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Federal Emergency Management Agency
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Washington, D.C. 20024

To Whom It May Concern:

The New York State Office of Resilient Homes and Communities is excited to share our project **“Community-Informed Planning to Increase Flood Resilience in Binghamton, New York”** and requests a grant of \$999,817. In Binghamton, social vulnerability and insufficient flood infrastructure increasingly threaten flood resilience, particularly for residents most at-risk of flood damage. This trend poses profound challenges for public and planetary health, underscoring the urgent need for evidence-based, proactive investments. Our organization aims to fill this gap by utilizing community-driven approaches to **develop flood resilience** in Binghamton through more **equitable participation** in flood resilience planning processes.

To actualize this opportunity, we propose the development of a **participatory planning process** to design initiatives that increase flood resilience in Binghamton, particularly for equity priority residents in the city. To achieve this goal, we will gather community input and design community-formed initiatives that may equitably mitigate the future impacts of flooding. We will then utilize the community input to generate and refine a flood resilience action plan that includes detailed descriptions of selected reconstruction projects for later implementation.

The New York State Office of Resilient Homes and Communities is well-positioned to lead the flood resilience project in Binghamton. Our demonstrated experience working with municipalities across New York State to plan and implement climate resiliency efforts can ensure the success of the planning and design process throughout the grant funding period.

We hope you will consider collaborating with us on a project to increase flood resilience through more equitable participation in planning processes in Binghamton. If you have any questions, please feel free to contact David Burgy at David.Burgy@stormrecovery.ny.gov.

Sincerely,

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Title: Community-Informed Planning to Increase Flood Resilience in Binghamton, New York

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Abstract:

In Binghamton, New York, social vulnerability and insufficient flood infrastructure increasingly threaten flood resilience and pose profound challenges for public and planetary health. Binghamton is located in one of the most flood-prone areas of New York State, and experiences riverine flooding, on average, every 15 years. Despite the presence of flood infrastructure and planning documents to mitigate the risk of flood damage for Binghamton residents, they have proven insufficient to protect against recent record-breaking flood events. Moreover, previous interventions have not adequately included populations most at-risk of experiencing detrimental impacts of flooding, including low-income, racial, and ethnic minority populations, renters, and individuals with disabilities, underscoring an urgent need to implement community-informed design initiatives that can mitigate the impact of future riverine flooding events for equity priority populations. The New York State Office of Resilient Homes and Communities is working to fill this gap in Binghamton by utilizing community-driven approaches to develop flood resilience in Binghamton through equitable participation in planning processes. To do so, we will: (1) Establish points of community engagement for input on feasibility and preference of future design plans focused on increasing equity, especially with flooding; and (2) Generate and refine a flood resilience action plan that can be adopted and executed by municipal partners. The New York State Office of Resilient Homes and Communities is well-positioned to lead this project in Binghamton, given our demonstrated experience working with municipalities across the state to plan and implement climate resiliency efforts. In the long term, our goal is for flooding to have little to no impact on the Binghamton community. Given the increasing impacts of climate risk across the U.S., this project can also serve as a model that can be adapted by other communities to develop similar participatory planning processes to address various climate risks.

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1. Background and Statement of Need

Statement of Need

Social vulnerability and insufficient flood infrastructure increasingly threaten flood resilience in Binghamton, New York. Binghamton, located in southeastern Broome County, is situated at the intersection of the Chenango and Susquehanna Rivers.¹ Since record keeping began nearly 200 years ago, the Susquehanna River has reportedly flooded every 15 years,² resulting in Broome County being ranked fourth in the state for flood risk.³ Since 1913, the Susquehanna River has left its banks over 100 times⁴; from 1953-2023, the city has declared a disaster nine times due to flooding, including two historic floods in 2006 and 2011.⁶ The City of Binghamton has identified this concern in their Code of Ordinances, which includes objectives to protect human livelihood, decrease damages to infrastructure and utilities, and develop areas at high risk for flooding.⁷ However, limited inclusion of populations most at-risk of experiencing flood damage within planning processes continues to limit the efficacy of design interventions. This project will increase the efficacy of design interventions by equitably including these communities within future flood resilience efforts in Binghamton.

Social Vulnerability Context in Binghamton

Binghamton residents experience a high degree of social vulnerability, defined as “a community's [ability] to prepare for and respond to the stress of hazardous events [including] natural disaster[s],”⁸ which predisposes the community to flood damage and risk. On a county-level, Broome County holds a Social Vulnerability Index (SVI) score in the 90th percentile,⁸ more than double the score of surrounding counties in the region.⁸ Among other communities in Broome County, Binghamton has an SVI in the 75th percentile.⁸ Social vulnerability is determined, in part, by socioeconomic characteristics.⁸ For example, the median household income in Binghamton is almost half that of the rest of the state (\$39,012 and \$74,314, respectively),⁹ and the poverty rate is over twice as high in Binghamton compared to New York State (32.0% and 13.9%, respectively).⁹ Racial and ethnic disparities also exist within the city that further increase social vulnerability to flood events. As of 2021, an estimated 51.3% of the city's Asian population and 47.8% of the city's African American population experience poverty, compared to only 26.8% of the White population residing in the city.¹⁰

Disproportionate Impacts of Flooding

Flooding of the Susquehanna River disproportionately affects under-resourced communities residing in the floodplains, resulting in challenges that span beyond the immediate consequences of water inundation.¹¹ Low-income housing in Binghamton is concentrated in the flood-prone area(s) near the Susquehanna River, located at lower elevation levels with higher proportions of poorly draining impervious surfaces.¹² Alongside individuals with limited household incomes, renters, individuals with disabilities, and minority communities are also more likely to reside in low-income housing in Binghamton.¹³ This pattern holds particularly true for African American residents in the city (**Figure 1**),¹⁹ as well as for Hispanic residents and other equity priority populations.¹⁴ For example, in Census Tract 11, located adjacent to the Susquehanna River, 50% of residents are Black or Hispanic.¹⁵ In this tract, over 60% of residents live below the poverty line, nearly double the rate (32%) of Binghamton.¹⁵ The median household income is also lower in Census Tract 11 compared to the city of Binghamton (\$18,689 and \$39,012 respectively).¹⁵ Further, 98% of housing units are occupied by renters,¹⁵ and individuals with disabilities also

reside in this census tract at approximately three-times the city-wide average.¹⁵ Low-income housing located in the floodplain may also diminish social resilience in under-resourced communities in Binghamton due to lack of flood insurance to cover damages, frequent use of emergency funds, and the inability to pay for new or temporary housing.¹¹ Further, because low-income residents and renters are often people of color, they may experience more difficulty accumulating necessary financial resources necessary to address flood damage due to financial and employment discrimination.¹⁶ Individuals with disabilities may face challenges relocating to affordable and accessible housing conditions, disrupting necessary systems of care.¹⁷ Beyond economic and housing instability, flooding may also increase water contamination, pathogenic species, compromised housing conditions,⁴ and mental health challenges.¹⁸ Flooding therefore creates a positive feedback loop of inequity among these communities, as resource-intensive flood impacts may exacerbate economic instability and health challenges, which lessens communities' ability to bounce back from flooding events.

