

THRIVE:

Resilience In Virginia



HUD-NDRC:
PHASE 2 Application
The Commonwealth of Virginia

THRIVE: Resilience In Virginia

INTRODUCTION

Virginia's Hampton Roads region embodies the cultural, military and commercial history of America. Its location at the mouth of the Chesapeake Bay, sheltered harbor, and extensive network of rivers, creeks and swamps have attracted people to settle here for thousands of years. The region's waterways remain integral to the region: Hampton Roads has served as the naval gateway to the Nation's capital for four centuries. The deep natural harbor is home to Naval Station Norfolk, the largest naval base in the world, and the Port of Virginia, the third largest port on the East Coast. Hampton Roads is a key trade juncture for the eastern United States and a security nexus for the world. The importance of the region's waterways is even reflected in the name: Hampton Roads is actually a body of water where three rivers, the James, Elizabeth and Nansemond, converge to meet the Chesapeake Bay.

The region's topography features prototypical coastal environments that are replicated along the east coast and beyond, and like other coastal regions, Hampton Roads faces increasing risks associated with sea level rise. In southeastern Virginia, however, the threat of rising seas is exacerbated by land subsidence; as a result, Hampton Roads is experiencing the impacts of climate change more rapidly than other coastal communities. The region faces serious environmental challenges; however, the Commonwealth believes that the solutions we develop in Hampton Roads will also present opportunities: in the future, coastal communities around the world will confront these same problems. As Virginia develops strategies for a resilient response, the Hampton Roads region can serve as a laboratory for solutions that can be replicated across the globe. National Disaster Resilience funding will help advance these solutions while supporting the Hampton Roads' most vulnerable populations.

REGIONAL APPROACH

A deep and thoughtful multi-year community process has produced a comprehensive community revitalization approach that builds on current strengths and converts risks and vulnerabilities into opportunity: *THRIVE: Resilience In Virginia*.

Our region’s work—shipping, shipbuilding, international trade, and naval operations—is on the water. Hampton Roads will thrive with water by continuing to create economic vitality from its position as the gateway to the Chesapeake Bay, even as the environment shifts. Specifically, Virginia’s strategy is to create long-lasting resilience in Hampton Roads at all scales—individual resident, neighborhood, city and region—by creating a unified strategy to meet the challenges of sea level rise and stalled economic growth by creating a coastal community that can support a water-based economy in a sea level rise environment.

The *THRIVE* framework is multidisciplinary and encompasses five resilience-building strategies:



Unite the Region

The goal is to unite the region by increasing cooperation and coordination around shared water and economic challenges and opportunities. This cooperation is underway. The Commonwealth has established formal relationships with regional partners to address the impacts of climate change and the resulting sea level rise.

Create Coastal Resilience

The goal is to use increasing risk to drive change, creating a region capable of thriving as a coastal community for the next century. As rising sea levels necessitate a changed landscape, our strategy is to adapt land use around water. Through this adaptive process, water will become a community amenity, reintroducing natural landscapes into neighborhoods. Residents will become an integral part of the region's risk reduction strategy. They will be asked to:

- Be knowledgeable about potential risk,
- Take action to lessen exposure,
- Be part of the water management solution by holding water on their property, and
- Actively protect vulnerable populations during disruptive events

Improve Economic Vitality

The goal is to maintain our economic drivers while diversifying our economy. In the coming decades, the region will invest heavily in water management and resilience-enhancing systems. The critical continuity of operations at the Port of Virginia, Naval Station Norfolk and other water-based businesses presents the region with the opportunity to drive systems innovation that can expand the regional economy. **THRIVE** will create a Resilience Lab/Accelerator designed to identify critical resilience issues that constrain business continuity of coast-based businesses, research solutions, develop needed workforce skills and training and support the expansion of businesses to deliver the solutions to the market.

Build Innovative and Replicable Water Management Solutions

THRIVE will create, test, and build water management solutions that showcase innovative and replicable solutions at multiple scales, and create multiple benefits to cities.

