

October 4, 2022

Mr. Clint Hodges
Chief/Director
Effingham County Emergency Management
804 S Laurel Street
Springfield, GA 31329

Re: Request for Quotation #23-RFQ-010, Hazard Mitigation Plan Update

Dear Chief Hodges:

Weston & Sampson is pleased to submit our quotation package for the update of Effingham County's 2017-2022 Hazard Mitigation Plan. With more than 725 staff in offices from New England to Florida, and an office nearby in Charleston, South Carolina, Weston & Sampson has the capabilities to meet all your project needs. Our qualifications and capabilities that distinguish us include:

A PROVEN TRACK RECORD IN CLIMATE RESILIENCY. Weston & Sampson's climate resiliency services support the development of actionable plans for a community to **adapt, survive,** and **thrive** both chronic and catastrophic changes in the natural environment. Since 1899, Weston & Sampson has been providing local governments and public agencies along the East Coast with cost-effective and innovative solutions to their infrastructure and environmental challenges. Our climate resilience practice provides several interdependent services, including, Risk and Vulnerability Assessments, Planning, Climate Modeling Design Guidelines, Public Engagement, Design and Adaptation, and Mitigation and Sustainability. Weston & Sampson's interdisciplinary team of engineers, scientists, climate specialists, architects, landscape architects, designers, and planners incorporate relevant climate models and data into the design of our infrastructure and facility projects. We work with our governmental (municipal and state) clients to study, plan, and implement resilient and cost-effective strategies for their infrastructure, buildings, and natural resources.



HAZARD MITIGATION PLANNING. Weston & Sampson has a solid background in a range of hazard mitigation planning for local and state governments. We are passionate about helping our clients, and our mission is to **“protect, improve and sustain the natural and built environment to enhance the quality of life.”** Weston & Sampson has worked on urban and rural planning projects throughout the east coast. We pride ourselves on offering our clients solutions that win the support of residents by incorporating best management practices, while enhancing a community's character, within budget and on schedule.

CREATIVE AND COMPREHENSIVE PROBLEM SOLVING. Every day, our award-winning team is working creatively to solve complex issues with our partner communities. At Weston & Sampson, we excel at listening, researching, and responding to pressing needs with flexible, adaptive, and practical thinking. We continuously foster collaborative engagement to ensure that a robust set of solutions are considered and vetted. This project sits at the *intersect* of climate resilience, emergency management and land use planning. We recognize that this project brings an opportunity to expand and advance the County's hazard management strategies to save lives, protect property and the natural environment.

MINDING YOUR BUDGET. Weston & Sampson has consistently remained at the forefront of obtaining available funding from federal, regional, state, and local sources to expand the scope of projects for our municipal clients. We are often able to assist clients in procuring funding from a combination of state and federal sources.

EXPERIENCED STAFF. Our staff is experienced with **FEMA's updated requirements** for Local Hazard Mitigation Plans and delivers comprehensive capacity for the full range of potential services—resiliency analysis, vulnerability assessment, transportation planning, land use planning, modeling, design, construction inspection, and contract administration—Weston & Sampson believes that we are the best fit for Effingham County.

Weston & Sampson appreciates the opportunity to provide our quotation to Effingham County, and we look forward to supporting your HMP needs. Please contact Jeannie Lewis by phone at 912.996.3881(cell) / 843.790.0580 (office) or by email at Lewis.Jeannie@wseinc.com for additional information. We look forward to your favorable evaluation of our qualifications.

Sincerely,

Kipling R. Gearhart, PE
Regional Manager | Authorized Signatory

Updated FEMA Considerations
Community Resilience

EFFINGHAM COUNTY HAZARD MITIGATION PLAN

- Equitable Community Participation
- Critical Asset Inventory
- Risk and Capability Assessment
- Climate Change
- Community Lifelines
- Compliance with NFIP
- Building Codes Land Use Planning
- Natural Systems Protection
- Actionable Mitigation Strategies

PROJECT APPROACH

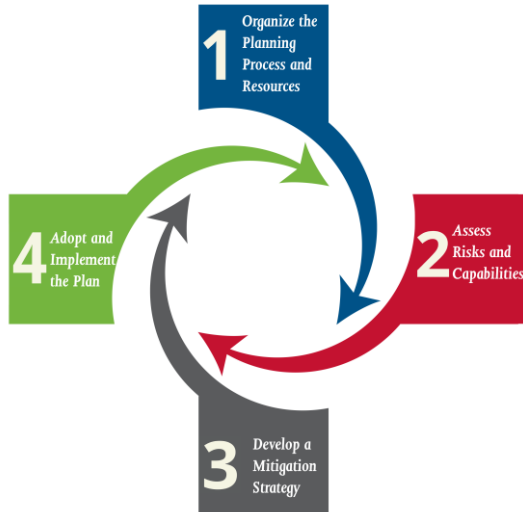


Figure 1: FEMA Local Hazard Mitigation Process

Task 1- Project Management and Coordination with Effingham County Emergency Management Agency and Hazard Mitigation Plan (HMP) Committee

Weston & Sampson will work with you to create a Hazard Mitigation Plan that works effectively for your community now and into the foreseeable future. Our team will support Effingham County and the HMP Committee throughout the project and the plan will fulfill requirements of GEMA and FEMA and comply with the requirements set forth in the Disaster Mitigation Act of 2000.

The HMP Committee is central to the success of the plan and membership will continue to include County and municipal staff from Springfield, Guyton, and Rincon, community leaders, residents, businesses, as

well as community-based organizations in support of equitable outcomes for historically underserved and socially vulnerable residents. The Weston & Sampson project team will hold a kick-off meeting with the HMP Committee and provide meeting materials, facilitation, and technical assistance to guide participation in the planning process. Our team will work with the multi-jurisdictional HMP Committee to:

- Develop a mission statement as well as review goals and roles for the planning process.
- Develop a detailed schedule and set of milestones to achieve the HMP.
- Facilitate four Hazard Mitigation Planning Committee meetings:
 - Two will be community public meetings during the planning process.
 - One will be a meeting held during the production of the plan.
 - One will be a meeting held during the review of the draft HMP plan.
 - We are prepared to hold additional meetings if needed, at cost.
- Prepare meeting materials and meeting notes that document discussions and decisions.
- Provide documentation for all in-kind services and regularly provide status of in-kind match.
- Prepare quarterly grant reports, invoices for services, and GEMA payment request forms.
- Establish and implement a local outreach communication strategy to gather input from the community and stakeholders. Specifically, the outreach strategy will target groups in the community including businesses, non-profit organizations, local or regional institutions, schools and universities, residents, and neighboring communities. We propose that the outreach plan include:
 - News releases for the County website, social media, and cable access to be issued by the County to announce formation of the HMP Committee, at draft publication of the HMP, at posting of online surveys, and to announce the public meetings.

- Development of an online survey to encourage input from the public on critical facilities/community lifelines, risks/vulnerabilities, mitigation goals, and appropriate actions for the HMP.
- Identify and provide input/recommendations regarding the feasibility and prioritization of mitigation measures.
- Prepare a draft HMP update that is structured to clearly communicate the plan's goals and elements with meeting-derived and committee provided information.
- Be responsible for sharing the draft plan for comments including implementation, maintenance, and revision of the plan as it is reviewed.

As part of the project kickoff meeting, we will review the existing Hazard Mitigation Plan and will work with the County to determine appropriate sources for data needs for tasks 2 – 9, which include but are not limited to Effingham County's history, demographics, and past storm events. If practicable, we request that data be provided to us at or before the kickoff meeting to expedite project work and development of the HMP.

Task 1 Deliverables: Mission Statement, Detailed Schedule with Milestones, Meeting Facilitation with Minutes, Local Outreach Communication Strategy with news releases and online survey, Draft HMP Update and Summary of Comments.

Task 2 – Creation of Hazard Profiles

Using the best available existing data from public sources such as the county, state and federal government, Weston & Sampson will create hazard profiles and mapping of areas affected by multiple natural hazards for the County. We will include a set of hazard maps as part of the HMP. The GIS (Geographic Information System) files used to create the maps will be provided to the County for integration with other community plans.

The HMP maps will be the basis for the community's known hazards. The hazard identification will include an assessment of Effingham County's vulnerability to hazards based on the location, extent, probability, and severity of the hazards. Weston & Sampson will perform a vulnerability analysis. The vulnerability analysis may be developed using FEMA's HAZUS–MH and a GIS map analysis to delineate those critical facilities that are located within mapped hazard areas. Working with the County and the HMP Committee, we will provide a description and prioritization of the natural hazards that have occurred within the community.

Task 2 Deliverables: Hazard Profile Write-ups and Map(s), GIS shapefile(s).

Task 3 –Critical Facility Inventory

Weston & Sampson will update the inventory of critical facilities in Excel and create a GIS map that explains how these facilities intersect with the known hazards for the community. To develop the inventory, we will use input from the community and the best available local and state information. The inventory will be finalized in collaboration with the County's HMP Committee.

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We will also update known repetitive flood loss structures and structures that have incurred substantial damage as defined by FEMA; repetitive loss data will be provided by Effingham County. We will analyze these structures by type, number, and general location as they relate to the known hazard areas. Weston & Sampson will compile an existing conditions land use map as well as an anticipated future land use map from data provided by the County that depicts the location of developed land uses, delineated by categories based on use (e.g., residential, commercial, industrial, institutional, other public use, etc.) and where they intersect with hazards.

Critical Facilities
<ul style="list-style-type: none">• Government Center/Municipal Offices• Fire Stations• Police Stations• Emergency Operations Centers• Schools (Public and Private, Including Universities/Colleges)• Senior Center• Water Treatment Plant• Wastewater Treatment Plant• Sewage Pumping Stations• Satellite Municipal Buildings• Hospitals• Day-Care Facilities• Public Works Highway Yard / Satellite Facilities• Nursing Homes/Elderly Housing• Emergency Shelters

Task 3 Deliverables: Spreadsheet of updated critical assets, land-use maps, and a GIS shapefile with geolocated assets.

Task 4 – Risk Assessment / Hazard Vulnerability

Based on the data collected and process, Weston & Sampson will assess risks and develop an overview of each of the specific hazards and the County’s vulnerability to those specific hazards for review by the HMP Committee. This assessment shall include:

- Types and numbers of buildings, infrastructure, and critical facilities located in the hazard areas.
- Existing multiple hazard protection measures within the County, including protective measures under the National Flood Insurance Program (NFIP).
- A description of each measure, the method of enforcement, and/or the point of contact responsible for implementation of each measure.
- Historical performance of each measure and a description of improvements or changes needed.
- General description of land uses and development trends to incorporate future land use decisions.

Once the overview is developed, we will provide it to the HMP Committee for review and comment. We have budgeted for two rounds of comments from the HMP Committee.

Task 4 Deliverables: Risk assessments provided in draft HMP for review and comment.

