

Municipal Vulnerability Preparedness Grant Program Application Form

RFR ENV 20 MVP 02

Combuys Bid # BD-20-1042-ENV-ENV01-44367

- 1. Municipality:** City of Somerville, on behalf of Boston, Chelsea, Everett, Winthrop, and Revere
- 2. Project Title:** Critical Regional Infrastructure and Social Vulnerability in the Lower Mystic Watershed

3. Type of Project (check all that apply):

- Detailed Vulnerability and Risk Assessment and Further Planning
- Community Outreach and Education
- Local Bylaws, Ordinances, Plans, and Other Management Measures
- Redesigns and Retrofits
- Energy Resilience Strategies
- Chemical Safety & Climate Vulnerabilities
- Nature-Based Flood Protection, Drought Mitigation, Water Quality, and Water Infiltration Techniques
- Nature-Based, Infrastructure, and Technology Solutions to Reduce Vulnerability to Extreme Heat and Poor Air Quality
- Nature-Based Solutions to Reduce Vulnerability to other Climate Change Impacts
- Acquisition of Land to Achieve a Resiliency Objective
- Ecological Restoration and Habitat Management to Increase Resiliency
- Subsidized Low Income Housing Resilience Strategies
- Mosquito Control Districts

4. Local Project Manager and Point of Contact:

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5. Proposed Funding Summary:

Total Project Cost: \$570,936
Grant Request: \$389,995
Municipal Match (at least 25% of total project cost): \$180,941 (32% of total project cost)

6. Project Summary (1-2 short paragraphs describing the project):

The City of Somerville, with partners Boston, Chelsea, Everett, Revere, Winthrop, and the Mystic River Watershed Association (MyWRA), is submitting this regional Municipal Vulnerability Preparedness (MVP) Action Grant proposal to fund the development of two related assessments over the course of an 18-month project period. These communities are all members of the Resilient Mystic Collaborative's (RMC) Lower Mystic working group. The Lower Mystic River Watershed (Amelia Earhart Dam through Deer Island) is home to some of Greater Boston's most critical transportation, energy, food distribution, and water infrastructure. It is also one of the densest residential areas in New England, with tremendous socioeconomic diversity, wealth disparities, and environmental justice concerns. The RMC's Lower Mystic working group has begun discussing extreme weather events to understand how residents will be impacted, but needs financial support to conduct targeted analyses of the impacts and anticipated response and results.

With Somerville as lead agency, this workgroup is requesting \$389,995 to hire consultants to lead the development and completion of two assessments. The first will engage public and private infrastructure managers in a regional vulnerability assessment to identify critical interdependencies and potential cascading failures during and after an extreme coastal storm. The second will involve community and public health experts and identify the possible impacts to vulnerable residents and workers when critical infrastructure fails. These assessments will help municipalities work with infrastructure managers to assess current systems, develop response plans, and seek additional funds to storm-harden regional infrastructure and keep residents safe during and after coastal storms.

7. Project Narrative

7.1 Project Description, Rationale, and Public Benefits (25 points)

Project Rationale

The Lower Mystic River Watershed is defined as its saltwater portion below the Amelia Earhart Dam. It includes the municipalities of Somerville, Everett, Chelsea, Boston (Charlestown and East Boston), Winthrop, and Revere. This region is home to both the most concentrated assembly of critical infrastructure in New England and some of the most diverse environmental justice communities in Massachusetts.

The Department of Homeland Security (DHS) recognizes 16 critical infrastructure sectors “whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.”¹ DHS calls these “lifeline sectors.” Of these 16 critical infrastructure sectors, the Lower Mystic hosts at least five, including:

- Transportation: Logan Airport, three MBTA rail lines, the Ted Williams and Callahan tunnels
- Food distribution: the New England Produce Center
- Energy: Over 100 fuel storage tanks, the Lower Mystic Generating Station
- Wastewater management: Deer Island Wastewater Treatment Plant
- Dam: Amelia Earhart Dam

Residents of the Lower Mystic are heavily burdened by active industrial sites and legacy brownfields. Bulk fuels—including jet fuel for Logan airport, home heating oil, and other petrochemicals—are stored adjacent to dense residential neighborhoods, putting them at risk of significant toxic releases during and after extreme weather events. Four of these communities—Charlestown/East Boston, Chelsea, Somerville, and Everett—are among the most intensively overburdened communities in Massachusetts, according to Dr. Daniel Faber’s *Unequal Exposure to Ecological Hazards: Environmental Injustices in the Commonwealth of Massachusetts* (2005). Residents in these communities are disproportionately low income people of color, English-language learners, and/or living with health conditions. Each of these factors increases their risk of economic and physical harm during and after extreme weather events.

Public and private infrastructure managers range widely in their level of planning and preparedness for extreme coastal storms. Massport and MWRA, for example, operators of Logan Airport and Deer Island Wastewater Treatment Plant, were early leaders in planning, training, and investing in coastal flood resiliency. Conversely, the New England Produce Center, which imports and distributes nearly all of the fresh fruits and vegetables for New England and the Canadian Maritimes, is a privately owned cooperative located in Chelsea and Everett with little ability to examine its own vulnerabilities or plan for future events. Last year, the Produce Center was flooded with three feet of saltwater that came over seawalls and up through broken culverts in 2018’s record Nor’easters.

Recent extreme weather in Boston and elsewhere has elevated concerns about catastrophic infrastructure failure and harm to surrounding residents. The Associated Press and Houston Chronicle documented over 100 Hurricane Harvey-related toxic releases, including an exploding chemical plant and multiple fuel tank

¹ <https://www.dhs.gov/cisa/critical-infrastructure-sectors>

failures. Hurricane Florence's record rains flooded toxic pig manure ponds and coal ash pits, causing their toxic contents to spread widely. Some of the active and historic industrial sites in the Lower Mystic also have the potential to contaminate surrounding neighborhoods and Boston Harbor during severe flood events. Low-lying areas already flood during King Tides and severe storms.

Regulations governing the safe storage of petrochemicals and other hazards were developed long before climate change was widely understood to be an issue of concern. We seek to understand, for example, whether current regulations and standard of care protecting oil terminal workers and residents from tank breaches would be sufficient during and after the level of flooding projected during future stronger storms with underlying sea level rise.

Advancement of MVP Priority Actions

This MVP Action grant would support the regional and individual priorities of Lower Mystic municipalities. First, the Resilient Mystic Collaborative, a voluntary partnership among 17 municipalities, was launched in September 2018 and has grown to cover approximately 90 percent of the Mystic River Watershed by area. Participating municipalities include: Arlington, Boston, Burlington, Cambridge, Chelsea, Everett, Lexington, Malden, Medford, Melrose, Revere, Somerville, Stoneham, Wakefield, Winchester, Winthrop, and Woburn. In developing a common workplan, we unanimously agreed on four strategies:

- Upper Mystic communities would work to develop and pursue opportunities for regional stormwater management, leading with nature-based solutions;
- Lower Mystic communities would focus on increasing the resiliency of critical regional infrastructure to current and projected extreme weather;
- A watershed-wide Social Resiliency working group would identify and pursue policies and investments to increase the resiliency of vulnerable residents to extreme weather; and
- The Collaborative would actively advocate for meaningful improvements in local and statewide policies to help communities prepare for climate change.

Second, the Collaborative's common concerns are reflected in individual MVP plans, or their equivalent, as well. For example:

Somerville's Climate Forward Plan, Action Area 13: Regional Collaboration for Coastal Resilience, states:

- A regional coalition of neighboring municipalities and stakeholders in the Mystic River watershed needs to be formed to develop a cohesive regional strategy and to push State action.
- It is necessary to assess potential interventions to address flooding risks along the Mystic River.