Hampton Roads is experiencing the highest relative sea level rise on the East Coast, making it a natural lab for experimental water management practices. The Rockefeller Foundation-supported Structures of Coastal Resilience design and REinvest Initiative designs, the US Army Corps of Engineer's North Atlantic Coast Comprehensive study, the Urban Land Institute's Resilience Technical Panel recommendations and most recently, the Dutch Dialogues water management designs for the region all offer innovative approaches for living. These designs block, hold, channel, absorb and release water in ways that create new open spaces for residents to enjoy, new connectivity to increase vitality, new opportunities to remove water pollutants, and new opportunities for land development. These solutions will help revitalize neighborhoods, de-concentrate poverty, provide improved educational opportunities, and create affordable housing options and jobs.

The specific NDRC-proposed projects for the target areas in three Virginia cities are described in *Section III: Soundness of Approach* and with additional detail in the BCAs. The projects are guided by the following replicable water management principles: 1) system approach, 2) scales approach, 3) hold water as far up the watershed as possible, 4) slow it and clean it as it drains through distributed green multi-purpose open space areas, 5) restore creek beds to channel water, and 6) physically reimagine the community to achieve co-benefits such as connectivity, economic revitalization, social cohesion, and health and ecological benefits. The result is a new paradigm, where neighborhoods are organized around storm water management strategies.

Strengthen Vulnerable Neighborhoods

The proposed projects will help build regional resilience and strengthen vulnerable neighborhoods by reducing flood risk, while increasing opportunity. The cities will augment these initiatives to help people

adopt behaviors that reduce vulnerability. Using storm preparedness as a tactic, these initiatives are designed to build social cohesion by establishing networks that connect people. Research conducted in the aftermath of Hurricane Sandy reveals that cohesive communities bounce back from disruptive events more quickly. By establishing hyper-local networks tasked with ensuring the safety of neighbors, who are vulnerable due to social, physical or economic conditions, there will be increased communication between neighbors and decreased burden on emergency responders during a crisis.

I. CAPACITY



I. CAPACITY

Commonwealth of Virginia

A. The Governor's Commission on Climate Change

Governor Terry McAuliffe issued Executive Order 19 on July 1, 2014 convening the Governor's Climate Change and Resiliency Update Commission. The Commission, co-chaired by Secretary of Natural Resources Molly Ward and Secretary of Public Safety and Homeland Security Brian Moran, was directed to develop up to five actionable recommendations and submit those recommendations in a report to the Governor. On July 1, 2015, Governor McAuliffe signed Executive Order 45 extending the Commission's work for one year and requiring that the Commission submit its report by September 30, 2015. This collaborative and bipartisan effort consisted of individuals from around the state including local elected officials, members of the General Assembly, business leaders, environmental advocates, faith leaders, and industry representatives.

Former Governor Tim Kaine's Commission on Climate Change and the resulting 2008 Climate Change Action Plan served as a starting point for the new discussion. The 2008 Climate Change Action Plan outlined the impact that changing weather conditions have on Virginia's built environment, natural systems, and the health of its citizens. Among the findings was the decline or disappearance of key species of the Chesapeake Bay, increased damage from more frequent and severe storms, and the spread of vector-borne diseases like West Nile virus. The report also made 113 recommendations to help Virginia adapt to the consequences of climate change, as well as reduce Virginia's contributions to the problem.

In addition to building off this prior work, the Commission received information regarding work that has been underway since the 2008 Climate Change Action Plan was developed. These efforts include the work of the Secure Commonwealth Panel's Recurrent Flooding Subpanel, the Center for Coastal Resources Management at VIMS, the Coastal Policy Clinic at William & Mary Law School, Old

Dominion University's Whole of Government Pilot Program, Virginia's Coastal Zone Management Program and Floodplain Management Program, and many other efforts throughout the Commonwealth. The Commission was directed to reflect upon all of this prior and ongoing work as it developed its recommendations:

1. Establish a Climate Change and Resilience Resource Center
2. Create a Virginia Trust for Energy and Resilience
3. Establish a Renewable Energy Procurement Target for Commonwealth Agencies
4. Adopt a Zero Emission Vehicle Program
5. Leverage Federal Funding to Make Coastal Communities More Resilient

Additional Actions

In addition, Governor McAuliffe appointed Secretary Moran as the Commonwealth's Chief Resiliency Officer, the single point of contact for issues related to resiliency. Since that time, Secretary Moran's office has initiated serious updates to emergency planning and disaster relief in eastern Virginia to address the deficiencies that Governor McAuliffe identified in his earliest days on the job.

Furthermore, the Virginia Institute of Marine Science (VIMS) has developed a statewide protocol for sea level rise projections to reliably inform planning.