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Task 5 – Mitigation Strategies with Prioritized Actions

In collaboration with the HMP Committee, Weston & Sampson will develop updated mitigation strategies specific to each community exposure to, and impacts from, identified natural hazards. The strategy will include a list of mitigation goals and objective statements that focus on reducing the risks from the identified natural hazards, and updates to existing measures will be specifically noted. This will include a capability assessment and incorporate a review of existing building codes and land use regulations, compliance with the National Flood Insurance Program (NFIP), and the ability to expand upon and improve mitigation capabilities.

Actions and projects will include both existing and planned projects to reduce the effects of each hazard, with particular emphasis on buildings and infrastructure and limiting risk to new development and redevelopment. The written analysis will include a list of *prioritized* cost-effective hazard mitigation projects that best meet the County’s needs for multiple hazard damage reduction. We understand that the projects may include structural solutions (e.g., culverts, dams, dikes), nature-based and natural systems protection (e.g., green infrastructure, floodplain protection, conservation) and nonstructural solutions (e.g., planning, regulatory measures, education and awareness, property acquisition, retrofitting, and elevation). The prioritized projects will account for economic considerations (including benefits and costs), engineering, technical, legal, environmental, and social feasibility. Weston & Sampson will coordinate with relevant local, state, and federal agencies for input and technical assistance (e.g., neighboring jurisdictions, GA Coastal Program, Coastal Regional Commission, Sea Grant/Marine Extension, GDOT, GEMA, FEMA).

MUNICIPALITY	HMP-MVPs		
	HMP	Successful Grant Support	Year
Ashby, MA	X		2020-2021
Attleborough, MA	X		2020-2021
Avon, MA	X		2020-2021
Belmont, MA	X	X	2020-2021
Boston, MA	X		2020-2021
Fitchburg, MA	X	X	2020-2021
Egremont, MA	X		Ongoing
Granville, MA	X		2021
Groton, MA	X		2020-2021
Hopkinton, MA	X		2020
Lowell, MA	X	X	2020-2021
Middleton, MA	X		2020-2021
Richmond	X		2020-2021
Stoneham, MA	X		2020-2021
Tewksbury, MA	X	X	2020
Townsend, MA	X		2020
Tyngsborough, MA	X		2020
Waltham, MA	X	X	2020
Wenham, MA	X	X	2019
Wilbraham, MA	X		2021
Winchester, MA	X		2020
Winchendon, MA	X		2020-2021

Figure 2: Recent Weston & Sampson Hazard Mitigation Plans

Task 5 Deliverables: Updated Mitigation Strategies, Capabilities Assessment and Prioritized Actions in draft HMP for review and comment.

Task 6 – Plan Maintenance

Weston & Sampson will develop short-term and long-term recommendations in collaboration with the HMP Committee as part of the plan to ensure it remains a current document and becomes embedded into Effingham County’s procedure/processes and policies. We will also develop a general monitoring schedule with procedures for ensuring the plan’s implementation, update, and revision every five years. The procedure for updating the HMP will be provided as a narrative and included as a section of your HMP. We will provide the short- and long-term recommendations in a tabular form that includes

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a row for each recommendation and columns for responsible lead entity, other participants, approximate implementation cost, schedule, and other implementation challenges.

Task 7 – Public Review of the Draft Plan

Weston & Sampson will work in collaboration with the County and the HMP Committee to post the Draft HMP for public comment on the County’s website. After the comment period, we will work with the HMP Committee to finalize the draft plan and submit it to GEMA/FEMA for review. We have budgeted for one round of HMP Committee comments with revisions as needed prior to submission to GEMA/FEMA.

Task 7 Deliverables: Draft Plan for public comment.



Figure 3: HMP Maintenance

Weston & Sampson will work with the HMP Committee to revise the draft plan based on GEMA/FEMA comments and submit the revised plan for approval pending adoption. After approval from GEMA/FEMA is received, we will work with the HMP Committee to submit the plan to the County Board of Commissioners for adoption. We understand that the County will send the final adopted plan to GEMA/FEMA.

Task 8 Deliverables: HMP for GEMA/FEMA review (2 printed copies and 2 digital copies by the agreed-upon deadline; Finalized HMP (9 printed copies and 10 digital copies) to Effingham County.

PROPOSED ENGINEERING FEES:

The estimated lump-sum fee for Tasks 1.0 through 8.0 as described herein is:\$19,500.00

PROPOSED SCHEDULE

Weston & Sampson is prepared to begin work on this assignment upon receipt of written authorization and will work with Effingham County to determine an agreed-upon project schedule.

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BACKGROUND

2013 - Present
Vice President | Regional Manager
Weston & Sampson

2010 - 2013
Senior Associate | Program
Manager
Weston & Sampson

2004 - 2010
Principal
HEG, LLC

1997 - 2004
Director of Design & Construction
Charleston Commissioners of
Public Works

1989 - 1997
Engineering Manager
Charleston Commissioners of
Public Works

1986 - 1989
Associate Engineer
Charleston Commissioners of
Public Works

1985 - 1986
Associate Engineer
Nivens Engineering, Inc.

EDUCATION

1985
Bachelor of Science
Civil Engineering
The Citadel

1982
Bachelor of Science
Biology
The Citadel

PROFESSIONAL REGISTRATION

Professional Engineer:
South Carolina No.13416
North Carolina No.032786
Georgia No.034969
Ohio No.75111

Certified Erosion Prevention &
Sediment Control Inspector, 0568

Bob has more than 30 years of engineering design and leadership experience. He has an in-depth understanding of the public works industry, having worked for 18 years as Engineer, Engineering Manager, and Director of Design and Construction for the Charleston Commissioners of Public Works. Bob has extensive experience with the conceptual development and detailed designs for large public works projects, including public relations, easement acquisitions, community impact mitigation, and public acceptance. His project experience includes facility master planning and expansion, stormwater management, water transmission and distribution, wastewater collection and pumping, water and wastewater system rehabilitation, roads, bridges and drainage.



A civil engineering graduate of The Citadel, Bob develops and coordinates practical and economical solutions for complex engineering problems. His approach to all projects includes team building and a determination to see projects beyond completion and into the operational phase.

SPECIFIC PROJECT EXPERIENCE

Bay Street Pump Station Rehabilitation, Beaufort-Jasper Water & Sewer Authority, Beaufort, South Carolina. Principal-in-charge for the overall plans, specifications, construction administration and inspections for rehabilitation of all pumping, piping, equipment and electrical for a 0.5-mgd wastewater pump station located in the Beaufort Waterfront Park.

Laurens Street Pump Station Rehabilitation, Beaufort-Jasper Water & Sewer Authority, Beaufort, South Carolina. Principal-in-charge for the overall plans, specifications, bidding, construction administration and inspections for replacing all equipment and electrical for a 0.6-mgd wastewater pump station located in Beaufort, South Carolina.

Duke Street Pump Station Rehabilitation, Beaufort-Jasper Water & Sewer Authority, Beaufort, South Carolina. Principal-in-charge for the overall plans, specifications, bidding, construction administration and inspections for replacing all equipment and electrical for a 0.8-mgd wastewater pump station located in Beaufort, South Carolina.

CDBG Water Main Extensions, Ridgeville, South Carolina. Project manager for water main extensions within the Town of Ridgeville to improve water service and fire protection. Work included the design of various sizes and lengths of water mains to provide improvements to service and fire protection. Coordinated with the town Fire Department, SCDHEC, Ocean & Coastal Resource Management, SCDOT, and the county.

Stuart Point Well and Public Water System, Beaufort, South Carolina. Principal-in-charge for the permitting of a test well to determine water quality and production rates for a new public water supply in Beaufort County. The test well was successfully installed and converted to a production well. Responsibilities included design, permitting, inspections, and project close-out.

PUBLICATIONS

Horner, R., Lewis J.,
Burnette, J. (Second Quarter 2022)
A Readiness Guide to Applying for
and Securing SRF Infrastructure
Funding - *South Carolina AWWA
Journal*

Well Installation, Dorchester County Water & Sewer, Ridgeville, South Carolina.

Principal-in-charge for the installation of a 20-inch well for the DCWS system in the Ridgeville area. Responsibilities included assistance with design, permitting and construction administration. Oversaw installation of the 600-gpm well, which uses 75-horsepower pumps, to a depth of just below 500 feet.

Inland Port Facility Road Reconstruction, Dillon County, South Carolina.

Project Manager for SCDOT design for the Access Road for the new Dillon Inland Port Facility. The new Access Road connects the recently completed Phase 1 Road to Harbor Freight Tools with Fairfield Road, and serves for container movement from the Port facility to I-95.

Public Works Indefinite Delivery Contract, Berkeley County, South Carolina.

Principal-in-charge for this IDIQ to provide surveying, design, traffic, geotechnical, permitting, construction administration and inspection services for various road, drainage, and infrastructure-related projects. Assignments include intersection improvements located in the City of Hanahan on Yeamans Hall Road, including improvements to turn lanes, traffic signals, sidewalks, drainage, and pedestrian safety and accessibility.

Church Creek Drainage Study, Charleston, South Carolina.

Principal-in-charge for a flood reduction study for the Church Creek Drainage Basin—an area prone to flooding of increasing severity and frequency. Work included evaluating past study recommendations, upgrading the hydraulic model to ICPR4, directing over 14 outreach meetings, and developing seven initiatives to fix the flooding problems. Used a new modeling approach to identify trouble areas, and provided innovative solutions for flooding issues. Upon completion, the project was publicly recognized by the City of Charleston for its resolution of a centuries-old flooding problem.

Charleston National Country Club Drainage Improvements, Mt Pleasant, South Carolina.

Project manager working with the Charleston National Country Club and the Charleston National Owners' Association to study drainage for the area. Developing ways to improve sustainability, reduce saltwater intrusion into the stormwater and irrigation system, and confirm drainage capacity for significant storm and tidal events. Coordinating with the town's Stormwater Division and other regulatory entities.

West Ashley Park, Charleston, South Carolina.

Principal-in-charge for the planning and design of water and wastewater facilities for a 133-acre site that includes nature trails, four soccer fields, four baseball diamonds, interpretive structures, a brackish water lake, and wetland areas.

West Ashley Greenway Utility and Trail Corridor, West Ashley, South Carolina.

Coordinated with landscape architects to determine utility accommodation and planning to ensure that SCE&G, City of Charleston, and Charleston Water System improvements were coordinated with this project to convert an abandoned ACL Railroad right-of-way into a linear park and trail, including a 5-mile (approx.) paved bike trail.

Joe Riley Baseball Park, Charleston, South Carolina.

Oversaw design of water and wastewater facilities to accommodate peak flows during special events, as well as irrigation, for the Joe Riley Park, a minor league baseball park and home to the Charleston Riverdogs team.