Insufficient Flood Infrastructure

While some interventions currently exist to mitigate the damage of flooding on communities in Binghamton, they are insufficient to fully address flooding risk. Infrastructural flood systems in the city consist of a levee, flood walls, channel excavation, amongst other structures.⁴ The Binghamton Flood Damage Reduction Project includes similar infrastructural improvements, as well as the reinforcement and elevation of preexisting levees and walls.¹⁹ Recent flooding has, however, revealed that these interventions are not sufficient to meet community's needs. During the historic 2011 flood, for example, over 20,000 residents were instructed to evacuate their homes after the Susquehanna River topped the city's floodwalls and levees,²⁰ resulting in over \$502.8 million of damage across the county.⁶ Moreover, while the NY Rising Community Reconstruction Program has implemented multiple programs aimed towards developing new infrastructure to enhance flood resilience, the document has not been updated since 2014, and lacks data on current flood risk, particularly for areas of highest vulnerability within the city.²¹

Project Urgency and Risk of Inaction

Clearly, there is an urgent need to plan and implement community-informed design initiatives that can mitigate the impact of future riverine flooding events for equity priority populations in the Binghamton area. Populations most at risk of experiencing detrimental impacts of flooding include low-income, racial, and ethnic minority populations, as well as renters and individuals with disabilities, due to their housing location within the river floodplain,¹¹ as well as from disparities in household income and health status.^{10,14} Left unaddressed, evidence indicates that ongoing risk of riverine flooding may lead to an exacerbation of present mental and physical health issues amongst equity priority communities,¹⁸ as well as the development of new health challenges due to increased stress from flood impacts, including through housing damage and loss,¹⁸ health resources,¹⁷ and other community assets (**Figure 2**). Moreover, a failure to act increases the likelihood of continued detrimental impacts to public and planetary health across Binghamton due to ongoing flooding risk,¹⁴ thereby impacting critical social determinants of health in the face of projected increases in the frequency and intensity of heavy precipitation and riverine flooding.¹ Fortunately, a collaboration between the State University of New York at Binghamton and the New York State Office of Resilient Homes and Communities (RHC) presents the opportunity to develop participatory planning process to design interventions that can equitably improve social and environmental resilience to riverine flooding in Binghamton.

2. Goals and Objectives

I. Project Goal

We propose the development of a participatory planning process to design initiatives that equitably increase flood resilience in the City of Binghamton, particularly for equity priority residents in the city. The purpose of this project is to increase resilience to future riverine flooding events in the city by creating interventions directly informed by community members, particularly those who are most at-risk of facing deleterious health and economic impacts due to flood events. We recognize that governance and planning processes are critical determinants of health (**Appendix II**),²² and that a lack of meaningful participation in such processes may lead to decisions based on inaccurate or incomplete information, as well as lacking in community buy-in.²² As a result, decision making processes may ultimately maintain and reflect inequitable access to resources and opportunities, thereby furthering social, environmental, and health inequities.²² To address this, it is important to consider components at multiple levels of the governance and planning processes, including an initial understanding of needs and opportunities, governance structures to promote shared visions for change, and deliverables that reflect community input gathered through the process.² The Social Network Theory is our guiding rationale and emphasizes the importance of trust among community members and their leaders, especially given the strain that traumatic events like flooding has on communities. We will therefore use this participatory planning process to build resilience in a way that prioritizes the empowerment of community members and their relationships with local leadership (**Appendix III**).^{22,23} Taken together, an equitable planning process raises the likelihood that future interventions, including planning documents and infrastructural interventions, reflect the needs and opportunities of residents to ultimately mitigate future impacts of riverine flooding on equity priority communities in Binghamton.

II. Target Population

We propose prioritizing equity priority populations across the city of Binghamton throughout the engagement and implementation processes, with a particular focus on the following populations that are at high-risk of flood damage: renters, individuals with disabilities, low-income individuals, and individuals of color. The aforementioned populations will be prioritized by the following objectives due to the disproportionate impact that riverine flooding may have on communities' socioeconomic well-being and health, as well as due to the populations' historical exclusion from governance and planning processes.²² Specifically, equity priority residents in Binghamton face an increased risk of riverine flood damage due to inequitable income distribution and rates of poverty,¹⁷⁻¹⁹ as well as their housing location(s) within the floodplain.¹⁹⁻²⁰ Therefore, by incorporating equity priority residents at every stage of the planning process, there is an increased likelihood that future interventions to reduce riverine flooding will directly address the identified needs of individuals most at-risk of flood damage.

III. Objective 1: Establish points of community engagement for input on feasibility and preference of future design plans focused on increasing equity, especially with flooding

It is important to engage the Binghamton community through a participatory planning process in order to ensure future design projects meet the needs of populations most at-risk of deleterious effects of riverine flooding. The participatory planning process will prioritize elevating voices of equity priority populations, though we will also gather input from the broader Binghamton

community. Formal opportunities for input will be established in order to consistently engage the community in the planning process. Drawing on the Bio Socio Ecological model, we have identified potential accessibility limitations for participating in these opportunities, including: language barriers, time constraints, transportation needs, and conflicting child care and/or health care needs.²⁴ In order to achieve ***Objective 1***, these limitations will be addressed through offering multiple mediums (e.g. video, Braille, closed captioning, American Sign Language) for participation in addition to childcare and transportation vouchers.

Strategy 1: By 2024, conduct a knowledge, attitudes, and practices (KAP) study to gain information about community members' needs, especially related to flooding resilience

A KAP study will allow for community members to have their thoughts and reactions on current and proposed flooding interventions be considered. In the study, pertinent information would be gathered on current knowledge of flooding resilience measures, support systems during times of flooding and practices for preventing flood damage at an individual level.²⁵ As a result, the KAP study will illuminate areas of need and potential community-specific interventions,²⁵ especially for equity priority populations targeted throughout the planning process.