Department of Housing and Community Development (DHCD)

Past Experience of the Applicant

Governor McAuliffe has appointed the Virginia Department of Housing and Community Development (DHCD) as the lead agency for the Commonwealth's application to the National Disaster Resilience Competition (NDRC). DHCD has significant project experience and also been designated to serve as the grant administrator and project implementation manager for any grant funds awarded through the NDRC. As the primary point of contact for all programmatic and contractual obligations, DHCD will be responsible for overall oversight, fiscal and budgetary controls and inter-community coordination.

DHCD is committed to creating safe, affordable, and prosperous communities in which to live, work and do business in Virginia. DHCD partners with Virginia's communities to develop their economic potential, increase entrepreneurial capacity, and help produce affordable neighborhoods. By partnering with local governments, nonprofit groups, state and federal agencies, and others, DHCD is working to improve the quality of life for Virginians.

DHCD invests more than \$100 million each year into housing and community development projects throughout the state; the majority of these are designed to help low-to-moderate income citizens. This strategic investment of financial and technical resources fosters an environment that attracts private sector development and investment in communities. DHCD works to encourage and promote regional economic collaborations in economically distressed areas to stimulate job creation, economic development and build community capacity and leadership. By advocating for communities to work together on a regional basis, there are greater opportunities to package experiences more broadly, offering a wider array of economic opportunities to the communities.

DHCD's focus is on enhancing small business and entrepreneurial development, incorporating community assets into revitalization strategies, strengthening downtowns and commercial corridors through various redevelopment activities that often include infrastructure enhancements, commercial and residential blight removal, and mixed-use reconstruction. Recently, DHCD has given special emphasis on efforts to stabilize neighborhoods adversely affected by the foreclosure crisis. DHCD also supports innovative strategies to redevelop underutilized properties or structures that are no longer economically viable.

The agency recognizes that safe and affordable housing is a critical component of a comprehensive approach to economic and community development. DHCD collaborates with community partners to reduce the impact of homelessness on individuals and families. Investments and support emphasize housing stabilization and rapid-rehousing, creating linkages to community resources and mainstream

benefits, and helping clients develop a plan for preventing future housing instability. DHCD also supports efforts that target special needs populations, seeking to provide more integrated community housing options for persons with intellectual, developmental, and physical disabilities.

General Administrative Capacity

DHCD implements comprehensive community revitalization strategies throughout the Commonwealth and has experience with leading major projects, including some that have been cited as models. DHCD's implementation of the HUD Neighborhood Stabilization Program (NSP), a high profile program developed to help communities stabilize neighborhoods impacted by foreclosure and abandonment, illustrates the agency's ability to effectively implement a highly leveraged, time-sensitive priority program. Virginia's highly successful NSPs acquired, rehabilitated, and resold over 300 homes, generating close to \$50 million in program income that was made available to reinvest in continued operation of the program.

To accomplish its mission of creating safe, affordable, and prosperous communities where citizens can live, work and do business in Virginia, DHCD must routinely collaborate with a wide range of groups, including other state agencies, municipalities, special interest groups, nonprofits, foundations, the business community, and local outreach organizations. For the Virginia NSP program, DHCD coordinated the efforts of 25 municipal governments and nonprofits assisting homeowners in danger of foreclosure. The program was efficiently managed through proven strategies, such as providing on-line and on-site training and workshops, policy briefs, technical assistance for outreach marketing and a variety of financial resources, including a frequently-asked-questions database, standardized forms, brochures, standardized sample transaction processes, and reporting mechanisms.

DCHD's coordinated approach to the Continuum of Care system transformed Virginia's homeless services system into a national model: in 2014, Virginia saw decreases of 7.9% in overall homelessness, 10.8% in family homelessness, and 14% decrease in veteran homelessness. This was primarily

accomplished through effective coordination of existing resources and through the transformation of the delivery system to a community-based network focused on best practices such as Housing First.

Cross Disciplinary Capacity

DHCD performs cross-disciplinary work regularly, as part of the agency responsibility to manage state CDBG funds, federal and state housing programs, disaster recovery assignments, and other major federal and state programs. The agency's large affordable housing and neighborhood enhancement projects entail coordination of multiple public and private sector functions, teams, and disciplines, including planning, design, engineering, environmental, and socio-economic approaches. DHCD also manages the Commonwealth's storm disaster management, public works, environmental quality, building and fire code regulation, and economic revitalization projects, all within a framework of federal and state standards which regulate fair housing, civil rights, environmental review processes, labor standards, and others.