BACKGROUND

2020-Present
Team Leader
Weston & Sampson

2017-2020
Senior Project Manager
Weston & Sampson

2014-2017
Principal Scientist
ESS Group

2008-2014
Senior Project Manager
Fuss & O'Neill Engineering
Consultants

2005-2008
Project Manager
Fuss & O'Neill Engineering
Consultants

1999-2005
Principal Environmental Scientist
Rhode Island Department of
Environmental Management

1994-1999
Senior Environmental Planner
Rhode Island Department of
Environmental Management

1993-1994
Environmental Planner
Rhode Island Department of
Environmental Management

EDUCATION

1993
Master of Urban Planning
Environmental Planning
New York University

1989
Bachelor of Science
Psychology
University of Lowell

PROFESSIONAL REGISTRATION

Certified Planner with the American
Institute of Certified Planners (AICP)

LEED® Accredited Professional
Municipal Vulnerability
Preparedness (MVP) Certified
Provider

Jim is the team leader of Weston & Sampson's Urban and Environmental Planning Group. He brings over 25 years of experience in urban planning and environmental management. He has directed state and federal programs for the improved management of nonpoint source pollution, decentralized wastewater, stormwater, wetlands, and habitat resources. Jim's background in science, planning, public health, and psychology uniquely positions him to analyze complex problems, engender stakeholder support, and implement powerful solutions. He is a trained facilitator, LEED® Accredited Professional, and AICP certified, as well as a recipient of USEPA's Environmental Merit Award (2005). Jim currently serves as the Immediate-Past President of the American Planning Association (APA) Rhode Island Chapter, Chair of the APA Environment, Natural Resources, and Energy Division, and as a representative to the Rhode Island State Planning Council.



SPECIFIC PROJECT EXPERIENCE

Emergency Operations Plan, Narragansett, Rhode Island. Project manager for the update of the Emergency Operations Plan for the Town of Narragansett, Rhode Island to assist the town in planning a wide variety of emergency situations including natural disasters, terrorism, hazardous spills, water emergencies, etc. Reviewed background information on existing conditions and previous hazard events, prepared the plan in cooperation with the town. This project includes a significant public participation and outreach element. This project is ongoing.

Hazard Mitigation Plan, Narragansett, Rhode Island. Project manager for the development of a Hazard Mitigation Plan for the Town of Narragansett, Rhode Island to mitigate the effects of natural hazards and increase resilience against climate change. Reviewed background information on existing conditions and previous natural hazard events, prepared the plan in cooperation with the town, and hosted the public information sessions. The plan identified features most at risk; including critical infrastructure, vulnerable populations, and natural resources; and assessed their vulnerabilities to natural hazards and climate change. Prepared in accordance with FEMA guidelines for Hazard Mitigation Planning, the plan also identified and analyzed hazard mitigation strategies that best meet municipal needs for multiple hazard damage reduction.

Hazard Mitigation Plan and Municipal Vulnerability Preparedness Plan, Waltham, Massachusetts. Technical reviewer for the development of a joint Hazard Mitigation and Municipal Vulnerability Preparedness Plan for the City of Waltham to mitigate the effects of natural hazards and increase resilience against climate change.

Hazard Mitigation Plan and Municipal Vulnerability Preparedness Plan, Wenham, Massachusetts. Technical reviewer for the development of a joint Hazard Mitigation and Municipal Vulnerability Preparedness Plan for the Town of Wenham to mitigate the effects of natural hazards and increase resilience against climate change.

**PROFESSIONAL
AFFILIATIONS**

RI Chapter of American Planning
Association (President-Elect)

US Green Building Council

Water Environment Federation

American Institute of Certified
Planners

Yankee Onsite Wastewater
Association

Rhode Island State Planning Council

PROFESSIONAL AWARDS

USEPA Environmental Merit Award
2005 (Awarded for Smart Growth
and Stormwater)

Rhode Island APA Chapter
President's Award
2011, 2014

Municipal Vulnerability Preparedness Plan, Salisbury, Massachusetts. Presenter at an all-day workshop as part of the development of a Municipal Vulnerability Preparedness Plan for the Town of Salisbury to mitigate the effects of natural hazards and increase resilience against climate change. The workshop included a review of critical features most at risk; including critical infrastructure, vulnerable populations, and natural resources; and an assessment of their vulnerabilities to natural hazards and climate change.

Municipal Vulnerability Action Project, Brookline, Massachusetts. Technical advisor and reviewer for the development of new policy and guidance for the Town of Brookline to address stormwater flooding, green infrastructure, extreme heat and other issues related to climate change. The policy and guidance is intended to support development and redevelopment reviews in town.

Hazard Mitigation/Municipal Vulnerability Plan, Attleboro, Massachusetts. Project manager for updating the existing hazard mitigation plan and creating the municipal vulnerability component for the City of Attleboro. Work including researching relevant data and working with the community to identify hazards, vulnerabilities, and strengths to determine appropriate hazard and climate change actions measures. This work also involved developing and implementing engagement strategies for gathering input from stakeholders and the general public. This project also includes an analysis of the feasibility of establishing a stormwater utility for the city.

Plymouth-Carver Aquifer Action Plan, Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA), Plymouth, Massachusetts. Project manager for development of an aquifer action plan to maximize water supply using LID-style approaches. The project involved working with Plymouth-Carver Aquifer Advisory Committee to identify action plan items and develop a MOU that would be acceptable to all seven municipalities in the region.

Regulatory Research for the Capehart Facility Redevelopment, Connecticut. Project manager for review of floodplain redevelopment policy and comparison to other northeast states on behalf of the Capehart Facility for vetting with the Connecticut State Legislature.

Pequonnock River Watershed Land Use Regulatory Review, Connecticut. Task manager for the review of land-use policy for three municipalities for protection of the Pequonnock River.

Smithfield Onsite Wastewater Management Plan, Smithfield, Rhode Island. Technical lead and project manager for development of an onsite wastewater management plan for the Town of Smithfield. This is the first OWMP that has been developed for Smithfield and will give the Town access to the Community Septic System Loan Program.

Onsite Wastewater Management Plans for Exeter, Hopkinton and Richmond, Rhode Island. Managed the development of three onsite wastewater management plans for CSSLP loan eligibility. All three plans were completed in a total of three months. Project included public meetings/hearings in each town.

BACKGROUND

2021-Present
Senior Project Manager
Weston & Sampson

2016-2021
Coastal Zone Consistency Project
Manager
SC Department of Health and
Environmental Control

2013-2016
Natural and Coastal Resources
Consultant
Brunswick, GA

2013-2014
Coastal States Organization
Chair/Facilitator, National Nonpoint
Source Workgroup

2005-2013
Natural Resources Biologist
GA Department of Natural
Resources- Environmental
Protection Division

2001-2005
Marsh and Shore Regulatory
Program Manager
GA Department of Natural
Resources- Coastal Resources
Division

1994-2001
Senior Program Coordinator
VA Department of Environmental
Quality

1990-1994
Analyst
VA Department of Environmental
Quality

1989
Analyst
US Geological Survey/University of
Virginia Coastal Research

EDUCATION

1988
Graduate Studies Environmental
Science, Coastal Geomorphology

1987
Bachelor of Arts
University of Virginia

Jeannie is a coastal resources expert and innovator with more than 30 years of government experience in the Southeast and Mid-Atlantic. She has in-depth knowledge of and practice in regulatory permitting and compliance, sustainable and resilient design, environmental policy, community development, green infrastructure, wildlife and water quality protection strategies, stormwater management, habitat restoration, estuarine and freshwater wetlands, cultural and historic resources, and associated legal and regulatory frameworks. Jeannie is known for her collaborative team-building, multidisciplinary approaches and as a catalyzing problem solver and communicator. She is a seasoned and effective leader and also has extensive experience with public outreach, community engagement, grant writing and management and working with diverse stakeholders.



SPECIFIC PROJECT EXPERIENCE

Previous Employment Summaries and Project Spotlights

- City of Charleston Stormwater Design Manual, Team Member, SC DHEC
- Sustainable Community Action Team, Project Leader, GA DNR
- Model Ordinance Development and Outreach for Coastal Communities, Project Leader, GA DNR
- Georgia Coastal Stormwater Supplement, Project Leader, GA DNR
- Georgia Green Growth Guidelines, Project Leader, GA DNR
- Riparian Buffer Protection Models, Project Leader, GA DNR
- Priority Species Identification and Scaled Habitat Protection through Permitting, GA DNR
- Nontidal Wetlands Protection Project, Project Leader, GA DNR
- Virginia River Country Sustainable Economic Development Project, Leader, VA DEQ

Coastal Zone Consistency Project Manager, SC Department of Health and Environmental Control - Ocean and Coastal Resource Management, Charleston, South Carolina. Evaluated and provided consistency determinations (environmental impact review) for all development activities requiring state and federal permits with a focus on the Charleston region. Made recommendations and worked collaboratively with local government staff, NGOs applicants, engineers, consultants and agencies to improve project design, streamline processes, and protect coastal resources while balancing socio-economic development concerns. Presented technical, legal, and policy interpretations of applicable policies, statutes, and regulations. Ensured public participation requirements were met per State and Federal rules/guidelines. Team member for DHEC Emergency Response and DHEC Applied Science Committee.

Natural and Coastal Resources Consultant, Brunswick, Georgia. Consulted as expert on water, natural resource, and coastal resource management policies and

PUBLICATIONS

Horner, R., Lewis J.,
Burnette, J. (Second Quarter 2022)
A Readiness Guide to Applying for
and Securing SRF Infrastructure
Funding - *South Carolina AWWA
Journal*

practices. Interpreted complex state and federal statutes and regulations in context with proposed projects affecting a range of coastal resources and uses. Reviewed projects for compliance with regulations and statutory authority. Recommended actions to protect resources including wildlife/habitat protection in southeastern US. Identified gaps in resource protection & helped develop innovative approaches.

Chair/Facilitator, Coastal States Organization (CSO): National Coastal Nonpoint Source Workgroup, Washington, District of Columbia. Lead dynamic workgroup representing all coastal management and water quality programs of the US coastal states and territories. Assisted coastal states with program/project development, provided leadership to build and foster stronger relationships and regular dialogues between intrastate, regional, and interstate interests. Provided direction, developed and facilitated discussion and training agendas, drafted position documents representing the complex myriad of states' interests. Fostered exchange of information and ideas to promote collaborative efforts. Designed and edited marketing materials; presented reports to Executive Committee and full membership at annual meetings. CSO represents the interests of the Governors of the coastal states and territories since 1970.

Natural Resources Biologist, Advanced Level, Department of Natural Resources – Environmental Protection Division, Brunswick, Georgia. Development and implementation of Georgia's Coastal Nonpoint Source Program to protect human health and conserve terrestrial and marine habitats, associated wildlife, fisheries and ecosystems while providing for economic growth and development. Coordinated strategic planning activities in response to stakeholder needs with a collaborative team of subject matter experts, research/academic institutions, and NGO's to manage and reduce impacts from residential and commercial construction, forestry, agriculture, hydromodification, marinas and recreational boating. Evaluated and recommended program improvements for critical coastal areas, maritime forests, wetlands and for expansion of multi-trophic riparian area for private and public property protection. Developed and administered cross-cutting grant and project proposals. Planned, organized, and conducted workshops through collaborative partnerships. Promoted land conservation through planning and ordinance development, transfer of development rights, blue/green infrastructure, conservation easements, and tax incentives. Identified opportunities to locate, protect / restore priority coastal ecosystems.