Chelsea's MVP plan listed sea-level rise and severe storms as two of its top concerns, and identified many related priority actions, including:

- Requesting funding from the petroleum farms on the waterfront to help protect and mitigate potential toxic exposure in flooding plan. Propose adaptation and mitigation projects to utility companies.
- Requiring communication from the petroleum farms along the waterfront/floodplain on their solution in the event of flooding. Creating zoning restrictions or regulations for hazard mitigation.

Climate Ready Boston includes Strategy 6: Coordinate investments to adapt infrastructure to future climate conditions. This strategy includes establishing an infrastructure coordination committee to:

- Use updated climate projections to develop planning and design standards across member agencies for retrofitting or constructing all major infrastructure systems to a standard set of future climate conditions.
- Collaborate to identify cascading vulnerabilities and opportunities for joint adaptation projects that could improve effectiveness or cost efficiencies by addressing multiple systems’ vulnerabilities at once.
- Develop adaptation plans, tied to capital improvement plans, in order to upgrade their vulnerable assets over time to meet the agreed-upon planning and design standards.

Project Description

This Action Grant lays the groundwork for multi-year efforts to minimize coastal storm damage to critical regional infrastructure and the people who depend on it. The project involves two streams of integrated work: a critical infrastructure vulnerability assessment and a related social vulnerability assessment. The critical infrastructure vulnerability assessment (“infrastructure assessment”) involves working with infrastructure managers and emergency preparedness agencies to identify infrastructure interdependencies and potential cascading failures resulting from current and projected coastal storms as defined by the Boston Harbor Flood Risk Model, the consensus best available science for this region.²

The social vulnerability assessment will seek to understand how subsets of people (e.g., commuters, people with frail health, people with language barriers) could be affected when those infrastructure failures occur. This product will help identify and prioritize those assets most critical to maintaining economic and physical health among vulnerable residents. It will also help municipalities prioritize and plan for alternative services in case infrastructure assets are damaged or destroyed.

The outcome of both assessments will be priority cost-effective “punch lists” of capital and operational improvements and regional coordination needed to stormproof infrastructure in the Lower Mystic and keep people safe. Once we complete this dual assessment, Lower Mystic municipalities will have a more comprehensive analysis of the regional infrastructure that we host but do not control and a better understanding of how to support our residents and workers when this infrastructure fails. Below is a summary table describing both workstreams.

SUMMARY TABLE FOR COMPLEMENTARY WORK STREAMS	
Phase 1: To be completed by June 2020	
Task 1A: Convene and Build Critical Infrastructure Vulnerability Assessment	Task 1B: Convene and Build Framework for Social Vulnerability Assessment
1A.1: Convene a Resilient Infrastructure working group	1B.1: Hire consultant team

² <http://resilientma.org/resources/resource::2125/boston-flood-maps>

1A.2: Secure Agreement on Flood Data and Design Storm Parameters for Vulnerability Assessment	1B.2: Align roles and responsibilities among social vulnerability assessment team partners
	1B.3: Integrate understanding across vulnerability assessment teams (critical infrastructure and social)
	1B.4: Develop social vulnerability assessment framework
Phase 2: To be completed by June 2021	
Task 2A: Complete Infrastructure Vulnerability Assessment	Task 2B: Complete Social Vulnerability Assessment
2A.1: As needed, provide a self-assessment tool and technical support to infrastructure managers	2B.1: Review draft assessment framework with communities
2A.2: Evaluate existing Hazard Mitigation Plans and other data; prepare GIS data	2B.2: GIS analysis of social vulnerability to show where we have overlaps between storm impacts and vulnerable communities.
2A.3: Perform Lower Mystic tabletop exercise to identify critical dependencies and possible cascading failures across infrastructure types	2B.3 Integrate critical infrastructure data and finalize assessment framework
2A.4: Use results of tabletop exercise to prioritize working group deliverables	2B.4 Conduct social vulnerability assessment (deep community engagement)

Critical Infrastructure Vulnerability Assessment Phase 1: To be completed by June 2020

Task 1A: Convene Critical Infrastructure Vulnerability Assessment

During summer 2019, RMC members met one-on-one with public and private infrastructure managers and emergency preparedness experts to evaluate their interest and concerns around participating in a regional vulnerability assessment and preparedness plan. These meetings resulted in a kickoff working lunch on September 18th among municipal staff, public and private infrastructure managers, and emergency preparedness agencies. Participants agreed on the need to understand individual and regional vulnerabilities to more extreme coastal storms, and expressed willingness to participate in a facilitated process that was efficient, effective, and protected confidential information.

Following the September meeting, we spoke with experts from the NYC Mayor’s Office of Recovery and Resilience, Massport, Mass Water Resources Authority (MWRA), US Coast Guard (USCG), DHS,

Northeastern University Global Resilience Institute, and NY/NJ Regional Plan Association. Based on their guidance, we developed the following process for the regional infrastructure assessment.

First, the NYC Mayor's Office of Recovery and Resilience developed and have provided us with a standardized Excel-based self-assessment template with local climate projections. We will modify this template for local conditions and climate projections and will provide technical support to infrastructure managers who have not yet completed climate vulnerability assessments to ensure that they have the data needed to participate meaningfully in the regional assessment. We are working with staff from DHS and the Massachusetts Emergency Management Agency (MEMA) to develop and implement a process to ensure that any sensitive or confidential information they agree to share or jointly develop in this process will be protected.

Post-award, the City of Somerville will contract with a consultant to work with willing facility managers to ensure that all participants have the self-assessments needed to participate in this regional assessment. The consultant will work with infrastructure managers and DHS staff to gather additional geospatial information about critical infrastructure vulnerabilities as available and necessary for the analysis.

Second, the DHS Exercise and Evaluation Program is the accepted standard for building out scenario exercises from classroom discussions to full-scale mock emergencies. DHS recently led a simultaneous tabletop exercise across multiple Boston-area university campuses examining risks from a major coastal storm. They have agreed to help us develop and lead a similar exercise for infrastructure managers.

We plan to partner with DHS on a regional tabletop exercise that simulates the Lower Mystic being hit by current and projected extreme coastal storms, as defined by the Boston Harbor Flood Risk Model. For this exercise to be successful, we need the willing participation of private and public infrastructure owners and managers in the region. They will need to agree on common climate projections, identify facility-specific vulnerabilities, and share those vulnerabilities during the DHS-led tabletop exercise to identify cross-sector vulnerabilities during and after major coastal storms. The results of the tabletop exercise will be a prioritized list of capital and operational improvements.

Based on the discussions with experts described above, we have developed the following 18-month process for identifying and prioritizing capital investments and operational improvements to increase the resiliency of critical regional infrastructure in the Lower Mystic to extreme coastal storms.

Sub-Task 1A.1. Convene a Resilient Infrastructure Working Group

Facilitators from the Mystic River Watershed Association (MyRWA), Consensus Building Institute (CBI), and DHS will staff a multi-stakeholder working group comprised of planners, engineers, and emergency preparedness experts from the following entities:

- Lower Mystic municipalities: Somerville, Chelsea, Everett, Boston, Winthrop, and Revere.
- Public infrastructure managers: Massport, MWRA, MBTA, MassDOT, Mass DCR, BWSC
- Private infrastructure managers: Exelon, Global Oil, New England Produce Center, Eversource, National Grid, additional oil terminals as possible
- Emergency preparedness agencies: MEMA, USCG, DHS

Deliverables: A memorandum of understanding agreed upon by all participants that includes agreements on a process, deliverables, commitments to participate, and confidentiality. A commitment by a subset of

participants (e.g., Massport, MWRA, BWSC, DHS, USCG, MEMA) to serve as a leadership team to help guide the process between meetings.

