliverables Preparation
Value Added Post Project Services
Training (Required for Agency)
Training (Value-add for Communities)
Essential Facility Analysis
TBD
Depth-Grid Analysis
TBD
Average Annualized Loss (AAL Value-add Element)
TBD
Web-based Tools
TBD
denotes a QC checkpoint