An example of DHCD's cross-disciplinary implementation is Building Collaborative Communities, an innovative program coordinating resources from a number of state entities to stimulate job creation, economic development and build community capacity and leadership in economically distressed areas. This program brings together multiple state agencies, private sector partners, educational institutions, community groups, and residents, in a participatory process.

To ensure Virginia's commitment to the intent of both the American with Disabilities Act (ADA) and the Olmstead Act, the state has launched an intensive community engagement initiative to increase integrated community-based housing with supportive services in communities with the largest number of individuals impacted by the Department of Justice Settlement Agreement. This interagency initiative is known as Housing and Supportive Services (HSS).

The project goal is to increase access and availability of integrated housing options with appropriate supportive services for individuals with intellectual and developmental disabilities. The DHCD is actively

working with other state agencies and local partners to move this effort forward. In early June 2015 government (federal, state, county) agencies and community organizations came together to officially launch the “HSS 100-Day Challenge” across the three key regions. At this event, four distinct Community Teams were formed to develop their own set of goals to be reached within the 100 day period. The 100-day challenge will conclude with a “Sustainability” event where all the teams will reconvene to share their accomplishments and plan their next steps with state leaders and other community teams to keep the HSS initiative moving forward.

The DHCD is often called upon to lead regional efforts, including utility consolidation, development of regional industrial parks, and regional economic restructuring efforts. DHCD staff and resources frequently play a critical role in convening stakeholders, identifying barriers, facilitating conversations, and working to develop consensus around solutions.

DHCD oversees the Commonwealth’s uniform building code. Codes and regulations are adopted by the Board of Housing and Community Development and periodic amendments are utilized to update codes and incorporate new reference standards. Code changes are managed through a stakeholder driven process, where public and private interests provide input. A group of industry associates work together to vet suggestions, analyze the impact, review cost-benefit information, and reach a final decision.

DHCD has extensive experience managing federal resources, included HUD-funded programs to include the HOME, state CDBG, Neighborhood Stabilization, Emergency Solutions, HOPWA, and when appropriated, Disaster Recovery programs, along with other federally funded programs including Weatherization Assistance, LIHEAP, Rural Community Development Initiative. DHDC staff are experienced and equipped to navigate federal cross-cutting and housing-related requirements, including the Environmental Review Process, Section 3, Labor Standards, and Lead, and Fair Housing. Staff have significant experience working in both IDIS and DRGR and are cross-trained to provide back-up coverage as needed. DHCD staff are currently working with the Council of State Community Development

Agencies and HUD on the development of an Affirmatively Furthering Fair Housing assessment tool for use by states.

Experience with Collaboration and Coordination for Large Projects

DHCD implements comprehensive community revitalization strategies, including the investment of more than \$100 million each year into housing and community development projects throughout the state—the majority of these are designed to help low-to-moderate income citizens. DHCD emphasizes collaboration with and coordination of various partners, including contractors, state and federal agencies, local government, nonprofit groups and others.

A central part of the DHCD project management philosophy is the creation of a project management team, a group of project stakeholders held accountable for oversight and management of each project. Key to the success of this team is citizen participation and each management team must include residents from the project area. DHCD actively participates in the management team and facilitates the development of the project work plan and contract.

One example of a large-scale community revitalization development strategy and systems change is DHCD's leadership in the transformation of the delivery of homeless services which exemplifies the agency's ability to effect change through a collaborative model. As the agency administering all state and federal funding dedicated to preventing and ending homelessness, DHCD has moved from a strictly shelter based system to a community based system focused on collaboration to ensure an effective emergency response to homelessness utilizing best-practice strategies, such as rapid re-housing and maximizing limited resources. As a result, last year overall homelessness decreased by 7.9 percent, family homelessness decreased 10.8 percent and homelessness among veterans decreased 14 percent.

Following the shift in the delivery of services, DHCD launched the next phase in this transformation in the spring of 2014 by releasing the Virginia Homeless Solutions Program (VHSP) application, where

five federal and state funding streams that DHCD administers for homeless assistance were combined into one program.