Project team: Julie Wormser (MyRWA), Carri Hulet (CBI), Kristina Arsenault (DHS), Oliver Sellers-Garcia (City of Somerville), resilient infrastructure working group

Sub-Task 1A.2. Secure agreement on flood data and design storm parameters for vulnerability assessment

The Greater Boston area is very fortunate to have the Boston Harbor Flood Risk Model, a highly respected hydrodynamic model developed by the Woods Hole Group (WHG) for MassDOT, that calculates probabilities and depths of coastal flooding in 2030 and 2070 based on sea level rise projections, 1% storms and 0.1% storms. The Commonwealth contracted with WHG to develop updated versions of these flood maps for the entire Massachusetts coastline, adding probabilities for 2050 and 2100. We will use the most up-to-date version of these maps in our infrastructure assessment. The current versions may be downloaded from <http://resilientma.org/resources/resource::2125/boston-flood-maps>.

Most Boston Harbor public agencies and municipalities are already using these projections in their climate vulnerability assessments. The flood projections go beyond current regulations; private facilities are not required to use them. Woods Hole Group modelers have agreed to present to the working group and lead a discussion to help us come to agreement on the flood inundation maps we will use in our vulnerability assessment. Our hope is to get full agreement to use the 2030 maps as an indicator for immediate risks, and 2070 maps as an indicator for risks to be managed during the next round of scheduled capital improvements.

Deliverable: Memorandum documenting the working group's agreement and assumptions on the Boston Harbor Flood Risk Model maps to be used for the Lower Mystic regional vulnerability assessment.

Project team: Julie Wormser (MyRWA), Carri Hulet (CBI), Kristina Arsenault (DHS), Oliver Sellers-Garcia (COS), resilient infrastructure working group; presentation by Kirk Bosma (WHG).

Critical Infrastructure Vulnerability Assessment Phase 2: To be completed by June 2021

Task 2A: Complete Infrastructure Vulnerability Assessment

Sub-Task 2A.1. As needed, provide a self-assessment tool and technical support to infrastructure managers

Many, but not all, of the regional infrastructure managers in the Lower Mystic have completed climate vulnerability assessments. They will need this basic information for each facility in order to participate in a regional assessment. The NYC Mayor's Office of Recovery and Resilience has provided us with the self-assessment tool they require infrastructure managers to use. To assist those who haven't, or who haven't used the higher flood projections, contractors will provide confidential professional support to help facility managers identify at-risk assets.

Deliverables: Consultant modifies NYC tool to fit local climate projections and other conditions and supports participants in filling out tool. Every infrastructure manager participating in the regional assessment has completed an initial self-assessment of at-risk assets sufficient to participate in a regional vulnerability analysis. These assessments will be developed by DHS into a data layer and overlaid with the defined flood risk areas associated with sea level rise and coastal storms developed in Task 2.

At this point in the analysis, we will meet with the social vulnerability team to share data as appropriate, in order to prioritize risks to vulnerable populations (see social vulnerability Task 3 for more detail).

Project team: Consultant, individual infrastructure managers as needed, Julie Wormser (MyRWA), Carri Hulet (CBI)

Sub-Task 2A.2: Evaluate existing Hazard Mitigation Plans and other data

Additional data exists for risks to individual facilities and infrastructure sectors from extreme storms. For example, DHS has completed a Regional Resiliency Assessment Program (RRAP) analysis of New England's power grid. Contractors with security clearance will work with DHS, MEMA and facility managers to access existing emergency preparedness plans as well as geospatial databases of critical infrastructure assets and systems from existing sources, such as the National Risk Management Center and the National Infrastructure Simulation and Analysis Center. Contractors will review these additional data with facility managers in preparation for a regional assessment.

In addition, we will ask the same contractors completing the geospatial analysis for infrastructure to also complete the geospatial analysis of social vulnerability (see Social Vulnerability Assessment Task 4, below).

Deliverables: Compilation, ground-truthing, and development of geo-spatial and other data of at-risk assets in preparation for the tabletop exercise. Development of map-based social vulnerability data for the social vulnerability assessment.

Project team: Consultant, municipalities, DHS, resilient infrastructure working group, coordinating with social vulnerability team.

Sub-task 2A.3: Perform Lower Mystic tabletop exercise to identify critical dependencies and possible cascading failures across infrastructure types

Using the consensus design storm parameters and facility data developed in Tasks 2 through 4, DHS will develop and lead a seminar and a tabletop exercise for key facility personnel and emergency managers. Seminar exercises are classroom discussions that elicit predictions of vulnerabilities to simulated emergencies, in this case a major coastal storm.

Tabletop exercises involve facilitated classroom sessions with maps, data and emergency simulations where participants are guided through one or more defined scenarios to identify likely responses.³ In this case, we will be simulating the impacts of an extreme coastal storm on Lower Mystic infrastructure. This exercise will bring key operations personnel from multiple facilities together for a short, intense workshop to identify functional interdependencies (e.g., if the power grid fails, subways stop immediately) and prioritize needs for real-time emergency communications and key investments in resiliency. The group may also invite additional maritime industrial businesses—such as the Boston Autoport, Eastern Salt, and Schnitzer Northeast—to participate in the tabletop exercise.

Deliverable: Development and completion of the tabletop exercise, including written results for use by the infrastructure resilience working group.

Project team: Kristina Arsenault (DHS), Julie Wormser (MyRWA), Carri Hulet (CBI), Oliver Sellers-Garcia (COS), resilient infrastructure working group

³ <https://www.ready.gov/business/testing/exercises>

Sub-Task 2A.4: Use results of tabletop exercise to prioritize working group deliverables

Following the tabletop exercise, the contractor and the leadership team will help the working group identify at-risk critical assets and the consequences of infrastructure failure. The deliverable will be a simplified dependency matrix that prioritizes capital investment and operational readiness needs to make those assets secure. The exercise should also help identify needs for real-time regional communication and assessment tools during extreme weather events.

At this point, the working group will determine which activities need to be pursued together, and which would be completed by individual infrastructure managers. External funding for this prioritized list of activities would be sought. Examples of possible future work and project ideas include:

- Incorporating identified risks into Hazard Mitigation Plans in order to pursue funding
- Identifying needs for short-term actions as longer term efforts are designed and resourced
- Advocacy for regional capital investments, such as flood barriers
- Coordination of emergency operations and communication channels
- Creation of regional dashboards that provide real-time emergency information to facilities
- Peer-to-peer trainings, problem solving and case studies to help institutionalize resilience
- More robust follow-up assessments of system interdependencies and vulnerabilities, as needed

Deliverable: Summary document of priority capital investments and needs for operational improvements and regional coordination.

Project team: Consultant, Kristina Arsenault (DHS), Julie Wormser (MyRWA), Carri Hulet (CBI), Oliver Sellers-Garcia (COS), resilient infrastructure working group

Social Vulnerability Assessment Phase 1: To be completed by June 2020

Task 1B: Convene and Build Framework for Social Vulnerability Assessment

As we learn more about the vulnerabilities of our critical infrastructure in the Lower Mystic, we will also be asking the next logical question: “Who will be impacted, and how, when the infrastructure fails?” The social vulnerability assessment will seek to answer that question.

The social vulnerability assessment will be completed in two phases. In the first phase, a consultant team, consisting of a professional firm and community organization partners, will work with the Resilient Mystic Collaborative (RMC) to develop a rigorous framework for conducting the analysis. The framework will articulate the methodology by which deep community engagement, combined with existing data and new data and analysis from the critical infrastructure assessment, will illuminate the challenges people face in extreme weather and how they imagine coping with them.