Strategy 2: By 2025, hold three annual community focus groups and two annual town hall meetings for residents to voice ideas and concerns about flooding resilience in Binghamton

Focus groups and town halls offer opportune spaces for community members to share their ideas and concerns while feeling that their voice is being honored.²⁶ In a focus group related to flooding resilience in Binghamton, people's opinions can be voiced more candidly compared to the KAP study.²² Because focus groups offer substantial information in a short amount of time, several can be conducted and analyzed throughout the project duration.²² Focus groups are not cost intensive but limited in their need for assisted discussion by a trusted facilitator.²⁶ To account for this disadvantage, town halls can be held to further gather community input. Similar to focus groups, town halls allow for community transparency, as stakeholders and community members share information.²⁷ In order increase inclusivity, focus groups and town halls will be heavily promoted throughout the community and held in areas accessible by walking and public transportation.²⁷ Overall, community input about flooding resilience has the power to increase the sustainability, effectiveness, and equity of a future project that addresses highlighted needs.²⁸

Strategy 3: By the end of 2024, identify and onboard a team of 10 priority population members to serve as the Initiating Committee

For the participatory planning process to be most effective, an Initiating Committee (IC) comprising 10 community members will be created from the community members involved most during ***Objective 1*** from priority populations. Priority populations will be identified as the previously identified populations most affected by the flooding in Binghamton (see ***Target Population***).²⁹ Individuals will be selected using the approach from a 2018 flooding intervention in Harris County, Texas, that selected individuals based on the Center for Disease Control's SVI, depth within the floodplain and existing levels of drainage service.²⁹ Prior to initiating ***Strategy 3***, members of the IC will be paid to participate in training sessions led by the Broome County Council to learn about relevant civics information to ensure that proposed visions and interventions are aligned with what is legally feasible.

IV. Objective 2: Generate and refine a flood resilience plan for adoption and execution.

The next stage of the project is to organize an updated list of community-informed flooding intervention projects and organize them into a detailed Binghamton Community Reconstruction Plan document. This document will be informed by the expressed views of the community and their desired visions as derived from our first two objectives (**Appendix III**). Reconstruction projects that align with the community's needs and input will be identified. This is an integral part of the project that will convey the extent in which community input is being valued to produce equitable solutions. This approach increases the community's support and commitment to designed projects while aiming to build a more flood resilient community.

Strategy 1: By 2025, curate a list of community reconstruction projects in conjunction with the IC that align with data from the KAP study, focus groups, and town hall meetings.

Drawing on data from the first two objectives, the IC will identify projects to curate a new reconstruction plan that would still aim to achieve riverine flood mitigation and reduce long-term vulnerability towards future flooding events,³⁰ but will include community input. This approach will probe stakeholders to make decisions that serve the best interest of community members.³⁰

Strategy 2: By 2026, formally review and plan feasible curated projects.

Once projects have been identified, local leadership will contract local architects, engineers and planners to assess the feasibility of proposed projects and create official blueprints and sketches for the feasible projects.³¹ This stage will include collaborating with expert personnel who will assess out the scope and timelines of the projects, identify their complexities, determine their effectiveness in reducing risk and flooding impacts, identify required permits, and create detailed construction plans and management measures.³¹ This stage will also include determining a detailed budget that estimates all costs associated with the projects. The budget will involve a cost-benefit analysis, along with cost estimates of materials, equipment, and labor required.³¹

Strategy 3: By 2026, develop a detailed document of selected reconstruction projects.

After feasible projects have been identified and professionally planned and/or designed, the architectural, planning, and engineering teams will compile and present these projects into a Binghamton Community Reconstruction Plan document. This document will supplement the 2014 NYRCR plan. It will showcase each viable project in depth, including project descriptions, preliminary blueprints, detailed estimated budgets, timelines, identified potential expert personnel or task forces needed, required regulations, and projected outcomes or effectiveness in reducing flood risks and impacts on the community.³¹ Lastly, the document will also contain economic, environmental, and health benefits of each project.³¹ Once compiled and finalized, the document will be formally presented to local leadership and the IC for approval. Additionally, a public distribution and comment period will be held to ensure that the document aligns with the community's interest.

3. Project Work Plan and Timeline

Goal: In ten years, we envision flooding events having little to no major impacts on the Binghamton community				
Objective 1: Establish points of community engagement for input on feasibility and preference of future design plans focused on increasing equity, especially with flooding				
<i>Proposed outcomes:</i> Knowledge, Attitudes, and Practices (KAP) study, 3 focus groups, 2 town hall meetings, Initiating Committee (IC)				
Time	Activities	Process of Implementation	Person(s) Responsible	Desired output(s)
Oct. 2023 - June 2024	Conduct a Knowledge, attitude, and practices (KAP) study	Identify partners for data collection and analyzation, draft formal project proposal, create survey tool, survey community participants, analyze data, publish findings for community	Study director and SUNY Binghamton graduate student interns	Qualitative and quantitative data from community input
Nov. 2023, Nov. 2024, Nov. 2025	Hold 3 annual community focus groups	Identify meeting location, build a group of 8-12 community members, ³² establish time, determine a method (video or written notes) for sharing conversations, analyze data, share with IC	Trusted community member to facilitate; ³³ Study director to spearhead implementation	Qualitative data of perceptions and suggestions on flooding resilience and community needs
Aug. 2024, Aug. 2025	Hold 2 annual town hall meetings	A “planning committee” ³³ will identify a location for the town hall, reach out to community members, establish a time, advertise the event, determine a method (video recording or written notes) for sharing conversations with the community.	Trusted community member to facilitate; ³³ Planning committee to coordinate logistics	Qualitative data on community perception and actions related to flooding resilience

July 2024	Identify and onboard 10 members as the IC ²⁹	Post opportunity to participate in committee to KAP study participants, onboard community members, finalize payroll, and train members	KAP study facilitators and hired study director	Group of individuals to direct intervention plan
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Objective 2: Generate and refine a flood resilience plan for adoption and execution

Proposed outcomes: A complete and comprehensive community reconstruction plan document that describes community-informed initiatives to be completed that increase flooding resiliency

Time	Activities	Process of Implementation	Person(s) Responsible	Desired output(s)
Oct. 2024 - Feb. 2025	Create a list of reconstruction projects	Identify specific projects from the 2014 NYRCR plan based on the KAP study, focus groups, and town halls.	IC and local leadership	List of projects to present to architects and planners
Feb. 2025 - Jan. 2026	Formally plan curated projects	Contract architects and construction planners to assess feasibility of proposed projects and gather formal plans for feasible projects	Local leadership, architects, and construction planners	Budget, preliminary sketches, and timelines gathered for feasible projects
Feb. 2026 - June 2026	Develop reconstruction plan document	Formally present each project's and their budget, preliminary sketches, plans, and timelines in a written document for municipal use	Hired study director and local leadership	Reconstruction plan document
June 2026 - Oct. 2026	Distribution and comment period	Distribute document and hold a period of comment to ensure that document reflects community needs	IC and hired study director	Confirmation that reconstruction plan document reflects community needs

4. Monitoring and Evaluation

The success of our project will be determined by our progress toward each objective's indicators (**Appendix IV**) in alignment with our overall project goal of developing a participatory planning process to design initiatives that equitably increase flood resilience in Binghamton, particularly for equity priority residents in the city. Because the equity priority populations have been historically excluded from planning, we will engage in an iterative monitoring process such that we can correct deviations from our intended goals to reduce the risk of further harm to the Binghamton community.