Marsh and Shore Regulatory Program Manager, Department of Natural Resources – Coastal Resources Division, Brunswick, Georgia. Lead staff responsibility for the implementation of the Coastal Marshlands Protection Act of 1970 and the Shore Protection Act of 1979. Assigned duties, provided oversight and daily guidance to staff working on permit requests for proposed activities in tidal wetlands and construction activities in the State's shore jurisdiction. Supervised and guided staff of permit coordinators in coastal and marine regulatory and policy directives and agency actions through routine collaboration with the Office of the Attorney General; acted as lead staff to Georgia's Coastal Marshlands and Shore Protection Boards. Assisted in the leasing public submerged lands. Coordinated with property owners, attorneys, developers, scientists, environmental groups, localities, consultants and land planners to implement sustainable development/smart growth designs and practices on the Georgia coast. On-call biologist in response to marine mammal and sea turtle strandings, fish kills and spills.

BACKGROUND

2022-Present
Environmental Scientist III
Weston & Sampson

2019-2022
Resilience Specialist
Kiawah Island Community
Association

2017-2019
Graduate Assistant
College of Charleston

2017-2018
Marine Science Educator
Patriots Point Naval & Maritime
Museum

EDUCATION

2019
Concurrent Degrees, Master of
Environmental and Sustainability
Studies and Master of Public
Administration
University of Charleston

2016
Bachelor of Science
Environmental Technology &
Management
North Carolina State University

PROFESSIONAL AFFILIATIONS

Charleston Resilience Network
South Carolina Beach Advocates
Southeast Sustainability Directors
Network
Johns Island Task Force
National Weather Service Weather
Ready Nation Ambassador

Lucas is a Climate Adaptation and Resilience Specialist with over five years of experience in resilience planning. His expertise includes raster-based flood modeling, sustainable and resilient design, environmental monitoring, community development, green infrastructure, wildlife and water quality protection strategies, stormwater management, cultural and historic resources, and associated legal and regulatory frameworks. In addition, he has experience with public outreach, community engagement, and grant administration. Lucas has worked with diverse stakeholders across numerous projects throughout the Southeast.



SPECIFIC PROJECT EXPERIENCE

Quail Creek HUD NEPA Environmental Review, Richland County, South Carolina. Climate Adaptation and Resilience Specialist responsible for assisting in performing an environmental compliance review on behalf of the Richland County Office of Community Development (RCCD) in compliance with requirements set forth in 24 C.F.R. Part 58 ("Environmental Review Record or ERR"). In accordance with CDBG regulations, Weston & Sampson acted as the Environmental Officer to perform an environmental compliance review as required by HUD. Responsibilities for this project included developing all exhibits for the Quail Creek project, review, and evaluation for compliance with federal, state, and local land development, and the development of a final Environmental Review satisfying HUD, NEPA and all applicable South Carolina Codes.

Green Infrastructure and Living Shorelines Manual (NFWF ECRF) Kiawah Island, South Carolina. Project coordinator responsible for writing, research and planning, and coordination of green infrastructure and living shorelines manuals for a National Fish and Wildlife Foundation Emergency Coastal Resilience Fund Grant. As Project Coordinator for the NFWF ECRF Grant, the Resilience Specialist not only provided administrative support and coordination to the Kiawah Conservancy but contributed time each week for two years assisting in the development of publications, documents, reports, research, and communications. This involved assuming an advisory role on a shoreline change and Unvegetated-Vegetated Ratio (UVVR) modeling effort to evaluate marsh vulnerabilities and on a groundwater study for island-wide mapping and modeling of the water table to analyze fluctuations in water levels and salinity, seasonally, and with influences from rainfall and tides. The project involved over \$125K in NFWF funding and resulted in two vetted nature-based solutions guidance documents: one for living shorelines and the other for green infrastructure.

Resilience Planning, Kiawah Island, South Carolina. Resilience Specialist responsible for chairing the Adaptive Management Plan Task Force, coordinating stakeholder engagement, and developing Kiawah Island's Resilience Plan. This included organizing weekly Task Force meetings to develop strategic community engagement activities, survey development, methods for statistical analysis, and planning for stakeholder interviews for an effort between the Town of Kiawah Island and Kiawah Island Community Association. Phase one of this project resulted in

the development of threshold conditions (undesirable conditions) for eight areas of concern identified by the community. Phase two of this project involved defining indicators, threshold values (frequency and duration of the undesirable condition), trigger points, and a monitoring framework for Kiawah's marsh, maritime forest, beaches and dunes, vegetation, roads, properties, utilities. This plan resulted in the guidelines for an annual Resiliency Report to allow community leaders to identify and prioritize investment in projects related to community resilience.

Flood Mitigation Stormwater Projects, Kiawah Island, South Carolina. Resilience Specialist responsible for mapping drainage infrastructure and modeling flood scenarios for various sea level rise and designed storms for the Kiawah Island Community Association's Water Management Task Force. The Task Force consisted of Community Association Board Members, staff, and an outside engineering firm. The responsibilities of the Resilience Specialist on this Task Force included baseline flood modeling of NOAA's Sea Level Rise Projections for 2030, 2050, 2070 and 2100 and various designed storms (1-year through 100-year rainfall events). After modeling each of these events, the Resilience Specialist compiled anecdotal accounts of flooding to "train" the baseline model to reflect conditions of normal tidal inundation with the combined effects of various designed rainfall events. The proposed drainage infrastructure was later built into the model to illustrate the level of mitigation these proposed solutions offered. The Task Force outlined seven of nine proposed solutions that would benefit stormwater management. The Resilience Specialist then presented all modeling and research to the community and garnered a unified vote of the membership to proceed with more than \$3 Million in infrastructure investment after public presentations and various neighborhood meetings.

Community Flood Modeling Exposition, Mt. Pleasant, South Carolina. Responsible for developing high-resolution flood models and participating in community outreach and engagement. This effort was funded by a National Oceanic and Atmospheric Administration Regional Coastal Resilience Grant obtained by through the S.C. Sea Grant Consortium on behalf of the Charleston Resilience Network. The original goal of this outreach event was to gather anecdotal flooding data from residents to ground-truth storm surge and rainfall models developed by the Low Country Hazards Center, housed at the College of Charleston. This event involved coordination with local stormwater engineers, emergency managers and public works departments to develop a list of study areas, rainfall/ storm surge scenarios, historic storms, and future scenarios of sea level rise to model for the events. After developing and presenting the models to each municipality, presented the models to the public in two separate outreach events and answered questions about modeling methods. Recorded anecdotal reports from community members.

Community Flood Modeling Exposition, North Charleston, South Carolina. Graduate Assistant responsible for developing high-resolution flood models and participating in community outreach and engagement. This effort was funded by a National Oceanic and Atmospheric Administration Regional Coastal Resilience Grant obtained by through the S.C. Sea Grant Consortium on behalf of the Charleston Resilience Network. The original goal of this outreach event was to gather anecdotal flooding data from residents to ground-truth storm surge and rainfall models developed by the Low Country Hazards Center, housed at the College of Charleston.

BACKGROUND

2020-Present
Engineer III
Weston & Sampson

2020-2020
Engineer II
Weston & Sampson

2019-2020
Environmental Scientist I
Weston & Sampson

2016-2018
Project Technician
Stoney Ridge Environmental

2015-2016
Research Assistant
Stormwater Center
University of New Hampshire

2014-2016
Member
Engineers Without Borders

EDUCATION

2016
Bachelor of Science
Civil Engineering
University of New Hampshire

Summer 2014
Environmental Conservation
Program
EcoQuest Education Foundation

PROFESSIONAL REGISTRATION

Engineer-in-Training (EIT)
New Hampshire

Certified Erosion, Sediment and
Stormwater Inspector - Envirocert
International

CERTIFICATION

Municipal Vulnerability
Preparedness (MVP) Certified
Provider

PROFESSIONAL TRAINING

10-Hour OSHA Construction Safety
Training

Lindsey is a Resiliency Engineer with Weston & Sampson working on interdisciplinary climate adaptation projects. Lindsey's background includes environmental engineering, conservation, and sustainability. She has five years of experience in resiliency engineering, environmental permitting, and wetland delineating. Her expertise includes CAD design, GIS mapping, stormwater modeling, wetland delineations, stream assessments, hazard mitigation planning, municipal vulnerability preparedness planning, and SWPP.



SPECIFIC PROJECT EXPERIENCE

Hazard Mitigation & Municipal Vulnerability Preparedness Planning, Lowell, Massachusetts. Assisted with the preparation of a joint Hazard Mitigation Plan (HMP) and Municipal Vulnerability Preparedness (MVP) Plan. The scope included equitable community engagement strategies to gain input from a broader, more diverse segment of the population, including the translation of public outreach materials into Khmer, Portuguese, and Spanish and use of virtual engagement, including webinars, videos, and online surveys. The resulting plan identifies local features most at risk and prioritizes specific mitigation actions to reduce vulnerability. The work led to a successful MVP Action Grant.

Hazard Mitigation Plan, Wenham, Massachusetts. Assisted with the town's HMP effort, including facilitation of the HMP Committee, workshops, and public meetings. Researched existing conditions and previous natural hazard events and mapped vulnerable areas, critical infrastructure, and special populations. With the HMP Committee, prioritized actions to reduce vulnerability to natural hazards. Prepared drafts and updates based on public input.

Hazard Mitigation Plan, Waltham, Massachusetts. Assisted with the town's HMP effort, including facilitation of the HMP Committee, workshops, and public meetings. Researched existing conditions and previous natural hazard events and mapped vulnerable areas, critical infrastructure, and special populations. With the HMP Committee, prioritized actions to reduce vulnerability to natural hazards. Prepared drafts and updates based on public input.

Grant Writing for Municipal Vulnerability Preparedness (MVP) Planning and Action Grants, Woburn and Lynn, Massachusetts. Collaborated on successful grant proposals, leading to climate resilience planning and implementation projects for the communities of Lynn and Woburn.

Hazard Mitigation and Municipal Vulnerability Preparedness Planning, Belmont, Fitchburg, Granville, Groton, Hopkinton, Middleton, Tewksbury, Wilbraham, and Winchendon, Massachusetts. Assisted with climate change vulnerability assessments, hazard mitigation, and resiliency planning efforts for the communities of Belmont, Fitchburg, Granville, Groton, Hopkinton, Middleton, Tewksbury, Wilbraham, and Winchendon. Efforts included assessing climate change projections, researching and identifying potential hazards and vulnerabilities, conducting community engagement, prioritizing actions to increase resilience, and preparing action plans for submittal to the state.

BACKGROUND

2021-Present
Project Planner
Weston & Sampson

2019-2021
Climate Resource Planner
Water Resource Team
Kleinfelder

2018-2019
Climate and Environmental
Planning Fellow
City of Boston Department of
Environment, Energy, and Open
Space

2014-2017
Designer
KieranTimberlake Associates

EDUCATION

2019
Masters in City Planning
Housing, Community and
Economic Development
Massachusetts Institute of
Technology

2014
Bachelor of Science in Architecture
University of Virginia

Bella is a climate resiliency specialist and urban planner with 6 years of professional experience. She works with institutions, government agencies, and municipalities to address their environmental and climate concerns through adapted design, land use, and policy. Bella is passionate about community resilience and believes that climate change is a ‘threat-multiplier’ for populations that are already socially vulnerable. She is skilled in urban design, graphic communication, spatial analysis, research, and innovative outreach. She uses these skills to convey climate change as an opportunity to create more just and equitable urban environments. As a City of Boston Climate and Environmental Planning Fellow, Bella wrote an amendment to the historic preservation regulatory standards to include resiliency standards for Bay Village District, created a design guide for retrofitting historic buildings to address climate change, and developed a guidance document for developers to facilitate compliance with Zoning Article 37, Green Buildings and Climate Preparedness. She has three years as an architectural designer, specializing in the design of university buildings and green building techniques.