In the second phase, the consultant team will work with the RMC to execute the framework. This work will be shaped by the infrastructure assessment, necessitating clean coordination across the two work streams. The RMC’s two co-facilitators, Carri Hulet with the Consensus Building Institute (CBI) and Julie Wormser with MyRWA, will be primarily responsible for facilitating that coordination.

In preparation for this grant, the RMC has already developed an inventory of social service providers in the Mystic watershed dedicated to helping a range of vulnerable populations. The Barr Foundation is funding a

full-time climate resilience project manager, Melanie Gárate (hosted at MyRWA), whose main responsibility is to develop relationships with these entities on behalf of the RMC. When the social vulnerability consultant team comes on board, they will have the advantage of leveraging the knowledge and new relationships the RMC has begun developing in order to build the framework for the assessment.

The primary outcome of the social vulnerability assessment will be an understanding of how vulnerable residents and workers in the Lower Mystic will be impacted when critical infrastructure fails in extreme weather, and what could be done to avoid harm to the extent possible. This project has also been designed to build one of the key characteristics of climate resilient communities: strong relationships among the people who live and work there.

Sub-Task 1B.1: Hire consultant team

The first step will be to find the right partners to design and implement the assessment. The City of Somerville, on behalf of the RMC, will conduct an RFP process to hire a consultant team, including a professional firm with experience designing and managing complex planning engagements, with several partners who are NGO or social service providers with deep connections with underserved populations in the Lower Mystic. This combination of expertise will be critical to delivering the work.

The consultant team will ultimately work closely with the RMC Climate Resilience Project Manager and the RMC Social Resilience working group to carry out the assessment. The Social Resilience working group is a developing body of leaders whose professional affiliations, and often personal backgrounds and experiences, qualify them collectively to guide the RMC's work to increase social resilience to climate impacts in the Mystic River Watershed. Their particular role on this project will be to support and guide the consultant team and advise the RMC on key decisions.

For this task, the Social Resilience working group will review drafts of the RFP before it is finalized and posted. They will also review the applications and recommend an applicant to the RMC and City of Somerville. Ms. Gárate, with support from Carri Hulet of CBI, will facilitate the connections between the Social Resilience working group and the consultant, and between the working group and the RMC.

Deliverables: RFP for services to design and implement the social resilience assessment; contract with consultant team.

Project team: Melanie Gárate (MyRWA), Carri Hulet (CBI), Oliver Sellers-Garcia (COS), Social Resilience working group (RMC), RMC (to vote on the selection of the consultant)

Sub-Task 1B.2: Align roles and responsibilities among social vulnerability assessment team partners

Once the consultant team is selected, all the key players on the social vulnerability assessment will meet to build relationships and to discuss and confirm their respective roles and responsibilities. The key players include the consultant team, the Social Resilience working group, Melanie Gárate, Carri Hulet, and Julie Wormser, who will serve as a bridge to the critical infrastructure vulnerability assessment team.

The RFP will describe each party's roles and responsibilities in concept, and will serve as the starting point for the conversation, but the consultant's unique approach may require some adjustment to the expectations outlined in the RFP. Also, by the time the consultant team is under contract, the critical infrastructure vulnerability assessment will have progressed so an update will be in order.

When these players meet together for the first time, their objectives will be to:

- Review the scope, timeline, and budget for the social vulnerability assessment;
- Discuss the key points of connection between the social vulnerability assessment and the critical infrastructure vulnerability assessment and confirm the broad outlines of the approach to manage these projects in parallel;
- Clarify each entity and individual's respective roles and responsibilities to each other and to complete the work; and
- Schedule at least six months of meetings or other means for coordinating the work among the key players.

Deliverables: Coordination meeting agenda and minutes; revised versions of the scope and schedule

Team members: Social vulnerability assessment consultant team, social resilience working group (RMC), Melanie Gárate (MyRWA), Carri Hulet (CBI), Julie Wormser (MyRWA), Oliver Sellers-Garcia (COS)

Sub-Task 1B.3: Integrate understanding across vulnerability assessment teams (critical infrastructure and social)

For the social vulnerability assessment team to have a clear understanding of the likely short- and longer-term impacts (as predicted in the 2030 and 2070 Boston Harbor flood maps) they will be exploring with the communities, they will need a solid understanding of the scope, process, and deliverables of the critical infrastructure vulnerability assessment. Likewise, it is important to keep the infrastructure team grounded in the reality that mitigating infrastructure failure is ultimately about protecting people. To that end, one meeting early in the process, with everyone who is working on both assessments, should increase understanding, build relationships, and raise the collective investment in the outcomes of both projects. One other potential benefit is that relationships may start here that lead to future collaborations when the projects that result from the assessments need to be funded and implemented.

Key leads from both assessment teams will meet with Julie Wormser, Carri Hulet, and Melanie Gárate to design the meeting. The planning team will select the appropriate data/information to share that will be relevant to everyone, as well as the questions to ask that will benefit from the group's collective insight. This meeting may be an opportunity to include external partners and supporters, such as MVP program officers or team members' colleagues or supervisors. The meeting will be facilitated by CBI and MyRWA.

Deliverables: Memorandum documenting data and assumptions from the infrastructure assessment (Tasks 2A.3 and 2A.4) that will be used in the social vulnerability assessment

Team members: Social vulnerability assessment consultant team, social resilience working group, critical infrastructure working group, critical infrastructure consultant, Melanie Gárate, Carri Hulet (CBI), Julie Wormser (MyRWA), Oliver Sellers-Garcia (COS)

Sub-Task 1B.4: Develop social vulnerability assessment framework

The consultant team will draft a framework for assessing the impacts of critical infrastructure failure in the Lower Mystic, with an emphasis on vulnerable communities. This framework will:

- Develop the questions the assessment seeks to answer;

- Identify relevant information that is expected to come from the infrastructure assessment and how it will be utilized in the social vulnerability assessment;
- Propose a process by which the assessment will be carried out, including extensive public/community engagement and communication activities, roles and responsibilities, timeline, and expected outcomes and deliverables; and
- Cite examples and lessons learned from similar efforts in other places.

Once the draft framework has been developed, the consultant team will facilitate an “internal” review process with the RMC and the critical infrastructure vulnerability assessment team. They will also undertake an extensive exercise to workshop the draft with Lower Mystic communities (see Phase 2, subtask 2B.1).

Deliverable: Draft framework for social vulnerability assessment, with revisions/notes from internal reviews

Team members: Social vulnerability assessment consultant team, Social Resilience working group, appropriate members of the critical infrastructure assessment team, RMC, Melanie Gárate (MyRWA), Carri Hulet (CBI), Oliver Sellers-Garcia (COS)

Social Vulnerability Assessment Phase 2: To be completed by June 2021

Sub-task 2B.1: Review draft assessment framework with communities

Once the framework is drafted, the consultant team will engage in an extensive community-based review process. This effort will both improve the draft and build relationships that may facilitate the implementation in the next phase. The RMC is interested in learning how different consultant teams might approach this task, so we will not prescribe the methodology in the RFP; rather, we will invite the applicants to be creative in their responses, and we will be clear that ample time and resources have been provided to ensure this step is done with care, through deep community engagement. The team will be required to track the feedback and guidance from these interactions and make preliminary adjustments to the framework accordingly.

Deliverables: Summary of the feedback and a preliminary revised draft of the assessment framework.