Our first objective seeks to gather community input on the feasibility and preference of future design plans focused on increasing equity, particularly in the face of riverine flooding. This objective's **iterative monitoring process** will involve (1) baseline, midpoint, and end-of-project surveys to the IC to determine self-efficacy in planning processes and ability to represent the needs of the community and (2) feedback requests among the community at large to monitor adequate assessment of shared needs. To **evaluate** this objective, we will answer: (a) Did the KAP study capture the population of interest's knowledge, attitudes, and practices vis-a-vis flood risk and resilience? (b) Did we gain information related to community need, equity, and preference for future design plans from the town halls and focus groups? and (c) Do we have an IC of 10 people who reflect the population(s) of interest? To answer the first of these questions, a Study Director from SUNY Binghamton, along with graduate interns, will collect data from population(s) of interest and subsequently conduct data analysis of the KAP data to elucidate leading themes. To answer the second of these questions, the Study Director, along with graduate interns and a community facilitator, will record meeting minutes and document community conversations. The Study Director will decide if the data volume matches a predetermined sample size standard and if the content of data highlights knowledge, attitudes, and practices. To answer the last of these questions, the head of the IC will document progress by the number of people who sign a memorandum of understanding (MOU) to join the IC.

Our second objective is to generate and refine a flood resilience action plan that can be adopted and executed in Binghamton. This objective's **iterative monitoring process** will include the submission of progress reports by contractors to ensure progress of the planning document, particularly in alignment with community preferences identified in **Objective 1**. To **evaluate** this objective, we will answer: (a) Were community reconstruction projects identified based on results from the participatory planning process (e.g. KAP study)? (b) Were the community reconstruction projects identified by local architects and planners? (c) Was the reconstruction plan document approved by local leadership? (d) Was the reconstruction plan approved by community partners engaged throughout the planning process? To answer the first of these questions, the head of the IC, in collaboration with local municipal leadership will create a preliminary list of projects to present to collaborating architects and planners, based on input from community-focused actions, such as the KAP study and town halls. To answer the second of these questions, the head of the IC, in collaboration with local municipal leadership will document and file all relevant (sub)contracts and planning documents (e.g. architectural sketches, computer-aided designs, budgets, timelines) for review and utilization in the revised Binghamton Community Reconstruction Document. To answer the last two of these questions, the study director will seek and document formal approval by local leadership and community partners, including through a period of public comment to ensure that the document accurately reflects community needs. This formal approval is the primary measure of success of the entire program.

5. Collaborators and Respective Roles and Responsibilities

The New York State Office of Resilient Homes and Communities (RHC): RHC will serve as a critical partner throughout the grant period. The organization works in municipalities across the state to advance recovery and resiliency efforts through both social and infrastructural investments, and currently operates over 80 projects throughout the state.¹⁹ A representing member will be responsible for providing content-specific expertise (e.g. flooding and climate change resilience) and will also be responsible for facilitating dialogues and partnerships between community members, local leaders, and other collaborators. The representing member will also be the primary point of contact between participating organizations in the grant period. A project manager from RHC will oversee the project over the three-year grant duration. They will regularly communicate with partners, monitor and evaluate the aforementioned indicators, and manage the project timeline to support overall success. At the onset of the project, the program manager will need to identify community members with whom to partner.

The State University of New York at Binghamton (SUNY Binghamton): This organization will be responsible for providing the personnel (e.g. Study Director, graduate interns) to conduct the KAP studies, analyze the data, and conduct a community-wide survey to ensure external validity of the proposed reconstruction plan, in collaboration with the IC.

Community Partnerships:

Engaging community members is an integral part of this project and fundamental to its success. Community members are the first main collaborators for this project. The role of community members is to be the main informers of current and future flood-mitigation planning. Potential responsibilities of community members include: attending focus groups and town hall meetings, minute-taking during the meetings, and providing iterative feedback throughout the participatory planning process. Community members will provide valuable insights and inform the necessary equitable measures that will be implemented to increase flood resilience within Binghamton.

Initiating Committee:

The Initiating Committee (IC) will be composed of 10 community members. Members will be trained by public officials on feasible planning methods. The IC's primary role is to inform future intervention designs, as well as to identify feasible community reconstruction projects to include in the revised Binghamton Community Reconstruction Document. The committee will meet monthly to advance project goals and will be advised by community partners.

Other Collaborators and Partners:

The involvement of local leadership and collaboration with external organizations is necessary to execute project objectives. Local leadership will be represented by municipal staff members from the City of Binghamton, in collaboration with Broome County. Local leadership will provide all subject-matter and training expertise for community members and integrate community input and operationalize the Binghamton Community Reconstruction Document. Architectural, planning, and/or engineering firms will be also involved in the document revision process, including in the creation of planning documents (e.g. sketches, budgets). Potential partners may include organizations that have previously collaborated with RHC, which will benefit from the aforementioned organizations' existing relationships and familiarity with the local context.

6. Proposed Budget and Justification

The total request for this grant is **\$999,816.90**, with \$869,406 in direct costs and the FEMA indirect rate of 15%. The following sections are assumptions and estimating parameters used to develop the projected expenditures in sufficient detail to permit analysis of our proposed costs. We have presented supporting details by cost category. In cases where vendor estimates are not available, projections are based on our experience with projects of similar size and scope.