SPECIFIC PROJECT EXPERIENCE

Consulting Services for the American Rescue Plan Act (ARPA) Local Fiscal Recovery, South Kingstown, Rhode Island. Project Planner for development of a strategic plan to revitalize five areas of the Town of South Kingstown and develop ARPA programming. Role involves assistance with grant fund development to leverage ARPA funding. The Town of South Kingstown is slated to receive \$8.95 million over the next two years under ARPA. South Kingstown hired Weston & Sampson to provide specialized project development, design (civil, engineering, architecture, landscaping and traffic engineering) and grant management services to maximize the Town’s use of the ARPA funds to support the Town’s COVID-19 disaster response to economic recovery. These services include supporting the Town with project management oversight and ensuring accountability, transparency, and compliance with all federal requirements.

Hazard Mitigation Plan, Boston, Massachusetts. Developed the City of Boston’s Natural Hazard Mitigation Plan. Researched and compiled existing citywide mitigation measures, documented progress on the past plan, and identified future priority actions through interviews with critical stakeholders. Conducted inclusive community outreach to receive feedback on the plan recommendations. Wrote the final Plan and ensured compliance with FEMA’s HMP guidelines.

Municipal Vulnerability Action Project, Lowell, Massachusetts. Developed a process for prioritizing new green infrastructure projects in the Claypit Brook Watershed considering co-benefits for the community, feasibility of implementation, and contributions to flood reduction. Conducted expert stakeholder interviews and development presentations for neighborhood groups. Developed writing and graphics for the final Capital Improvement Plan for the Claypit Brook Watershed.

BACKGROUND

2022-Present
Senior Technical Leader
Weston & Sampson

2019-2022
Technical Leader
Weston & Sampson

2010-2019
Senior Professional
Kleinfelder

2005-2010
Teaching and Research Assistant
Department of Civil and
Environmental Engineering
Northeastern University

2004-2005
Design Engineer
Thermax India Ltd.

2002-2004
Research and Teaching Assistant
Department of Civil Engineering
Indian Institute of Technology

EDUCATION

2010
Doctor of Philosophy (PhD)
Environmental Engineering
Northeastern University

2004
Master of Science
Environmental Engineering
Indian Institute of Technology

2002
Bachelor of Science
Materials & Metallurgical
Engineering
Jadavpur University

CERTIFICATION

Municipal Vulnerability Preparedness (MVP) Certified Provider

AWARDS & HONORS

Clean Charles Award
Charles River Watershed
Association
2022

Clemens Herschel Award
Boston Society of Civil Engineers
and American Society of Civil
Engineers, 2014

Indrani has more than 15 years of experience as a water resources engineer and as technical lead in climate change resiliency projects, specializing in leading interdisciplinary teams and stakeholders through risk-based prioritization of adaptation solutions. She has industry-leading experience in translating climate change projections to engineering design criteria for new and existing infrastructure and modeling climate impacts for the purposes of vulnerability assessment and adaptation planning for many projects in the Northeast. She has worked with numerous municipalities and public agencies to model their exposure to coastal and stormwater flooding using the best available and most appropriate sea level rise, storm surge, and rainfall projections. She has extensive experience integrating climate projections in hydrologic/hydraulic models of urban storm and sanitary sewer systems. Indrani is frequently invited to be part of panel discussions on climate risk and resiliency at New England universities, and has won national awards for her contributions to the engineering profession. In addition, Indrani is fluent in Bengali, English, and Hindi.



SPECIFIC PROJECT EXPERIENCE

Statewide Hazard Mitigation and Climate Adaptation Plan (SHMCAP), Executive Office of Energy and Environmental Affairs, Massachusetts. Task lead for development of the most appropriate climate change scenarios for over 70 state agencies in the Commonwealth and the framework for conducting climate change vulnerability assessments for these agencies. Expertise led to the development of an online survey system that the agencies have been able to use effectively and efficiently to identify their most critical assets, functions, and vulnerable population groups served, and identify their priority planning areas. The approach adopted in the SHMCAP can be used as a template for other states and communities.

East Boston Resilience Technical Analysis, Boston Planning & Development Agency (BPDA), East Boston, Massachusetts. Provided climate/coastal resiliency support, working in collaboration with the design team and the City of Boston to identify practicable solutions at two vulnerable locations along East Boston's waterfront: Carlton Wharf and Lewis Mall. Helped identify technical considerations and strategies that emphasized accessible open space while providing critical flood protection for East Boston, including the MBTA Maverick Station. The project resulted in schematic designs for both locations that illustrated conceptual early concepts, practicable design alternatives, cost estimates, and next steps.

Orange Line Vulnerability Assessment, MBTA, Boston, Massachusetts. Project manager and technical lead in assessing potential vulnerabilities for the Orange Line system considering sea level rise and storm surge, heavy precipitation events and inland flooding that included 2D flood modeling at select locations, extreme heat, high winds, and winter weather events related to extreme cold, snow, and ice. Recommended prioritized areas for additional studies and consideration of adaptation strategies for stations, tracks, and maintenance yards.

AWARDS & HONORS (CONT.)

- Engineering News Record (ENR)
"Top 20 under 40" in the New
England Region, 2015
- Cities4Tomorrow Award
Bloomberg Philanthropies
C40 Cities, 2017
- Silver Award
ACEC/MA Engineering Excellence
Competition, 2015
- Bronze Medal Excellence Award
Kleinfelder's Annual Technical
Seminar, 2013
- Don Douglas Award
Kleinfelder's Annual Technical
Seminar, 2012
- Ranked second in Environmental
Engineering and Management
Master's Program
Indian Institute of Technology, 2004
- Sankar Kumar Das Memorial
Silver Medal
Metallurgical and Materials Science
Engineering Examination
Jadavpur University, 2002

PROFESSIONAL AFFILIATIONS

- Water Environment Federation
- New England Water Environment
Association
- American Society of Civil Engineers

PUBLICATIONS & PRESENTATIONS

- "The Climate Response—
Government Leaders Take Action,
Evaluate Vulnerabilities Due to
Climate Change"
Informed Infrastructure
2016
- "Driving through the pouring rain:
How to plan, prepare and adapt
America's transportation networks
for climate change"
Informed Infrastructure
2015
- "Effects of spatial resolution in
urban hydrologic simulations"
Journal of Hydrologic Engineering
2012

Resilient Cambridge Plan & Regional Flood Resiliency Technical Assistance, Cambridge, Massachusetts. As a subconsultant to Kleinfelder, conducted peer review of precipitation-driven riverine and piped infrastructure flood modeling and coastal flood modeling results from the Massachusetts Coast Flood Risk Model (MC-FRM) as it relates to Cambridge. Provided technical oversight and peer review in developing the city's FloodViewer. Assisted in developing the city's HeatViewer to visualize UHI modeling results and provided technical review of the citywide green infrastructure analysis and Resilient Cambridge Plan. Led the technical analysis for regional coastal flood resiliency in the lower Mystic River and lower Charles River watersheds. This included identification and technical coordination in modeling of 10 coastal flood interventions in the metro Boston area and participating in regional flood resiliency coordination efforts championed by the city with multiple stakeholders, including other municipalities, state agencies and state legislators.

Building Resilience into the Design and Construction of Transportation Infrastructure, North Carolina Department of Transportation (NCDOT). Advise NCDOT on integrating resilience into ongoing planning and design projects, especially regarding frequent hurricane and coastal storm events. As owner's representative, reviewing design criteria for proposed/upcoming projects across the state, developing resiliency design criteria and guidelines for transportation projects, and assisting in updating relevant standards and criteria based on most recent climate change projections.

MBTA Bus Maintenance Facilities Resilient Design Guidelines, Boston, Massachusetts. Developed a resilient framework that provides guidance to design teams to meet performance thresholds given specific design parameters, such as design flood elevation, rainfall depth and duration of heatwaves; consider operational strategies to quickly respond and recover from extreme weather events through designing with emergency preparedness in mind. Currently serving as technical lead in developing a 2D flood model for a proposed new bus maintenance facility site in Boston. This model is providing the basis of design in terms of finished floor elevation, as well as being used to assess flood impacts to the surrounding areas under existing and proposed conditions.

Blue Line Flood Vulnerability Evaluation, Massachusetts Bay Transportation Authority. Evaluated flood vulnerability including review existing assessments and records, perform site survey of existing conditions, conduct hydraulic modeling and preparing tunnel flooding maps to identify targeted resilience measures, and determine engineering and operational resilience recommendations to mitigate flood risk.

Resilient Massachusetts Action Team (RMAT) Technical Assistance Contract, Statewide, Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA). Responsible as technical lead for working with the multi-agency RMAT and an interdisciplinary team to implement the State Hazard Mitigation Climate Adaption Plan (SHMCAP) and develop clear, consistent guidance on the selection of climate design standards, standardize implementation of climate standards in existing practices, and create metrics and a web-based tool to evaluate climate resilience in capital planning.

BACKGROUND

2022-Present
Technical Leader
Weston & Sampson

2020-2022
Technical Specialist
Weston & Sampson

2009-2020
Hydrologist
Weston & Sampson

2006-2007
Water Engineer
Fay, Spofford & Thorndike

EDUCATION

2014
Master of Science
Hydrology
University of New Hampshire

2006
Bachelor of Science
Civil Engineering
Tufts University

PROFESSIONAL CERTIFICATIONS

Professional Hydrologist

Certified Floodplain Manager

Engineer-in-Training (EIT):
New Hampshire

PRESENTATIONS

October 2014
"Town-wide Stormwater Best Management Practice Screening"
NEWWA Water Resources & Sustainability Symposium

April 2014
"Surface Water Controls or Enhanced Aquifer Recharge, the Big River Story"
NEWWA Spring Joint Regional Conference

April 2013
"A Tale of Two Ponds: Developing Model to Improve Reservoir

Andrew is a hydrologist with 15 years of experience specializing in water resources and dam safety engineering. He has conducted hydrologic and hydraulic modeling on more than 70 dam projects, including hydraulic assessment of existing conditions, conceptual alternative analyses, rehabilitation design, dam breach analyses, inundation mapping, and inflow design flood studies. Andrew has developed dozens of hydrologic and hydraulic models and is intimately familiar with HEC-RAS, HEC-HMS, PCSWMM, HydroCAD, and other related software packages. In the past five years alone, he has spearheaded development of more than 30 Emergency Action Plans and associated dam breach analyses, with all manner of flood zones ranging from rural rivers valleys to dense urban floodways with no defined channel. In developing hydraulic models and EAPs, he has worked with regulators from every New England state as well as with FERC, FEMA, and the NRCS. He is also familiar with the latest GIS datasets and ArcGIS-based tools for evaluating hydrologic and hydraulic problems.