Team members: Social Vulnerability assessment consultant team, social resilience working group (RMC), Melanie Gárate (MyRWA), Carri Hulet (CBI), Julie Wormser, (MyRWA), Oliver Sellers-Garcia (COS)

Sub-task 2B.2: GIS analysis to identify geographic overlap between storm and heat impacts and vulnerable communities. (Note: The technical aspects of this task will be completed by the consultant working on the infrastructure assessment.)

Using the data on climate projections and critical infrastructure developed for the tabletop exercise, along with additional agreed-upon geospatial socioeconomic data, the infrastructure consultant will conduct a GIS analysis of location-specific communities that are likely to experience the greatest impacts from the failure of critical infrastructure. Prior to conducting the analysis, the consultant team will propose a methodology and review it with the Social Resilience working group and representatives of the critical infrastructure assessment team. They will then finalize the approach and conduct the analysis. It is understood that, in some cases, community-level or region-level data for useful parameters may require additional paperwork or clearances (e.g. LIHEAP).

The results of the GIS analysis will provide one more input into the design of the social vulnerability assessment framework. The team that performed the analysis will review the results with the Social Resilience working group and the full RMC. We expect the results to both confirm expectations on at-risk populations and offer some surprises. The RMC and Social Resilience working group will then develop questions that can be further explored in the assessment.

Deliverables: Coordination meeting agenda and minutes; revised versions of the scope and schedule; geo-spatial data and maps, and descriptive memo regarding social vulnerability.

Team members: Social Vulnerability assessment consultant team, social resilience working group (RMC), Melanie Gárate (MyRWA), Carri Hulet (CBI), Julie Wormser, (MyRWA). The infrastructure consultant will support development of GIS layers for the social assessment.

Sub-Task 2B.3: Integrate critical infrastructure data and finalize assessment framework

The final input into the social vulnerability assessment framework will be the non-sensitive data and analysis from the critical infrastructure assessment. As the critical infrastructure assessment reveals information that impacts the approach to the social vulnerability assessment, or the information that might be shared through the assessment process, it should be integrated into the social vulnerability framework. The lead consultants, with Melanie Gárate, Julie Wormser, and Carri Hulet, will track this task, and, when necessary, convene members from the Lower Mystic working group and the Social Resilience work group, along with the consultants, to discuss and review the information and proposed adjustments to the framework.

Once the social vulnerability assessment consultant team has all the input from the community engagement process, the results of the GIS analysis, and the new or revised information from the critical infrastructure assessment, they will finalize the assessment framework, facilitate a review process with the full RMC, and move toward implementation.

Deliverables: Descriptive memo and maps detailing the new, non-sensitive information from the critical infrastructure vulnerability assessment that is relevant to the social vulnerability assessment. Final assessment framework.

Team members: Social Vulnerability assessment consultant team, social resilience working group (RMC), Melanie Gárate (MyRWA), Carri Hulet (CBI), Julie Wormser (MyRWA), Oliver Sellers-Garcia (COS). The infrastructure consultant will support development of GIS layers for the social assessment.

Sub-Task 2B.4: Conduct social vulnerability assessment and community engagement

All of the previous tasks amount to preparation for this final sub-task: conducting the social vulnerability assessment. Because the work to design and prepare for the implementation has not yet been completed, this sub-task cannot be described in full detail. In fact, the first deliverable for Sub-Task 2B.4 is a complete scope of work and work plan for carrying out the social vulnerability assessment. That said, we have developed a budget and timeline for this work based on a set of expectations on the level of effort required. These include:

1. The social vulnerability assessment team will need to be able to understand and effectively communicate the effects of coastal storms on critical infrastructure and the ensuing “ripple effects” on people on the ground to decision makers and community members.

- This requires effectively conveying information through public-friendly materials through creative writing (and translation), design, and production for both digital and print media.
 - They will need to engage a range of audiences—online and in-person—in dialogue on the relevant science and information about critical infrastructure failure, and the questions embedded in the assessment framework. This includes one-on-one meetings and group workshop facilitation, public speaking, and a methodology for processing diverse feedback. It also requires an approach for delivering much of the engagement in different languages (e.g., English, Spanish, Portuguese, Haitian Creole, and Vietnamese).
2. The social vulnerability assessment will test multiple hypotheses about who might be impacted by critical infrastructure failure and what resources they might have today and/or need in the future to minimize the harm they experience due to these failures.
- The team will need time and resources to meet with audiences, both small and large, to test these hypotheses. In order to effectively reach vulnerable residents and workers, the team will subcontract with community non-profits with existing relationships and networks. Workshop costs will include translation services, child care, food, and participant stipends.
 - Our budget estimates include the following:
 - 12 meetings with key elected/appointed leaders in Lower Mystic municipalities.
 - 40 small-scale meetings with organized grassroots groups
 - Up to eight public workshops throughout the Lower Mystic watershed
 - The team will need time, resources, and expertise to manage a dynamic online portal to engage additional participants in meaningful consideration of the hypotheses. Our budget estimates include the following:
 - Sub-consulting to professional online engagement expertise and/or technology
 - Labor for the consultant team to manage the content and be responsive to the public
 - The team will need to analyze and communicate assessment results to community members and decision makers, and will need to facilitate a discussion around financially and socially effective policies and investments to help vulnerable people maintain their health, housing, and ability to work during and after extreme storms.

Deliverables: There will be at least two final deliverables: 1) The assessment results, which will convey a clear understanding of which populations and location-specific neighborhoods are likely to be most impacted by critical infrastructure failure, including how and to what extent, and the strategies people currently employ to deal with the impacts. 2) A prioritized list of resources and actions that would reduce the harm and some preliminary thinking on how to catalyze and fund those actions.

Team members: Social vulnerability assessment consultant team. The Climate Resilience Project Manager and the Social Resilience working group, with help from Melanie Gárate and Carri Hulet, will be significantly involved in the design and execution of these efforts by reviewing and guiding the engagement design, making helpful connections to key stakeholders, and engaging in the deliberations as representatives of vulnerable populations, where appropriate and productive.

Climate projections and data

Throughout this analysis, we will use the latest available Boston Harbor Flood Risk Model data developed by Woods Hole Group for the State of Massachusetts, as described above and provided on www.resilientma.org. The main question will be whether the resilient infrastructure working group will choose the 1% or 0.1% storm projections for 2030 and 2070.

Public benefits

This analysis is an essential first step in ensuring that the critical regional infrastructure required for food, transportation, energy, and water are prepared for extreme coastal storms. In addition, this project will help us better understand how to protect vulnerable residents and workers under circumstances when critical infrastructure does fail. Although the assessment is designed to focus on resources and people located in the Lower Mystic, the infrastructure being assessed—the MBTA, Logan Airport, the Amelia Earhart Dam, the New England Produce Center, the oil terminals—is essential to the Greater Boston and northeastern region economies.

7.2 Need for Assistance (10 points)

The Resilient Mystic Collaborative has to date secured \$1.3 million in regional support to enable 17 municipalities to work across political boundaries on regional climate preparedness projects. Of this funding, we are able to dedicate \$175,000 in staff resources, plus an additional \$5,940 in in-kind time from the City of Somerville, to facilitate these infrastructure and social vulnerability assessments. The Collaborative has neither the internal expertise nor the financial resources, however, to partner with infrastructure managers on vulnerability assessments, or to structure a statistically valid social vulnerability assessment, so it is requesting \$389,995 in funds to hire consultants and hold community and group meetings to complete these two work streams and lay the groundwork for years of regional work on priority resilience projects.