BINGHAMTON FLOOD RESILIENCY PROJECT					
Fiscal Year:		2024 - 2026			
Indirect Cost Rate:		0.15			
PROGRAM-SPECIFIC EXPENSES (Direct Costs)					
	Grant Request	In-Kind Contributions	Other Committed Funds	TOTAL PROJECT COSTS	
Personnel	\$ 602,900	\$ -	\$ -	\$ 364,350	
Professional Services	\$ 37,475				
Subcontracts	\$ 208,320				
Travel	\$ 585				
Equipment	\$ 3,556	\$ -	\$ -	\$ 3,556	
Supplies & Materials	\$ 9,940				
Other Expenses	\$ 6,630				
Total Direct Costs	\$ 869,406	\$ -	\$ -	\$ 367,906	
Total Indirect Costs	\$ 130,411	\$ -	\$ -	\$ -	
Total	\$ 999,817	\$ -	\$ -	\$ 367,906	

Personnel (all based in Binghamton, NY)

Salaried Employees:

- **Study Director (\$138,450):** \$35,000 is budgeted for to hire a study director with a 0.5 FTE annual salary and 30% fringe throughout the three years of the project.
- **Project Manager (\$253,500):** \$84,500 is budgeted per year for a project manager with an annual salary of \$65,000 and a 30% fringe rate.
- **Accountant/Bookkeeper (\$68,250):** \$22,750 annually with a 30% fringe rate will be accounted for as an in-kind contribution from the RHC.

Hourly Employees:

- **Graduate Interns (4) (\$103,200):** 4 graduate interns from SUNY Binghamton will be hired at \$20 for 15 hrs/week during the academic years of the grant period.
- **Translator (\$31,500):** A translator will be hired to translate data collection tools and other documentation (e.g. research reports) into languages other than English at \$30/hr for 10 hours/week for 35 weeks/yr for each year of the grant period.
- **Initiating Committee Members (10) (\$75,000):** IC members will be compensated throughout the duration of the (10 members x 5 hrs/week x \$20 x 75 total weeks).
- **Trainer for Initiating Committee (\$1,250):** One trainer will be hired to provide subject matter support to Initiating Committee members at \$25/hr for 5 hrs/week for 10 total weeks.

Professional Services

- **Graphic Designer (\$2,500):** A graphic designer will be hired at \$25 for 4 hours/day for 5 days to work on 7 projects (flyers, posters, etc.) for the community engagement periods.
- **GIS Mapping Specialist (\$4,080):** In-kind contributions from RHC will be made to produce geographic maps of the targeted areas where the projects outlined in Objective 3 will be implemented. The estimated time is 32, 3.5 hour work weeks spread over 8 months.

- **Website Design (\$18,240):** A full stack website developer will be hired at \$57 for 8, 40 hour work weeks (2 months).
- **Website Maintenance (\$15,360):** One person will be hired for website maintenance (\$20/hour x 32 hours/month x 24 months total) to update and improve the website.
- **ASL Translator (\$1,375):** An ASL translator will be hired at \$125/hour for a total of 11 hours for all community engagement sessions to ensure accessibility.

Subcontractors

- **1 Architectural Designer (\$76,800):** A subaward is requested for an architect to assess the feasibility of proposed projects and to develop plans for these projects.
- **1 Engineer (\$69,120):** A subaward is requested for a civil engineer to assess the feasibility of proposed projects and to develop engineering plans for these projects.
- **1 Urban Planner (\$62,400):** A subaward is requested for an urban planner to develop preliminary sketches and timelines for projects proposed by the IC and local leadership.

Travel

- **Travel to Community Engagement Sites (\$585):** We have budgeted \$360 for the Study Director and interns to travel for the KAP study, \$135 travel to 3 focus groups, and \$90 for vouchers to 2 town halls.

Equipment

- **Tables (17) (\$510):** \$30/table is requested for meetings during all 7 community input gathering sessions. We anticipate a maximum of 50 participants with 3 people per table.
- **Chairs (50) (\$700):** \$14/chair is requested for meetings during all 7 community input gathering sessions. We anticipate a maximum of 50 participants.
- **Recording Device (\$300):** A recording device will be utilized to share meeting discussions with community members who cannot be in attendance.
- **Speaker/Microphone (\$250):** A speaker and microphone will be used at all 7 community input sessions to help all participants to hear ideas being shared.
- **iPads (4) (\$1,800):** \$450/device is requested for data collection during the KAP study.

Supplies & Materials

- **Office Rental Space (\$1,400):** \$200/meeting space is requested to allow for town halls (3), focus groups (2), and community input session gatherings (2).
- **Food For Meetings (\$4,200):** \$20/person is requested to cover the food for 30 participants for each of 7 meetings (3 town halls, 2 focus groups, 2 community input sessions).
- **Promotional Materials (\$5,140):** \$2,400 (\$200 per advertisements x 6 advertisements) is requested for radio advertisements, \$1,440 (\$240 per advertisement x 6 advertisements) for newspaper advertisements, \$1,000 for a social media campaign, and \$300 for geo-fencing analysis to target advertisements.

Other Expenses

- **Transportation vouchers (\$1,200):** \$4/person is requested with an anticipated 300 participants needing reimbursement for traveling.
- **Childcare (\$3,000):** \$30/hour is requested for the cost of childcare during the town halls, focus groups, and community input sessions. We have budgeted for 100 vouchers.
- **Photocopying/printing (\$735):** \$10.5/print is requested to cover the cost of printing and photocopying of any and all materials pertaining to this project. There will be 10 prints for each of 7 meetings (3 town halls, 2 focus groups, 2 community input sessions).
- **Braille translation (\$2,100):** \$30/print is requested for print and photocopying 10 prints for each of 7 meetings (3 town halls, 2 focus groups, 2 community input sessions).

7. Resource Management, Sustainability and Scalability Plan

Resource Management

The Project Manager will be recruited at the beginning of the grant cycle to direct multiple aspects of the monitoring and evaluation process, including oversight of human resources, goods and services, and relationships with media and external funders. The Project Manager will be tasked with making necessary purchases, creating contracts, and developing memorandums of understanding over the grant period, as well as working in coordination with other staff members for additional management tasks. The Project Manager will work closely with the Study Director on other aspects of the monitoring and evaluation process (e.g. hiring graduate students and subcontractors). The Study Director will provide necessary training and supervision to graduate students; training for the IC will be provided by the IC Trainer. The Study Director, with support from graduate students and other staff providing professional services (e.g. graphic designer), will provide outreach to the Binghamton community. The Accountant/Bookkeeper will be responsible for fiscal resources, including budget tracking, reporting, and payments.

Sustainability

To sustain the participatory planning model and future intervention designs, we will prioritize investing in a relationship with SUNY Binghamton, having continued community engagement, and ensuring future interventions are community-oriented. A strong partnership with SUNY Binghamton will lend itself to additional personnel and resources for conducting future studies on community perception for city-wide change. Community engagement will continue beyond the granting period as focus groups and town halls related to disaster resilience are integrated into regular municipal proceedings. The approval of the reconstruction plan by all community stakeholders is important in order to proceed with the construction of identified interventions. Partnering with community stakeholders in diverse fields will allow for continued momentum for the flooding resilience project to materialize. The ***Monitoring and Evaluation*** framework outlined above details how progress toward objectives will be assessed, providing indicators of gaps and successes for the project's sustainability.