SPECIFIC PROJECT EXPERIENCE

Dam Breach Analyses and Inundation Maps, Connecticut and Deerfield Rivers. Conducted dam breach analyses and prepared inundation maps in support of the development of Emergency Action Plans for three high hazard dams on the Connecticut River in New Hampshire/Vermont and four high hazard dams on the Deerfield River in Massachusetts. Developed a hydraulic model that incorporated a total of 207 river miles, 7 downstream dams, 34 bridges, and 10 significant tributaries. Conducted dam breach simulations under both sunny and stormy day conditions.

Hazard Classification Analyses for Two Dams, Mashpee, Massachusetts. Conducted dam breach analyses and developed flood inundation maps to evaluate the potential impact of the hypothetical failures of two unclassified dams in Mashpee. Developed a HEC-RAS model for each dam and downstream floodway, including a total of 9 river miles, 1 downstream dam, and 18 bridges. Conducted dam breach simulations under a variety of antecedent conditions. Submitted a letter report to the NRCS summarizing the results of the modeling effort and recommending a NRCS Hazard Classification; the NRCS concurred with and approved the recommended Hazard Classification.

Charles River Watershed Model, Natick, Massachusetts. Lead hydrologist responsible for developing a planning level 1D/2D model of the Charles River and its watershed, the largest in the metro Boston area. The first of its kind for the approximately 300 square mile watershed, the model consisted of nearly 200 miles of the Charles River and its two dozen tributaries as well as 50 miles of existing storm drain and more than 450 dams and road crossings across parts of more than 40 communities. Developed a 2D mesh across the existing 500-year floodplain to evaluate the potential impact of climate change on flood frequencies, extents, and depths as well as the potential flood mitigation capacity of seven watershed-wide green infrastructure concepts.

Management”
NEWWA Spring Joint Regional
Conference

PRESENTATIONS (CONT.)

September 2011
“A Balancing Act: Optimizing
Water Supply Availability through
Integrated Management”
New England Water Works
Association

January 2011
“A Balancing Act: Optimizing
Water Supply Availability through
Integrated Management”
New England Water Works
Association

Waltham Stormwater Model and Green Infrastructure Screening, Waltham, Massachusetts. Lead hydrologist responsible for the development of a city-wide 1D stormwater model across five different watersheds and their dozens of subcatchments. Used the model to confirm the likely causes of nuisance flooding, identify areas that could experience significant flooding and associated damage during extreme events. Evaluated the potential impact of climate change on flood frequency and magnitude throughout the city. Also evaluated the potential benefit of more than 250 green infrastructure projects and several large-scale gray infrastructure improvement projects targeting floodprone areas.

Baker Brook Flood Study, Fitchburg, Massachusetts. Lead hydrologist for the development of a 1D/2D flood model for Baker Brook. The brook, which was rerouted in the 1950s as a result of several local and Army Corps projects, frequently jumps its bank and floods parts of its former floodplain, which now includes several strip malls and a state highway. The model includes a dense 2D mesh in order to identify, rather precisely, the limits and depths of flooding, to support modification of flood insurance zones, city buyouts of private property, and specific gray infrastructure improvements to the streambank and to stormwater infrastructure within the former floodplain. The model was also used to evaluate the potential impacts of climate change and the potential benefits of several high concept green infrastructure initiatives.

Strawberry Brook Stormwater Model and Green Infrastructure Screening, Lynn, Massachusetts. Lead hydrologist responsible for the development of a watershed-wide 1D stormwater model of Strawberry Brook. Used the model to confirm the likely causes of nuisance flooding, identify areas that could experience significant flooding and associated damage during extreme events. Evaluated the potential impact of climate change on flood frequency and magnitude throughout the watershed. Also evaluated the potential benefit of 26 green infrastructure projects and several large-scale gray infrastructure improvement projects within the watershed.

Wildwood Drainage Evaluation, Winchester Massachusetts. Hydrologist for this project to evaluate the conditions that produced flooding in the Wildwood area during high-intensity summer rain events. Tasks included detailed mapping of drainage catchments, inspection and evaluation of critical drainage infrastructure, hydraulic modelling, and development of five design alternatives with planning level construction costs. Design and construction of a 150,000 SF infiltration system in conjunction with a 24-inch drainage diversion pipe, sediment traps, and upgraded catch basins and roadway improvements. Construction cost is \$3.1 million.

Water Quality Study, North Andover, Massachusetts. Conducted a water quality-based study of a recreational pond to identify likely sources of and to evaluate potential remediation methods for seasonal algal blooms. Conducted a windshield survey of the pond’s drainage area to identify potential nutrient runoff sources and a bathymetric survey of the pond to identify potential in-pond flow patterns and a stage-volume relationship. Conducted a long-term pond level monitoring program to identify seasonal trends in pond level and groundwater contributions. Developed a hydrologic model of the pond’s drainage area, including a much larger lake immediately upstream to estimate seasonal inflow patterns. Used the model to evaluate potential for seasonal releases from the upstream lake to “flush” out the pond and improve dry season water quality.

BACKGROUND

2022-Present
Team Leader
Weston & Sampson

2020-2022
Architect Project Manager
Weston & Sampson

2016-2020
Climate Resilience Architect &
Planner
Kleinfelder

2014-2016
Architectural Designer
Add Inc/Stantec

2012-2014
Designer
Merge Inc.

2010-2012
Designer
Tobi Tobin Design

2008-2009
Special Events Coordinator
Carnegie Institution for Science

2007
Policy Intern
Senator Hillary Clinton

EDUCATION

2016
Master of Architecture
Northeastern University

2012
Master Certificate
Interior Architecture
University of California, Los Angeles

2008
Bachelor of Arts
Communication, Law, Economics,
and Government
American University

PROFESSIONAL REGISTRATION

Registered Architect
Massachusetts No. 952131

CERTIFICATIONS

Municipal Vulnerability
Preparedness (MVP) Certified
Provider

Over the past 10 years, Robin has been at the forefront of integrating resilience into design and planning. She focuses on not only addressing climate change but also ensuring that her projects benefit environmentally disenfranchised populations. She has technical expertise in city resilience, building and infrastructure adaptation, vulnerability assessments, sustainable design and mitigation strategy, transportation, and stakeholder engagement. Robin has led several vulnerability assessments and community engagement projects focused on climate resiliency, including environmental justice initiatives. She is on the AIA National Climate Change Resilience Committee and an MVP certified provider.



SPECIFIC PROJECT EXPERIENCE

Charles River Regional Watershed H/H Model, Charles River Watershed Association (CRWA), Massachusetts. Worked with 15 communities to develop a regional watershed model to provide technical information about where and when precipitation driven flood-risk in the watershed will be expected to be exacerbated by climate change. Provided engagement support to develop a comprehensive and synergistic approach to preparing and adapting to climate change.

Resiliency Study for the Department of Public Works, Salem, Massachusetts. Performed a vulnerability assessment of the existing Department of Public Works facility to determine if this existing site could be modified and maintained. This study included a gap analysis of the MC-FRM and existing FEMA floodplain inconsistencies, an analysis of total storm depths by recurrence interval for present and calculated future projections, existing conditions assessment and alternatives analysis. Adaptation strategy recommendations and costs were provided to help inform future decision making.

Climate Hazard Adaptation Resiliency Masterplan (CHARM), Department of Housing and Community Development, Boston, Massachusetts. Deputy project manager responsible for coordinating various disciplines to assess exposure to existing and future climate hazards using the climate change projections and scenarios based on the State Hazard Mitigation and Climate Adaptation Plan. Performed on-site assessments identified in the risk and vulnerability assessment and currently developing guidelines and tools for adaptation and resilience to be considered in DHCD's broader investment strategies, operation/management priority, and business continuity concerns.

Rose Kennedy Greenway Climate Change Asset Management Plan, Boston, Massachusetts. Deputy project manager and resiliency technical lead for this plan to provide actionable, realistic solutions to protect the Conservancy's assets from coastal flooding and other climate related hazards. Managed multiple subcontractors and coordinated efforts with a related project performed by another consultant.

CDBG-DR Climate Change Risk Study and Adaptation Plan, Waterford, Connecticut. Provided design and technical assistance for Waterford's CDBG-

AWARDS

2022 Ascending Leader Award
Environmental Business Council of
New England (EBC)

PROFESSIONAL AFFILIATIONS

American Institute of Architects

PRESENTATIONS

June 2022
“DPWs: The Backbone of a
Resilient & Sustainable Community”
NEAPWA Summer Conference
Yarmouth, Massachusetts

DR funded climate change planning study. Developed future riverine and worked with town staff to develop appropriate adaptation strategies and cost estimates for near- and long-term risks. Organized public meetings and conducted public outreach workshops and events. Also created maps and graphics for the town's use in future public projects and programs.

Municipal Vulnerability Assessment and Preliminary Design, Waterford, Connecticut. Developed roadway and pump station adaptation preliminary design strategies and cost estimates for near- and long-term flood risks. Organized and facilitated a community workshop, developed outreach materials, and educated community members at public events.

Resilience Toolkit Municipal Vulnerability Preparedness (MVP) Action Grant, Cambridge, Massachusetts. Created actionable information for residents and small businesses to use in preparing for climate change. Created specific guidance on how stakeholders can determine their risks, the specific steps they can take to reduce and manage those risks and collected resources available to support implementation. To disseminate the information and engage stakeholders in the use of the tool kits, conducted in-person workshops and focus groups to assist residents and businesses in starting their actions.

Municipal Vulnerability Preparedness (MVP) Planning, Medway, Arlington, Canton, and Worcester, Massachusetts. Lead facilitator for the MVP workshops and planning process. Also facilitated break-out sessions with stakeholders to identify and prioritize climate hazards, vulnerabilities, and community actions to build resilience. Performed additional facility and infrastructure risk and vulnerability assessments as part of the planning work for Worcester.

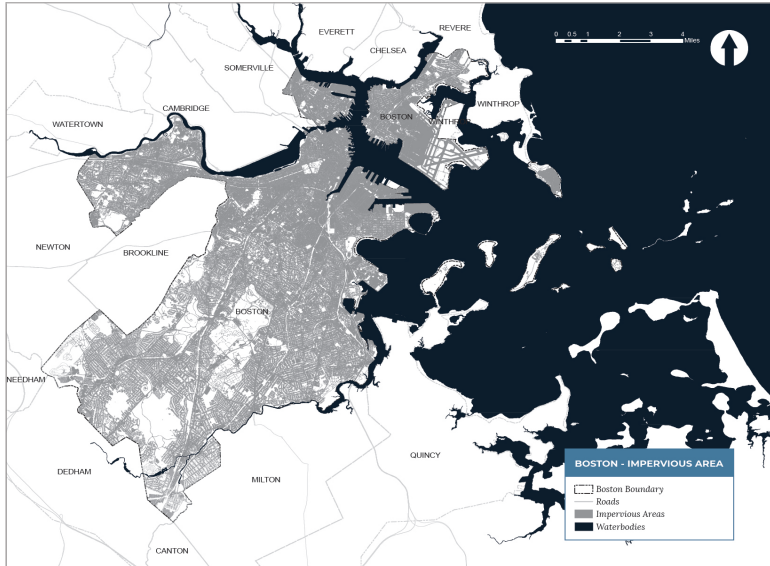
Somerville Climate Forward Plan, Somerville, Massachusetts. Assisted in developing the plan, which includes solutions to address the city's priority areas, such as adopting resilient design standards for new construction and retrofits of existing buildings, to increase flood and heat resiliency with the lens of equity. Translated technical language and created an accessible document and website for public use.