7.3 Project Feasibility and Management (12 points)

Technical capacity

We are able to propose this project because of the willingness of public infrastructure managers and emergency preparedness agencies—notably Massport, MWRA, DHS, USCG, and BWSC—to serve as thought leaders and endorsers of this process. Because of their commitment to this process and their experience in developing facility-wide vulnerability assessments, we are able to engage other public and private facilities in a successful regional effort. With the voluntary participation of infrastructure managers, completing and learning from a successful tabletop exercise is a straightforward and well-understood process.

We expect the resilient infrastructure working group to include the following participants:

- Lower Mystic municipalities: Somerville, Chelsea, Everett, Boston, Winthrop, and Revere.
- Public infrastructure managers: Massport, MWRA, MBTA, MassDOT, Mass DCR, BWSC
- Private infrastructure managers: Exelon, Global Oil, New England Produce Center, Eversource, National Grid, additional oil terminals as possible
- Emergency preparedness agencies: MEMA, USCG, DHS

Several of the infrastructure managers, including Massport and the Massachusetts Water Resources Authority, have done extensive vulnerability assessments and preparedness plans for Logan Airport and the Deer Island wastewater facility. Planners from both agencies, as well as DHS, MEMA, and USCG, have agreed to play leadership roles on our project team. Although private infrastructure managers are required to comply with existing regulations, we are not aware of any facilities having invested in resilience to projected climate conditions.

Financial capacity

The Barr Foundation has awarded the Mystic River Watershed Association (MyRWA) \$700,000 over two years to provide staff support for the RMC. This grant covers overall RMC facilitation by MyRWA and CBI and supports a new social resiliency organizer. Approximately \$175,000 in staff time from this grant will be available for this project over the next 18 months. MyRWA, and the City of Somerville, both have extensive experience managing grant funds awarded by the Commonwealth of Massachusetts and various foundations. The City of Somerville's Finance Department has developed policies and procedures that have been established and adopted by municipal departments to ensure effective control and accountability over the management of federal, state, and foundation grant funds. The policies govern allocation, expenditure and documentation of funds and are designed to incorporate proper administrative controls and separation of duties in order to prevent mismanagement or misappropriation of funds. The Director of Somerville's Office of Sustainability and Environment, who will provide fiscal and grant management oversight, has successfully managed over \$1.5 million in grant funds during his tenure with the City of Somerville.

Management capacity

Working together as the RMC makes it possible for municipalities to act across municipal boundaries to support projects and align management actions and local policies. The RMC Lower Mystic Infrastructure working group is chaired by Oliver Sellers-Garcia, Director of Somerville's Office of Sustainability and Environment, who will serve as the local project manager and point of contact for this grant.

The Social Resilience working group is in the process of being convened and will include municipal staff, other public health and emergency managers, local NGOs and other service providers.

See attached resumes for Oliver Sellers-Garcia (City of Somerville), Julie Wormser and Melanie Gárate (MyWRA), and Carri Hulet (CBI) for more details on the credentials and experience of the project team leaders.

Partner support

Attached are letters of support from Boston, Chelsea, Everett, Revere, Winthrop, and MEMA, in addition to match commitment letters from Somerville and MyWRA.

Regulatory hurdles

We are not aware of regulatory or other formal hurdles that would prohibit the project from being completed according to our proposed timeline.

7.4 Project Transferability, Measurement of Success, and Maintenance (8 points)

Project transferability

We hope to demonstrate an affordable process for prioritizing and managing risks across multiple jurisdictions. Northeastern University researchers identified the following six key conditions, which we are incorporating into our project and planning process, for a successful regional process for increasing resilient infrastructure:

1. Leveraging a neutral convener to empower an open regional conversation about a critical but sensitive topic.
2. Employing a well-understood recent disaster or a well-modeled, predicted event to baseline the challenges that stakeholders will need to understand and overcome.
3. Scaling the challenge to manageable proportions by selecting two or three critical functions (systems or systems-of-systems) and evolving the development of the final governance structure over time.
4. Identifying and engaging the relevant regional stakeholders to include public officials, private corporations and relevant associations.
5. Using existing plans to validate and baseline the regional challenge as the basis for action.
6. Collaboratively developing practical, affordable, regionally-tailored solutions through consensus and experience.

We are also relying on time-tested protocols developed by DHS and MEMA to enable facility operations personnel to both understand and convey the increasing risks of storm damage caused by climate change.

When we are successful, infrastructure managers will have the information needed to prioritize capital and operational improvements. Lower Mystic municipalities will have the information they need to prioritize backup plans to protect residents if infrastructure does fail. Finally, we seek to help municipalities and infrastructure managers develop the analysis needed to apply for pre-disaster funding under FEMA's new Building Resilient Infrastructure and Communities (BRIC) Program.

The two components of this project will create climate assessment/planning methodologies that can be replicated in other parts of the state and country. The infrastructure assessment will create a model for Massachusetts' municipalities to organize and participate in climate risk assessment with major stakeholders that are often difficult for communities to engage with on this topic. The social vulnerability assessment will create a standard methodology that could be repeated by other communities in Massachusetts. Our investment in the development of a social vulnerability assessment framework will significantly reduce the cost for communities that employ this method. Somerville and its partner communities will share the results of this project among our larger network of municipalities in the MAPC region.

Measuring success

Our long-term goal is to work with infrastructure managers in the Lower Mystic to be able to withstand extreme coastal storms without lengthy, expensive repairs. These assessments are designed to help infrastructure managers identify vulnerabilities and coordinate as needed and to help municipalities and community members in the Lower Mystic develop the policies and resources needed to prevent or reduce harm to vulnerable residents and workers if infrastructure does fail. Success on this project includes:

- A majority of infrastructure managers in the Lower Mystic agreeing to participate in the working group. To measure this, we will generate a comprehensive list of infrastructure managers who could engage in the work and then compare it with the list of those who do.
- Grassroots organizations that collectively represent all of the key vulnerable populations in the Lower Mystic engage on the project in meaningful roles (as part of the social vulnerability assessment consultant team and/or on the RMC Social Resilience working group). To measure this, we will name the key vulnerable populations in the Lower Mystic that are likely to be impacted by coastal storms, identify organizations that represent their interests, and then compare that list with the list of organizations that do engage.
- All participants understand the value of using the same design storm parameters and agree to use the most recent Boston Harbor Flood Risk Model data. The measure of success will be their affirmative agreement.
- All infrastructure managers complete a self-assessment (if needed) using these flood probabilities. The measure will be their completed self-assessments.
- Broad community engagement, with participation of grassroots organizations, happens iteratively through the two phases of the social vulnerability assessment development and implementation. This facilitates the building of relationships and knowledge. While this will be hard to measure, we will keep track of the participants, both individual and by affiliation, that participate in the community engagement efforts, and assess, to what extent, they have had multiple contact with the project. We also intend to add individuals to the RMC Social Resilience working group as we learn of their interest. This will be a measure of longer-term, iterative engagement and relationship building.
- Contractors and DHS successfully prepare an accurate, credible tabletop exercise, and all participants engage meaningfully and candidly in the exercise. The measure of success will be the quality and quantity of new insights regarding infrastructure interdependencies and cascading failures.
- The resilient infrastructure working group agrees upon a prioritized list of capital and operational improvements, and they express willingness to continue to work with the RMC on post-project action steps. Success will be measured here by the working group members' affirmative, documented support.
- We know more about who might be impacted by the failure of critical infrastructure due to coastal storms, and how. All of the deliverables for the social vulnerability assessment serve as measures of success on this point.

Future maintenance needs and updates

The results of these assessments will include lists of immediate- and longer-term capital, operational, and policy improvements to improve the resilience of infrastructure and people. Next steps for the RMC will involve seeking funding and community-engaged design for projects that require regional coordination and support.