Scalability

This project can be easily applied to non-flooding environmental hazards, increasing the scalability of the proposal, especially given the public health importance of increasing resiliency among Binghamton residents to all hazards. Moreover, given that our intervention aims to engage both community members and political stakeholders, this political buy-in for equity-driven flooding projects can result in a cascade of political reinvigoration to craft policies that directly benefit the Binghamton community. In addition to political reinvigoration, we plan to make our documents publicly accessible such that our initiative can be scaled to other communities to increase resiliency not only of Binghamton, but also of other regions where climate resiliency is urgently needed.

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Appendix I: Figures

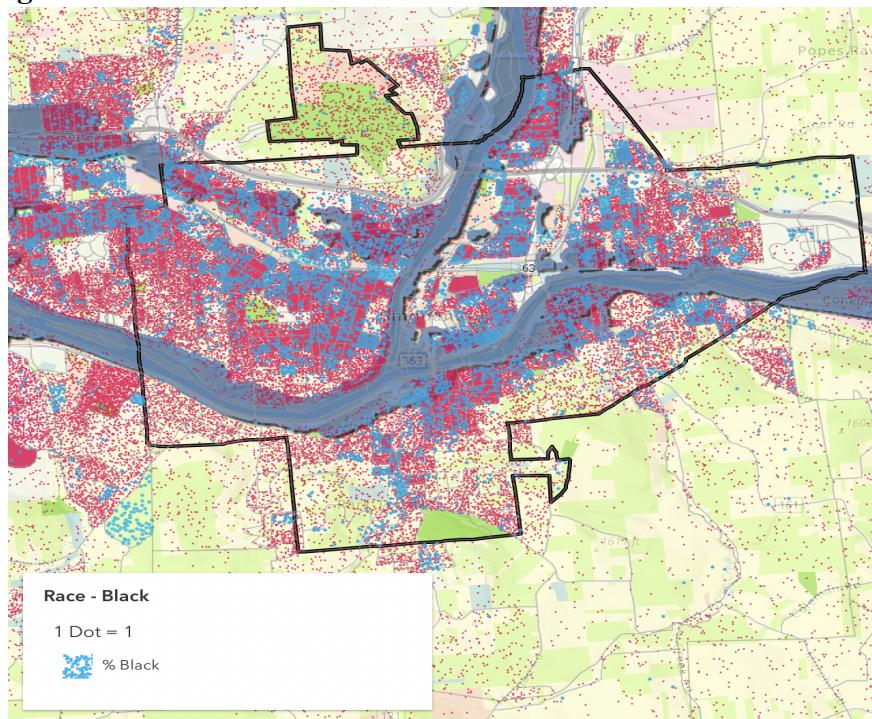


Figure 1. Racial Distribution, Binghamton, New York, 2022. The Black population distribution (blue) has been overlaid with the overall population density (pink); the densest concentration of black communities is around the Susquehanna River where flooding is most severe.⁹

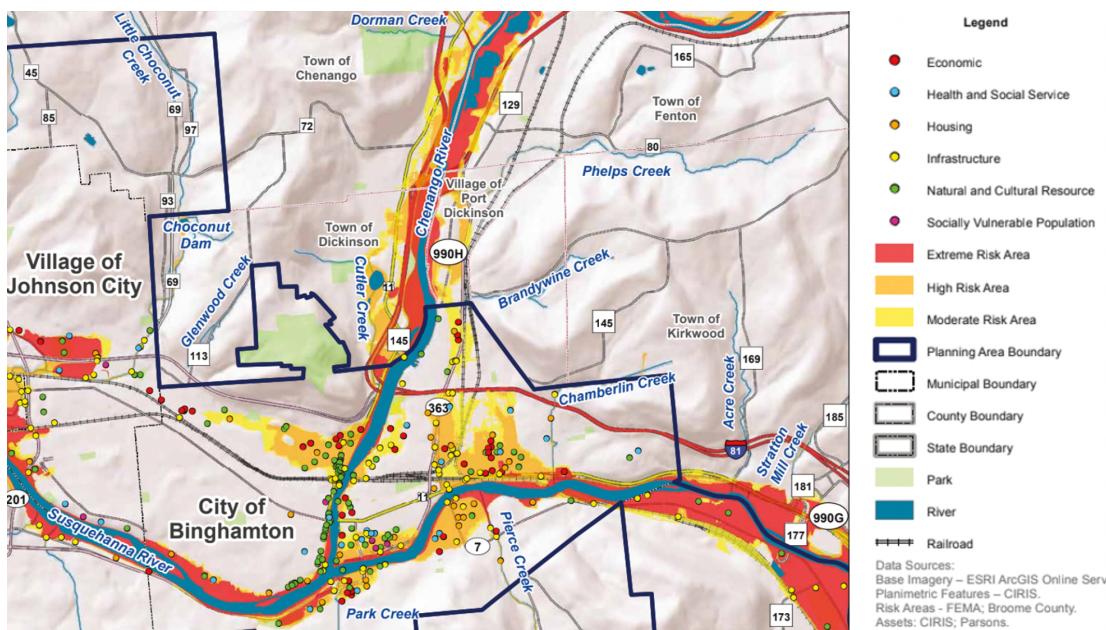
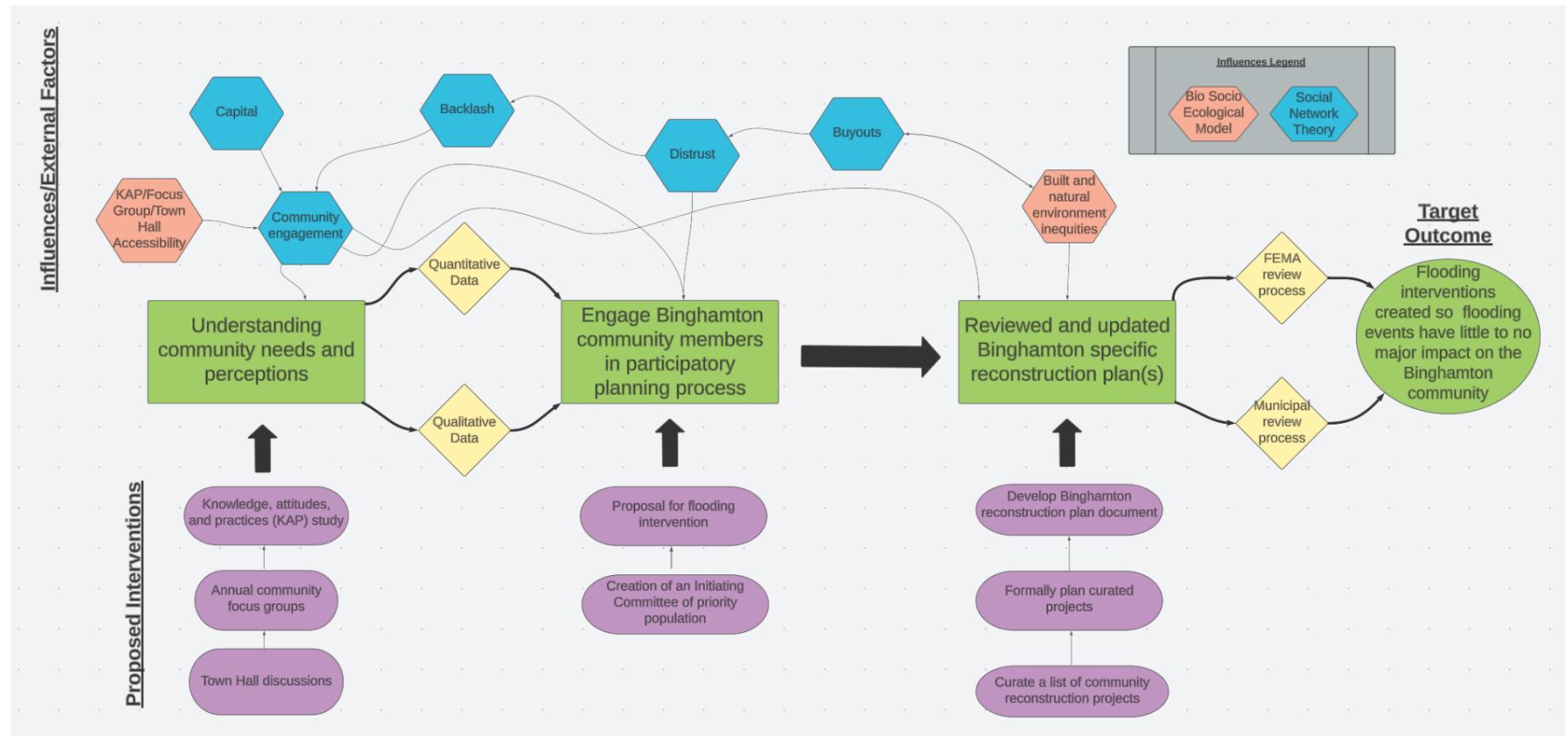