Flood Barrier Feasibility Analysis, Confidential University, Metro Boston, Massachusetts. Lead resiliency architect for a university study evaluating the feasibility of using various flood walls, gates, and barrier systems to protect critical research, lab, residential, and parking buildings on campus from future coastal and inland flooding. Conducted vulnerability assessments and developed alternatives analyses for the study.

AquaFence Flood Operations Planning and Permit Support, Various Confidential Real Estate Properties, Boston, Massachusetts. Advised several real estate owners and property manager in South Boston on their AquaFence flood barrier deployment operations, including flood forecast monitoring, estimating deployment time and labor, and regulatory issues. Led the building vulnerability assessments to determine critical thresholds for flooding and deployment.

NATURAL HAZARD MITIGATION PLAN

city of boston, massachusetts



What does the City do well to mitigate climate hazards? Examples could include city shelters, warming stations, and cooling stations.



Your answer

What are opportunities for the City to improve its preparedness for extreme events? This could include planning projects, public education, and addressing frequently flooded roads.

Your answer

As a dense, coastal New England city, Boston is vulnerable to many natural hazards such as flooding, severe winter weather, sea level rise, urban heat islands, and more. The City of Boston Office of Emergency Management (OEM) was seeking to update their Natural Hazard Mitigation Plan (NHMP) that had been approved in 2016 to document progress and identify new projects to reduce risks. Based upon our experience with hazard mitigation and climate change planning for local communities, the city retained Weston & Sampson to lead this effort, which included public engagement, stakeholder coordination, and updates to the previous NHMP.

We began by gathering available historic data, maps, and reports from relevant state, federal, and local agencies, utilities, and nongovernmental organizations. We then engaged a diverse group of local leaders to determine the best way to engage the public and other stakeholders early in the process, guided by equity goals and metrics that helped us measure success or identify the need to adjust our approach. Our team conducted a wide array of multilingual virtual engagement efforts, including Zoom workshops, stakeholder interviews, public webinars, project videos, and an online survey. We actively sought opportunities to share media and collect feedback, including a fact sheet, social media posts, and monthly updates to a project webpage. We also organized a “Street Team” of departments with ties to the community who shared their feedback and helped get the word out about the project.

We then identified and assessed potential natural hazards and vulnerable infrastructure and examined the history of natural hazards and regional climate change projections to determine which sites were more prone to natural hazards. We provided preliminary guidance on the range of strategy recommendations and their feasibility and community benefits. We updated the NHMP, in close coordination with other planning efforts like Climate Ready Boston and the engagement of a steering committee, with a narrative on how the plan will be carried out and progress monitored. The final report is a highly visual, user-friendly guide that communicates information through accessible language and diagrams. Once approved by federal and state emergency management agencies, the updated NHMP will provide a reliable and publicly acceptable roadmap, based on the latest climate change science, for protecting Boston’s most vulnerable neighborhoods from the worst of natural hazards for many years to come. This update, pending FEMA approval, will also make the city eligible for federal grants.



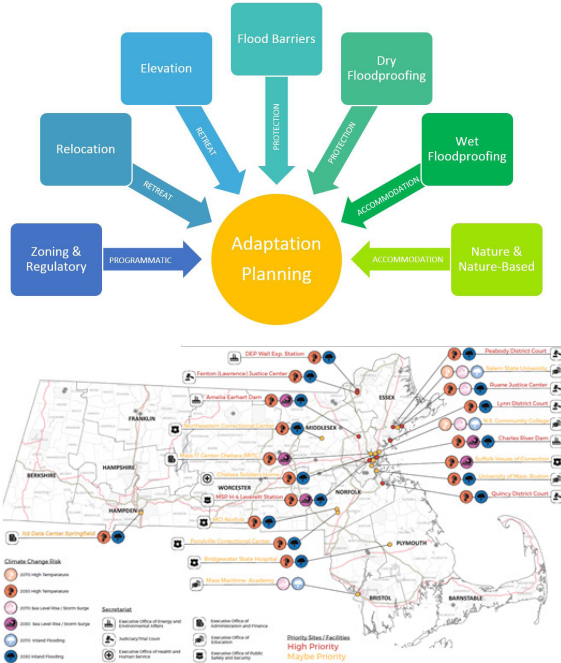
- community outreach, education, and engagement
- stakeholder engagement and coordination
- inclusion, diversity, equity, and access considerations
- risk and vulnerability assessment
- natural hazard mitigation planning

client contact

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STATEWIDE RESILIENCE MASTER PLAN

division of capital asset management and maintenance



FACILITY CHECKLIST

Features	Observations (Pre-existing Problems)	Climate Parameters (Tier 1)	Facility Manager Input	
			Adaptive Capacity	Consequence Rating
EXTERIOR AND GROUNDS (vegetation, drainage, signs)	evidence of pooling, erosion, trees	FLOOD, EXTREME PRECIPITATION	Rate the site feature's ability to withstand the climate parameter	Rate the consequence of damage or inoperability to site feature
ARCHITECTURAL (windows, doors, louvers)	glazing type, operability, impact resistant	HEAT*	1. EXCELLENT very unlikely to result in damage	1. LOW minor injuries and/or <\$5K
STRUCTURAL (roofs, foundations)	skylights, snow drift areas, drainage, cracking, mold	Climate Parameters (Tier 2) WINTER STORM	2. GOOD unlikely to result in damage	2. MODERATE moderate injuries and/or <\$250K
BUILDING SYSTEMS (mechanical, electrical, HVAC)	location, utility ports, temperature control, redundancy	WIND	3. SATISFACTORY may result in damage	3. HIGH severe injuries and/or <\$1M
OTHER (generators, server rooms, user groups, etc.)	location, fuel type, vulnerable populations	LANDSLIDE, FIRE	4. FAIR likely to result in damage	4. VERY HIGH possible loss of life and/or <\$10M
			5. POOR very likely to result in damage	5. EMERGENCY local or regional emergency and/or loss of life expected

Resilience Planning Graphic (top left)
DCAMM Facilities Map (bottom left)
Weston & Sampson-Developed Site-Specific Living Scorecard/Facility Checklist (right)

As the prime consultant, **Weston & Sampson** provided professional consulting services for the Massachusetts Division of Capital Asset Management & Maintenance's (DCAMM's) Statewide Resilience Master Plan (SRMP) project. The purpose of the project was to review the DCAMM portfolio's vulnerability to climate impacts and develop resiliency design guidelines to help DCAMM prepare and plan for climate change impacts, including coastal flooding, inland flooding, extreme heat, drought, landslides, wind, winter storms, and wildfires.

As part of our efforts, we developed a process for addressing climate change adaptation and implementing resilient design for the thousands of DCAMM facilities across the state. The SRMP tasks completed include:

- Reviewing 8,000+ state assets and developing portfolio screening tools
- Working with DCAMM stakeholders to identify representative Commonwealth assets
- Designing criteria for assessing criticality to apply to portfolio and selecting representative assets to perform a Risk and Vulnerability Assessment (RVA)
- Establishing climate scenarios and a planning horizon for climate change projections
- Evaluating vulnerability and risk to climate impacts for 57 state-owned facilities
- Developing a prioritization matrix to identify pilot sites for a site-specific RVA
- Designing a site-specific living scorecard (i.e., a Facility Checklist) that considers existing conditions, climate parameters, and building system criticality using Weston & Sampson's iDataCollectSM mobile platform
- Performing a site-specific RVA for 3 pilot sites using the Facility Checklist and identifying priority systems
- Conducting three pilot site workshops with stakeholders and facility managers to discuss the results of the RVA and the site-specific RVAs, and introduce general and site-specific adaptation strategies
- Developing site-specific adaptation strategies/methodology that connects the RVA process to risk mitigation
- Producing general resiliency design guidelines and a vulnerability scorecard for planning and development

In creating guidelines for implementing structural retrofits and improvements, this SRMP laid the groundwork for DCAMM to implement resilient design on future projects and ensure service continuity for constituents, and Weston & Sampson's development of the site-specific facility checklist proved instrumental to the RVA process. Adaptation strategies included infrastructure repairs and upgrades; land acquisition, management, and protection; and enhancement of natural systems. In addition, our team coordinated and collaborated with various local, state, and federal agencies throughout the development of the master plan.

client contact

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MUNICIPAL VULNERABILITY PREPAREDNESS (MVP) & HAZARD MITIGATION PLAN (HMP) UPDATE

town of groton, massachusetts



Take the **online survey** to tell us more about hazards and preparedness in Groton

- Comment on the webinar, and help us understand your priorities by taking our survey!
- tinyurl.com/GrotonMVPSurvey
- The survey will be available online until **April 23rd**



5. What steps have you already taken to prepare for extreme events?

- I have a kit in case of emergencies (which may include food, water, flashlights, batteries, and other supplies)
- I receive news, updates, and information about emergency preparedness in Groton
- I know where the nearest local shelter is
- I have signed up for the Code RED notification system
- Other

6. What resources do you need to feel more prepared?

8. Rank the following climate adaptation action items from highest priority to lowest priority.

- Update regulations related to stormwater management and low impact development
- Upgrade undersized culverts using climate change projections
- Increase water storage, address potential contaminants, and increase water conservation
- Address invasive species through removal and public education
- Increase and maintain open space and habitat for endangered species

Weston & Sampson worked with the Town of Groton to prepare a joint HMP and MVP plan to mitigate the effects of natural hazards and increase resilience against climate change. We leveraged the common steps of both processes, including collecting and reviewing background information on existing conditions and previous natural hazard events. We assisted the town in establishing a municipal planning team to guide the public engagement process and review recommendations from the public into the town's proposed hazard mitigation and climate resilience strategies. We engaged stakeholders through an all-day facilitated Community Resilience Building (CRB) workshop, following guidance from The Nature Conservancy, and we assisted the town in hosting a virtual public listening session on Zoom. This was paired with a recorded video and online survey to capture additional input. These meetings with stakeholders and the public were essential components of both HMP and MVP processes, and offered the public a variety of ways to participate.

The HMP-MVP Plan profiles potential natural hazards, including flooding, severe winter weather, wind events, extreme temperatures, brushfire, and drought. Each hazard profile also describes the anticipated amplification of these hazards under climate change scenarios and associated impacts. By conducting HAZUS and flood vulnerability analyses, Weston & Sampson was able to quantify the potential damages associated with future flooding, earthquakes, and hurricanes.