7.5 Community Outreach, Education, and Engagement (10 points)

This project is, essentially, a community engagement project. Both the infrastructure and social vulnerability assessments will be co-designed and carried out by industry and community stakeholders. Neither assessment exists without the leadership of those who know the critical infrastructure best (the managers, themselves) and

the community best (grassroots organizations, trusted community members, and social service providers). The detailed descriptions of the community engagement activities have already been stated above, but here we highlight a few examples:

- **Partnership with community organizations:** The social vulnerability assessment will be guided by the RMC's social resilience work group, a collection of representatives from local community organizations. The social vulnerability consultant will be a blended team with a professional firm and several grassroots organizations as partners. The budget assumes a higher blended rate for the consultant's work so the RFP can require the consultant team to propose budgets that fairly compensate all team members. Also, the critical infrastructure assessment is being developed by a voluntary group of private and public infrastructure managers and overseen by the RMC's Lower Mystic Work Group, which includes both municipalities and local NGOs.
- **Use of existing communication channels:** The RFP for the social vulnerability consultant will require their proposed methodology to leverage existing relationships and communication channels that are familiar to Lower Mystic communities, and vulnerable populations, in particular.
- **Analysis of affected communities (including economic and public health indicators):** The GIS analysis will involve layering storm impact data and projections with various socioeconomic indicators, to be determined during the assessment, and which may vary dependent upon municipal partner. The list of these indicators will be developed collaboratively with the social resilience work group, most of whom work full-time serving vulnerable populations, including some in public health, environmental justice, and low-income families.
- **Addressing specific barriers to participation and plan for integrating community feedback:** The social vulnerability engagement strategy, while not yet fully designed, must meet clear expectations around engaging people who have limited time or capacity to engage. For example, our proposed budget assumes an allocation for childcare, food, translation, and online access for engagement efforts, to reduce some of the known challenges associated with civic participation that face residents in the Boston metro region in particular.
- **Description/identification of co-benefits that improve quality of life for vulnerable communities:** If the critical infrastructure assessment were being carried out independent from the social vulnerability assessment, it would very likely result in a punch list of actions that had not been evaluated for co-benefits. In an explicit effort to avoid that outcome, these projects have been designed together and are intended to be carried out in tandem and with significant communication and overlap between the key actors so the need for solutions that benefit people, and the most vulnerable people, in particular, are not forgotten or undervalued.
- **Clearly defined goals and metrics on engagement of vulnerable communities:** One of the key questions the team will ask as they develop and then review the framework for the social vulnerability assessment is what to measure and how, relative to both engagement and outcomes. The community will have ample opportunity to weigh in on these questions so the metrics are not developed in a vacuum or with only theoretical drivers.

7.6 Incorporation of Nature-Based Solutions and Strategies (10 points)

This assessment seeks to prevent critical infrastructure from failing and causing harm to both people and the

Municipal Vulnerability Preparedness Grant Program Application Form

RFR ENV 20 MVP 02

City of Somerville

PROJECT SCOPE & BUDGET

FY20 MVP Action Grant Scope Template

Project Task Description	Deliverables	Due Date	Grant	Match	Total
Tasks to be Completed by June 20, 2020					
Task 0: Kick-off meeting with Town, EOEEA, and Consultants	Meeting notes, sign-in sheet	2/15/2020	N/A	N/A	N/A
Task 1A: Convene Workgroup and Build Framework for Critical Infrastructure Assessment					
Sub-task 1A.1 Convene a Resilient Infrastructure Working Group	Signed MOU; leadership team and project management team established	5/15/2020	\$ 14,220	\$ 58,310	\$ 72,530
Sub-task 1A.2 Agreement on Flood Data and Design Storm Parameters for Vulnerability Assessment	Memo on climate projections for analysis	6/20/2020	\$ -	\$ 5,140	\$ 5,140
Total Task 1A Cost			\$ 14,220	\$ 63,450	\$ 77,670
Task 1B: Convene Workgroup and Build Framework for Social Vulnerability Assessment					
Sub-task 1B.1 Hire consultant team	Prepare and release RFP; hire contractor	4/15/2020	\$ 1,480	\$ 7,530	\$ 9,010
Sub-task 1B.2 Align roles and responsibilities	Meeting agenda, minutes, revised scope, schedule	5/1/2020	\$ 12,700	\$ 4,030	\$ 16,730
Sub-task 1B.3 Integrate understanding across infrastructure and social vulnerability assessment teams	Memo on infrastructure data that will be used in assessment	6/20/2020	\$ 26,940	\$ 4,030	\$ 30,970
Sub-task 1B.4 Draft social vulnerability assessment framework	External review draft of assessment framework	6/20/2020	\$ 28,605	\$ 7,915	\$ 36,520
Total Task 1B Cost			\$ 69,725	\$ 23,505	\$ 93,230
TOTAL PROJECT COST FY20			\$ 83,945	\$ 86,955	\$ 170,900
Tasks to be Completed by June 20, 2021					
Task 2A: Complete Infrastructure Assessment					
Sub-task 2A.1 As needed, provide a self-assessment tool and technical support to infrastructure managers	Modified NYC tool, all participants complete self-assessment as needed	9/30/2020	\$ 24,000	\$ 9,200	\$ 33,200
Sub-task 2A.2 Evaluate existing Hazard Mitigation Plans and prepare GIS data	Geospatial data, maps and memos for tabletop exercise, social vulnerability assessment	12/15/2020	\$ 18,000	\$ 9,200	\$ 27,200
Sub-task 2A.3 Perform Lower Mystic tabletop exercise to identify critical dependencies/potential failures	Development and completion of tabletop exercise and written results; stakeholder meeting	3/31/2021	\$ 27,415	\$ 12,310	\$ 39,725
Sub-task 2A.4 Use results of tabletop exercise to prioritize working group deliverables	Summary document of priority capital, operational investments, and regional coordination	6/20/2021	\$ 15,000	\$ 23,810	\$ 38,810
Total Task 2A Cost			\$ 84,415	\$ 54,520	\$ 138,935
Task 2B: Complete Social Vulnerability Assessment					
Sub-task 2B.1 Review draft assessment framework with communities	Summary of the feedback and a preliminary revised draft of the assessment framework; stakeholder meetings	9/30/2020	\$ 42,440	\$ 5,650	\$ 48,090
Sub-task 2B.2 GIS analysis	Geo-spatial data on vulnerable populations, climate risks	12/15/2020	\$ 20,240	\$ 3,760	\$ 24,000
Sub-task 2B.3 Integrate critical infrastructure data and finalize assessment framework	Descriptive memo and maps detailing the new, non-sensitive information from the critical infrastructure vulnerability assessment that is relevant to the social vulnerability assessment. Final assessment framework.	3/31/2021	\$ 14,980	\$ 4,030	\$ 19,010
Sub-task 2B.4 Conduct social vulnerability assessment; conduct community engagement	Detailed scope of work for assessment; understanding of vulnerable populations; prioritized actions to minimize harm; stakeholder meetings	6/20/2021	\$ 143,975	\$ 26,026	\$ 170,001
Total Task 2B Cost			\$ 221,635	\$ 39,466	\$ 261,101
Required Task X:					
Sub-task X.1 Prepare Case Study Draft (template provided)	Draft case study report, 1-2 presentation slides with project photos	TBD	N/A	N/A	N/A
Sub-task X.2 Prepare Final Case Study (template provided)	Final case study report, 1-2 presentation slides with project photos	6/15/2021	N/A	N/A	N/A
TOTAL PROJECT COST FY21			\$ 306,050	\$ 93,986	\$ 400,036
TOTAL PROJECT COST OVERALL			\$ 389,995	\$ 180,941	\$ 570,936