Figure 2. Asset Locations in Flood Risk Areas of Binghamton, New York. The New York State Reconstruction Plan depicts areas of extreme, high, and moderate risk of flooding in Binghamton overlayed with community assets distribution. The areas of the greatest risk are along the Susquehanna River are for natural and cultural resources, economic, and infrastructure assets.²¹

Appendix II: Logic Model

In ten years, we envision flooding events having little to no major impacts on the Binghamton community					
INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES		
What we invest	What we do	What we create	Short-term results	Intermediate results	Long-term results
<ul style="list-style-type: none"> - SUNY Binghamton, City of Binghamton Office, local architectural, engineering & urban planning firms & New York State Office of Resilient Homes and Communities. - Binghamton community (e.g. residents, tenant's union) - Grant funding: \$1,000,000 - Time (staff and residents) - Meeting space for town hall discussions - Outreach materials (e.g. flyers, signs, KAP materials) 	<ul style="list-style-type: none"> - Knowledge, attitudes, and practices (KAP) study - Annual community focus groups (3) - Town hall discussions (2) - Facilitate communication between community members and government officials 	<ul style="list-style-type: none"> - Initiating Committee with 10-15 members with compensated training on public planning processes - KAP study and report accessible for all - Binghamton Reconstruction Plan document 	<ul style="list-style-type: none"> - Increase community agency in planning efforts - Increase interactions with decision makers - Increase self-efficacy in influencing political and planning decisions - Community network of partnerships 	<ul style="list-style-type: none"> - Increase equitable involvement of government planning and policies - Increase procedural equity (i.e., increase inclusivity, transparency, accessibility and fairness in all planning and decision making)²² 	<ul style="list-style-type: none"> - Increase flooding infrastructure that is in line with community needs for flooding resilience, as determined by the community - Improving characteristics of the built environment to allow for healthy living amongst all community members of Binghamton - Sustainable flooding infrastructure (reconstruction projects)
Assumptions					External factors
<ul style="list-style-type: none"> - Community input will be sustained and wide-reaching - Language used in deliverables will be digestible for everyone 	<ul style="list-style-type: none"> - Meetings with community members will be accessible for everyone 	<ul style="list-style-type: none"> - We will be able to foster trust between the community and partners. 	<ul style="list-style-type: none"> (-) Distrust of government (-) Structural discrimination producing housing inequity (+) Having facilitators of town halls be from the community 	<ul style="list-style-type: none"> (+/-) Timeliness (-) Low turnout or low community input (+) Having facilitators of focus groups be from the community 	<ul style="list-style-type: none"> (-) Fear of backlash (+/-) Hiring an external entity for conducting KAP study (-) Current active plans for buyouts

Appendix III: Theory of Change



Theory of Change diagram applying the Bio Socio Ecological Model²⁴ and the Social Network Theory^{22,23} to the proposed intervention. Elements of the Bio Socio Ecological Model are shown in orange while elements of the Social Network Theory are shown in blue, as both reflect systems-focused theories for public health that facilitate or limit the objectives (green). The objectives progress from the first objective on the far left to the final target outcome on the far right while accounting for concrete intervention elements (purple) and intermediate processes (yellow)