Working with the town, Weston & Sampson developed a comprehensive list of critical infrastructure, vulnerable populations, and natural resources. The plan then took into account the town's ongoing hazard mitigation and climate adaptation work that is interwoven into daily operations and maintenance. The team analyzed the vulnerabilities and strengths of community assets to generate a comprehensive range of hazard mitigation and climate change adaptation strategies. The result of this analysis, along with public input, is a final set of priority action items paired with potential funding sources.

We prepared the HMP-MVP Plan in accordance with FEMA guidelines for Hazard Mitigation Planning and the Massachusetts Executive Office of Energy & Environmental Affairs' requirements for Groton to become a Certified MVP Community. With this designation and a completed plan, Groton will be eligible for FEMA grant funding and Massachusetts MVP Action Grants, which are used to implement priority climate change adaptation projects.

- municipal planning team support
- all-day stakeholder workshop
- virtual public listening session
- online video and survey
- identification of natural hazards and climate change impacts
- identification of critical features and facilities
- HAZUS and flood vulnerability analyses
- action and strategy development and prioritization
- identification of grant opportunities to fund implementation of priority actions

client contact

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HAZARD MITIGATION PLAN

town of narragansett, rhode island



Tropical Storm Irene, 2011 (Photo credit: Dean Hoxsie, Former Narragansett Police Chief)



Tropical Storm Sandy



Blizzard of 2013



Damage from Tropical Storm Irene

Weston & Sampson assisted the Town of Narragansett with its Hazard Mitigation Plan (HMP), which recommended actions and policies for the town to minimize the social and economic losses and hardships resulting from natural hazards, such as severe weather, hurricanes, floods, earthquakes, tornadoes, heat wave, and drought. These hardships include the loss of life, destruction of property, damage to crucial infrastructure and critical facilities, loss/interruption of jobs, loss/damage to businesses, and loss/damage to significant historical structures. The HMP was adopted through a complex public and regulatory process that included:

- Review by Local Hazard Mitigation Committee
- Notice for public comment
- Public meeting
- Review and approval by the Rhode Island Emergency Management Agency
- Review and approval pending adoption by the Federal Emergency Management Agency
- Adoption by Town Council by Resolution on January 7, 2019

Weston & Sampson assisted with final development and drafting of the HMP, coordination with state and federal reviewers, presentation at public meetings, and incorporation of comments from the regulatory and public review processes. A key element of this project was to assist the town in meeting an ambitious 3-month schedule for completion and approval of the plan. Weston & Sampson helped the town to beat that deadline by two weeks.

client contact

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HAZARD MITIGATION & MUNICIPAL VULNERABILITY PREPAREDNESS PLANNING

city of waltham, massachusetts



Weston & Sampson worked with the City of Waltham to prepare a joint Hazard Mitigation Plan (HMP) to mitigate the effects of natural hazards, and a Municipal Vulnerability Preparedness (MVP) plan to increase resilience against climate change. We leveraged the common steps of both processes, including collecting and reviewing background information on existing conditions and previous natural hazard events. We assisted the city in establishing a municipal planning team whose responsibilities included guiding the public engagement process, and incorporating recommendations from the public into the city's proposed hazard mitigation and climate resilience strategies. We engaged stakeholders through an all-day facilitated Community Resilience Building (CRB) Workshop, following guidance from The Nature Conservancy, and we assisted the city in hosting the public in two information-sharing listening sessions. These meetings with stakeholders and the public were essential components of both the HMP and MVP process.

The city's plan describes the multiple natural hazards potentially affecting the community; including flooding, winter storms, high winds, fires and geologic hazards; and considers how the effects of climate change will intensify these hazards through more frequent and severe precipitation, droughts, extreme weather events, and increased temperatures. The plan identifies critical features of the city most at risk; including critical infrastructure, vulnerable populations, and natural resources; and assesses the vulnerabilities of these features to natural hazards and climate change. The plan also identifies and analyzes a comprehensive range of specific mitigation actions and includes a list of prioritized hazard mitigation projects that best meet the City of Waltham's needs for multiple hazard damage reduction.

We prepared the HMP-MVP in accordance with FEMA guidelines for Hazard Mitigation Planning and the Massachusetts Executive Office of Energy & Environmental Affairs' requirements for Waltham to become a "Certified MVP Community." Based on the MVP designation and a completed plan, Weston & Sampson then supported the town in obtaining and implementing an MVP Action Grant for a Resilient Stormwater Action and Implementation Plan to further delineate flood issues and solutions.

- **municipal planning core committee support**
- **all-day stakeholder workshop**
- **public education and interaction**
- **historic hazard profile and climate change projections**
- **critical features and facilities list**
- **vulnerability analysis**
- **development and prioritization of mitigation strategies**
- **implementation and funding strategy**

client contact

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HAZARD MITIGATION PLAN UPDATES

city of warwick, rhode island



Weston & Sampson assisted the City of Warwick in updating its Hazard Mitigation Plan (HMP). This project was undertaken to assess/minimize the risk of damage from potential future natural hazards events and ensure the city's continued eligibility for hazard mitigation grant funding administered by the Federal Emergency Management Agency (FEMA).

Weston & Sampson met with representatives from various city departments to gather information to update the existing HMP, including changes in city personnel, policies, and procedures; new and revised ordinances and other regulatory mechanisms; and the implementation status of previously recommended mitigation measures.

We also facilitated discussion regarding needed updates to the HMP, particularly identifying new mitigation measures based on experiences from the extreme rainfall events of March 2010. We researched historic and statistical data on climate, weather, and natural hazard occurrences, and gathered updated information on the city's assets. We reviewed, tabulated, and summarized data as part of revising hazard identification, risk assessment, and vulnerability analysis chapters in the HMP.

Weston & Sampson also worked with the city to identify existing and future hazard mitigation actions to help minimize potential future losses. In 2010, Warwick experienced one of its worst natural disasters on record. Two consecutive storm events in March dropped almost 12 inches of rainfall over the Pawtuxet River Basin. The two events caused the main channel of the Pawtuxet River to crest at an elevation of 20.79 feet, almost 12 feet over flood stage. Substantial flooding and extraordinary damages occurred along the Pawtuxet River, including Warwick, and a Major Disaster Declaration was issued by President Obama on March 29th. Although final damage assessments were not yet available at the time of the HMP update, at that time, FEMA estimated that almost \$79 million had already been paid out in federal grants and loans in Warwick. The magnitude of this one natural disaster, combined with the risk of other similar natural hazards impacting Warwick, made flooding the primary focus of the proposed mitigation actions.

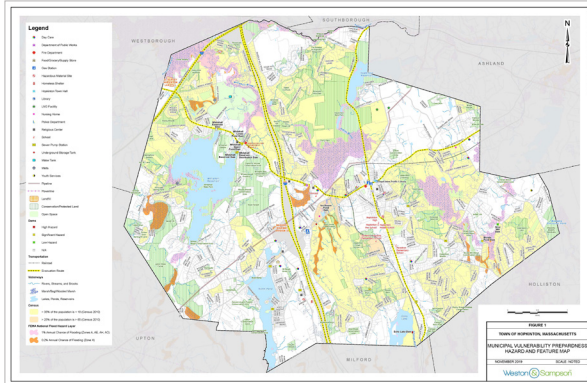
Weston & Sampson evaluated and prioritized the proposed mitigation actions using the Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria common to public administration officials and planners. Planning-level cost-benefit analyses and implementation schedules were also prepared for each of the mitigation actions. Weston & Sampson incorporated all of these efforts into an updated HMP document. We provided a draft of the HMP to city department heads for review, and to the public through a formal notice/hearing process. Weston & Sampson addressed comments and worked with the city on getting approval from the Rhode Island Emergency Management Agency.

client contact

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MUNICIPAL VULNERABILITY PREPAREDNESS (MVP) & HAZARD MITIGATION PLAN (HMP)

town of hopkinton, massachusetts



RESILIENCY STARTS HERE

Help us plan for a future with a changing climate

Hazard Mitigation and Municipal Vulnerability Preparedness Plan Listening Session

PRESENTATION + DISCUSSION + INTERACTIVE POLLING

THURSDAY MARCH 16

6:30-8:00PM

Hopkinton Public Library
 Large Event Room, Hopkinton Public Library, 13 Main Street, Hopkinton, MA

HOPKINTON
RESILIENCY STARTS HERE

HAZARDS IN HOPKINTON

Extreme Temperatures

Heavy Precipitation, Flooding

Severe Thunderstorms, Wind, Tornado

Drought, Wildfire

Severe Snowstorms, Ice Storms, Nor'easters

Erosion, Earthquakes, Landslides

Weston & Sampson worked with the Town of Hopkinton to prepare a joint HMP-MVP Plan to mitigate the effects of natural hazards and increase resilience against climate change, respectively. We leveraged the common steps of both processes, including collecting and reviewing background information on existing conditions and previous natural hazard events. We assisted the town in establishing a municipal planning team to guide the public engagement process and review/incorporate recommendations from the public into the town's proposed hazard mitigation and climate resilience strategies. We engaged stakeholders through an all-day facilitated Community Resilience Building (CRB) workshop, following guidance from The Nature Conservancy, and we assisted the town in hosting a virtual public listening session (using a video and online survey). These meetings with stakeholders and the public were essential components of both HMP and MVP processes.

The HMP-MVP Plan profiles all of the potential natural hazards, including flooding, severe weather, extreme temperatures, brushfire, and drought. Each hazard profile also describes the anticipated amplification of these hazards under climate change scenarios and the possible impacts. By conducting a HAZUS analysis, Weston & Sampson was able to quantify the dollar amount of possible damage for flooding, earthquakes, and hurricanes.

Working with the town, Weston & Sampson developed a comprehensive list of critical infrastructure, vulnerable populations, and natural resources. The plan accounts for ongoing hazard mitigation and climate adaptation work that is interwoven into daily operations and maintenance. The team analyzed the vulnerabilities and strengths of community assets to generate a comprehensive range of hazard mitigation and climate change adaptation strategies. The result of this analysis, paired with public input, is a final set of specific mitigation and adaptation actions prioritized by each one's benefit to the community, estimated cost, and political support.

One initial tool developed in response to these climate vulnerabilities addressed tick-related illnesses. With higher temperatures and late winter frosts, tick populations have been on the rise. Likewise, the incidence rate of vector-borne diseases, such as Lyme disease, has been increasing. Together, Hopkinton and Weston & Sampson developed a proactive approach to inform residents and hikers through educational content on how to protect against ticks and possible infections.

We prepared the HMP-MVP Plan in accordance with FEMA guidelines for Hazard Mitigation Planning and the Executive Office of Energy & Environmental Affairs' requirements for Hopkinton to become a Certified MVP Community. With this designation and a completed plan, the town will be eligible for FEMA grant funding and Massachusetts MVP Action Grants to implement priority strategies.

- municipal planning team support
- all-day stakeholder workshop
- public education and outreach, including virtual engagement
- hazard descriptions / identification of critical features and facilities
- vulnerability analysis
- climate adaptation strategy development and prioritization
- continued hazard mitigation planning and mitigation strategy
- tick education

client contact

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