32%

(Note: Match must be at least 25% of total project cost)

FY20 MVP Action Grant

	GRANT										Total Task (Grant)
	Project Team Hours						Direct Costs ²				
	CBI Senior Mediator ¹		Infrastructure Consultant		Social Vulnerability Consultant		Unit	Quantity	Unit Cost	Total	
Hourly Rate	\$185.00		\$150.00		\$150.00		X	X	X	X	
Tasks to be Completed by June 20, 2020											
Task 1A: Convene Workgroup and Build Framework for Critical Infrastructure Assessment	Hours	Total	Hours	Total	Hours	Total					
Sub-task 1A.1 Convene a Resilient Infrastructure Working Group	12	\$2,220.00	80	\$12,000.00	0	\$0.00		0	\$ -	\$0	\$14,220.00
Sub-task 1A.2 Agreement on Flood Data and Design Storm Parameters for Vulnerability Assessment	0	\$0.00	0	\$0.00	0	\$0.00		0	\$ -	\$0	\$0.00
Total Task 1A Cost											\$14,220.00
Task 1B: Convene Workgroup and Build Framework for Social Vulnerability Assessment											
Sub-task 1B.1 Hire consultant team	8	\$1,480.00	0	\$0.00	0	\$0.00		0	\$ -	\$0	\$1,480.00
Sub-task 1B.2 Align roles and responsibilities	20	\$3,700.00	0	\$0.00	60	\$9,000.00		0	\$ -	\$0	\$12,700.00
Sub-task 1B.3 Integrate understanding across infrastructure and social vulnerability assessment teams	24	\$4,440.00	0	\$0.00	150	\$22,500.00		0	\$ -	\$0	\$26,940.00
Sub-task 1B.4 Draft social vulnerability assessment framework	33	\$6,105.00	0	\$0.00	150	\$22,500.00		0	\$ -	\$0	\$28,605.00
Total Task 1B Cost											\$69,725.00
TOTAL PROJECT COST FY20											\$83,945.00
Tasks to be Completed by June 20, 2021											
Task 2A: Complete Infrastructure Assessment	Hours	Total	Hours	Total	Hours	Total					
Sub-task 2A.1 As needed, provide a self-assessment tool and technical support to infrastructure managers	0	\$0.00	160	\$24,000.00	0	\$0.00		0	\$ -	\$0	\$24,000.00
Sub-task 2A.2 Evaluate existing Hazard Mitigation Plans and prepare GIS data	0	\$0.00	120	\$18,000.00	0	\$0.00		0	\$ -	\$0	\$18,000.00
Sub-task 2A.3 Perform Lower Mystic tabletop exercise to identify critical dependencies/potential failures	12	\$2,220.00	120	\$18,000.00	36	\$5,400.00		1	\$ 1,795.00	\$1,795	\$27,415.00
Sub-task 2A.4 Use results of tabletop exercise to prioritize working group deliverables	0	\$0.00	100	\$15,000.00	0	\$0.00		0	\$ -	\$0	\$15,000.00
Total Task 1 Cost											\$84,415.00
Task 2B: Complete Social Vulnerability Assessment											
Sub-task 2B.1 Review draft assessment framework with communities	24	\$4,440.00	0	\$0.00	200	\$30,000.00		80	\$ 100.00	\$8,000	\$42,440.00
Sub-task 2B.2 GIS analysis	4	\$740.00	80	\$12,000.00	50	\$7,500.00		0	\$ -	\$0	\$20,240.00
Sub-task 2B.3 Integrate critical infrastructure data and finalize assessment framework	8	\$1,480.00	60	\$9,000.00	30	\$4,500.00		0	\$ -	\$0	\$14,980.00
Sub-task 2B.4 Conduct social vulnerability assessment; conduct community engagement	135	\$24,975.00	0	\$0.00	580	\$87,000.00		8	\$ 4,000.00	\$32,000	\$143,975.00
Total Task 2 Cost											\$221,635.00
TOTAL PROJECT COST FY21											\$306,050.00
TOTAL PROJECT COST OVERALL											\$389,995.00

1 In addition to the hours included in the MyRWA-funded match, CBI will provide project management and execution support to the municipalities and their partners on this project.

2 Direct costs include stakeholder and community meeting costs, such as food, translation services, child care, and participant stipends.

Budget Template

IN-KIND / CASH MATCH														Total Task (Match)	Total Project Cost
Project Team Hours								Direct Costs							
MyRWA Deputy Director		CBI Senior Mediator		City of Somerville OSE Director		MyRWA Climate Resilience Project Manager		Position/Title		Unit	Quantity	Unit Cost	Total		
\$115.00		\$185.00		\$54.00		\$47.00		\$0.00		X	X	X	X		
Hours	Total	Hours	Total	Hours	Total	Hours	Total	Hours	Total						
500	\$57,500.00	0	\$0.00	15	\$810.00	0	\$0.00	0	\$0.00		0	\$ -	\$0	\$58,310.00	\$72,530.00
40	\$4,600.00	0	\$0.00	10	\$540.00	0	\$0.00	0	\$0.00		0	\$ -	\$0	\$5,140.00	\$5,140.00
														\$63,450.00	\$77,670.00
0	\$0.00	16	\$2,960.00	15	\$810.00	80	\$3,760.00	0	\$0.00		0	\$ -	\$0	\$7,530.00	\$9,010.00
0	\$0.00	0	\$0.00	5	\$270.00	80	\$3,760.00	0	\$0.00		0	\$ -	\$0	\$4,030.00	\$16,730.00
0	\$0.00	0	\$0.00	5	\$270.00	80	\$3,760.00	0	\$0.00		0	\$ -	\$0	\$4,030.00	\$30,970.00
0	\$0.00	21	\$3,885.00	5	\$270.00	80	\$3,760.00	0	\$0.00		0	\$ -	\$0	\$7,915.00	\$36,520.00
														\$23,505.00	\$93,230.00
														\$86,955.00	\$170,900.00
Hours	Total	Hours	Total	Hours	Total	Hours	Total	Hours	Total						
80	\$9,200.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00		0	\$ -	\$0	\$9,200.00	\$33,200.00
80	\$9,200.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00		0	\$ -	\$0	\$9,200.00	\$27,200.00
100	\$11,500.00	0	\$0.00	15	\$810.00	0	\$0.00	0	\$0.00		0	\$ -	\$0	\$12,310.00	\$39,725.00
200	\$23,000.00	0	\$0.00	15	\$810.00	0	\$0.00	0	\$0.00		0	\$ -	\$0	\$23,810.00	\$38,810.00
														\$54,520.00	\$138,935.00
0	\$0.00	16	\$2,960.00	15	\$810.00	40	\$1,880.00	0	\$0.00		0	\$ -	\$0	\$5,650.00	\$48,090.00
0	\$0.00	0	\$0.00	0	\$0.00	80	\$3,760.00	0	\$0.00		0	\$ -	\$0	\$3,760.00	\$24,000.00
0	\$0.00	0	\$0.00	5	\$270.00	80	\$3,760.00	0	\$0.00		0	\$ -	\$0	\$4,030.00	\$19,010.00
0	\$0.00	0	\$0.00	5	\$270.00	548	\$25,756.00	0	\$0.00		0	\$ -	\$0	\$26,026.00	\$170,001.00
														\$39,466.00	\$261,101.00
														\$93,986.00	\$400,036.00
														\$180,941.00	\$570,936.00

(Note: Match must be at least 25% of total project cost)

31.69%