Appendix IV: Monitoring and Evaluation Framework

Objective	Evaluation & Monitoring Question(s)	Indicator(s)	Data source(s)	Person(s) Responsible
Objective 1: Establish points of community engagement for input on feasibility and preference of future design plans focused on increasing equity, especially with flooding	Monitoring (1) Baseline, midpoint, and end-of-project surveys to the IC to determine self-efficacy in planning processes and ability to represent the needs of the community (2) Feedback requests among the community at large to monitor adequate assessment of shared needs Evaluation (a) Did the KAP study capture the population's knowledge, attitudes, and practices vis-a-vis flood risk and resilience? (b) Did we gain information on community need, equity, and preference for future design plans from town halls and focus groups? (c) Do we have an IC of 10 people who reflect the population(s) of interest?	1. Analysis and coding of KAP study data 2. Attendance, minutes, and agenda for each town hall and focus group 3. Number of individuals on the IC	1. KAP study data 2. Meeting minutes 3. IC MOU	Study Director; Data Collection team at SUNY Binghamton University Head of IC; IC members
Objective 2: Generate and refine a flood resilience action plan that can be adopted and executed.	Monitoring (1) Submission of progress reports by contractors to ensure progress of the planning document, particularly in alignment with community preferences identified in Objective 1. Evaluation (a) Were community reconstruction projects identified based on results from the participatory planning process? (b) Were the community reconstruction projects identified by local architects and planners? (c) Was the reconstruction plan document approved by local leadership? (d) Was the reconstruction plan approved by community partners engaged throughout the planning process?	1. List of proposed projects submitted by the IC in with local leadership 2. Documented and filed relevant planning documents 3. Approval by IC and local leadership	1. Meeting minutes between members of the planning process and contractors 2. Hiring contracts 3. Signed letter of approval by IC and local leadership	Head of IC; local municipal leadership; Study Director; architecture, planning, and/or engineering firms

Appendix V: Itemized Budget

Personnel								
Salaried Employees	Annual Salary	Project FTE	Project Salary	Fringe (30%)	Total Cost Per Year	In-Kind Contributions	Other Funds Committed	Total Grant Request
Study Director	\$ 71,000	0.50	\$ 35,500	\$ 10,650	\$ 46,150			\$ 46,150
Project Manager	\$ 65,000	1.00	\$ 65,000	\$ 19,500	\$ 84,500			\$ 84,500
RHC Accountant/Bookkeeper	\$ 70,000	0.25	\$ 17,500	\$ 5,250	\$ 22,750	\$ 22,750		\$ -
Total Salaried Personnel Cost								\$ 391,950
Hourly Employees		# hours per week	total # weeks	Wage Per Hour	Total Wages	In-Kind Contributions	Other Funds Committed	Total Grant Request
Graduate Intern 1		15.0	86	\$ 20.00	\$ 25,800			\$ 25,800
Graduate Intern 2		15.0	86	\$ 20.00	\$ 25,800			\$ 25,800
Graduate Intern 3		15.0	86	\$ 20.00	\$ 25,800			\$ 25,800
Graduate Intern 4		15.0	86	\$ 20.00	\$ 25,800			\$ 25,800
Translator		10.0	105	\$ 30.00	\$ 31,500			\$ 31,500
Initiating Committee Member 1		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 2		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 3		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 4		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 5		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 6		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 7		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 8		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 9		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Initiating Committee Member 10		5.0	75	\$ 20.00	\$ 7,500			\$ 7,500
Trainer for Initiating Committee Members		5.0	10	\$ 25.00	\$ 1,250			\$ 1,250
Total Salaried Personnel Cost								\$ 210,950
Total Personnel Salaries								\$ 602,900
Professional Services								
Description/Purpose	Unit Cost	Unit 1 (Hours)	Unit 2 (People)		Total Expense	In-Kind Contributions	Other Funds Committed	Total Grant Request
Graphic Designer	\$ 25	100	1	\$	2,500			\$ 2,500
RHC GIS Mapping Specialist	\$ 34	120	1	\$	4,080	\$ 4,080		\$ -
Website development (Full stack developer)	\$ 57	320	1	\$	18,240			\$ 18,240
Website maintenance	\$ 20	768	1	\$	15,360			\$ 15,360
ASL Translator (accessibility services)	\$ 125	11	1	\$	1,375			\$ 1,375
Total Professional Services Cost								\$ 37,475
Subcontracts								
Description/Purpose	Unit Cost	Unit 1 (Hours)	Unit 2 (People)		Total Expense	In-Kind Contributions	Other Funds Committed	Total Grant Request
Architect	\$ 80.00	960	1	\$	76,800.00			\$ 76,800.00
Engineer	\$ 72.00	960	1	\$	69,120.00			\$ 69,120.00
Urban Planner	\$ 65.00	960	1	\$	62,400.00			\$ 62,400.00
Total Subcontracts Cost								\$ 208,320
Travel								
Description/Purpose	Unit Cost	Unit 1 (Meetings)	Unit 2 (Vehicle)		Total Expense	In-Kind Contributions	Other Funds Committed	Total Grant Request
Traveling to the KAP participants	\$ 30	6	2	\$	360			\$ 360
Traveling to the focus group	\$ 15	3	3	\$	135			\$ 135
Traveling to the town hall	\$ 15	2	3	\$	90			\$ 90
Total Travel Cost								\$ 585
Equipment								
Description/Purpose	Unit Cost	Unit 1 (Items)		Total Expense	In-Kind Contributions	Other Funds Committed	Total Grant Request	
Tables for KAP/focus group/town hall	\$ 30.00	17	\$	510				\$ 510
Chairs for KAP/focus group/town hall	\$ 14.00	50	\$	700				\$ 700
Recording devices	\$ 300.00	1	\$	300				\$ 300
Speaker/microphone	\$ 250.00	1	\$	250				\$ 250
iPads (for KAP study, etc.)	\$ 449.00	4	\$	1,796				\$ 1,796
Total Travel Cost								\$ 3,556
Supplies & Materials								
Description/Purpose	Unit Cost	Unit 1 (Meetings)	Unit 2 (People)		Total Expense	In-Kind Contributions	Other Funds Committed	Total Grant Request
Office Rental Space	\$ 200.00	6	\$	1,200				\$ 1,200
Food for events	\$ 20.00	6	30	\$	3,600			\$ 3,600
Radio Advertisements	\$ 200.00	6	2	\$	2,400			\$ 2,400
Newspaper Advertisements	\$ 240.00	6	\$	1,440				\$ 1,440
Social Media Campaign	\$ 1,000.00	1	\$	1,000				\$ 1,000
Geo-Fencing	\$ 300.00	1	\$	300				\$ 300
Total Supplies & Materials Cost								\$ 9,940
Other Expenses								
Description/Purpose	Unit Cost	Unit 1	Unit 2		Total Expense	In-Kind Contributions	Other Funds Committed	Total Grant Request
Transportation vouchers	\$ 4.00	300	\$	1,200				\$ 1,200
Childcare	\$ 30.00	100	\$	3,000				\$ 3,000
Printing costs	\$ 10.50	6	10	\$	630			\$ 630
Braille for posters	\$ 30.00	6	10	\$	1,800			\$ 1,800
Total Other Expenses								\$ 6,630
Indirect Cost Rate								0.15
Total Project Cost								\$ 999,816.90