While this approach presented some internal challenges to ensure compliance and proper expenditure of the funding streams, it was necessary to strongly encourage communities to look at things from a systems perspective. VHSP makes communities, as well as organizations, accountable for performance outcomes and was a huge shift from the prior emphasis on just organizational performance. The process required providers work together to present a community plan to address homelessness that identified the organizations within the community to provide the shelter, rapid re-housing and prevention activities funded through the new VHSP. The transformation of Virginia's homeless services system is now recognized as a national model.

As demonstrated above, DHCD implements comprehensive community revitalization strategies. The agency delivers substantial outcomes through its robust partnerships and oversight and investment of over \$120 million annually, including the creation of nearly 3,000 new jobs, providing 29,000 households with new or improved water and wastewater treatments solutions, providing nearly 4,000 households with new or improved affordable housing, and diverting over 2,400 households from homelessness while also helping over 5,000 homeless households secure permanent housing—all in 2014.

DHCD has expanded its capacity when necessary to administer new resources, illustrated through the agency's successful implementation of stimulus funds, which included nearly \$100 million through the Weatherization Assistance Program, \$43 million under the Neighborhood Stabilization program, and \$5 million in the Community Development Block Grant program. DHCD's response to managing programs and resources is scalable. When new resources become available the agency assesses its programmatic and financial capabilities, adjusts existing procedures, reassigns work responsibilities, and when necessary, adds increases staffing levels. As noted in the prior example with the NSP, DHCD quickly added staff with the appropriate knowledge, skills, and abilities, convened stakeholder meetings to solicit

input, and drafted programmatic materials, including a program design, competition materials, and a grant management manual.

With the Weatherization Assistance Program, almost overnight a program budget increased 10 fold, from roughly \$10 million to \$100 million. While a delivery system was in place, this network needed to quickly ramp up to accommodate the incredible increase. To facilitate this process, DHCD added additional staff to provide the fiscal and programmatic demands. The agency then worked with the existing providers to add additional local capacity, including a significant emphasis on technical training. DHCD accelerated curriculum development at the state training facility but recognizing this was not going to fully meet demand, the agency entered into discussions with the community college system to develop training modules to be delivered through a local campus. DHCD also invested in a management information system to increase provide a centralized and coordinated system for client intake, budget management, invoicing, reporting, and transparency. This system provided a consistent means for managing the program across local providers and streamlined the program management process.

Technical Capacity

The Department has developed and implemented monitoring procedures for the regular monitoring of project sponsors, grantees, and sub-recipient. Monitoring is based on a risk assessment that factors in the last date a project, program, grantee, sub-recipient, or project sponsor was monitored, the total relative amount of award, current and previous performance, and program requirements. Any specific observations or findings are noted with program narrative section.

Monitoring is performed annually for high performing sub-recipients and twice a year for all others. Skilled program administrators spend eight to twelve hours reviewing files on-site to ensure compliance with administrative oversight, applicant/contractor records, financial management, federal compliance, client file checklist and housing rehabilitation field inspections. Formal letters are sent summarizing any findings, concerns or recommendations noted during the monitoring visit and responses are due within 30

days. Technical assistance is provided throughout the program year by conducting site visits, workshops and conferences, email and telephone contact.

The Community Representative is responsible for direct technical assistance and for assuring that each assigned local partner achieves stated performance and compliance requirements. The Community Rep is responsible for helping the local partner get under contract, providing technical assistance as needed, providing onsite and desktop compliance monitoring, ensuring that Project Management Plans are being adhered to, and reviewing all reporting documentation. Technical assistance is also provided by the Associate Director, who is responsible for contract negotiations, program management design, and policy and overall administration, the Program Manager, who is responsible for uniform policy implementation and program management by the staff of Community Representatives, and the Financial Analyst who is responsible, for assuring accountability of funds, technical assistance in financial management, audit control and management.

DHCD's comprehensive management information system, CAMS, facilitates the implementation of its programs. This system provides financial and project management tracking support and adds a greater level of transparency as both DHCD staff and grantee staff can view the status of remittance requests, budget revisions, reports, and project management documents in real-time through a web-based system.

Capacity for Community Engagement and Inclusiveness

Through its administration of HUD and other social service programs, DHCD regularly works with vulnerable populations. Public participation is a requirement for most DHCD-administered programs, whether it is seeking input annually on the Program Design documents used to implement programs, regularly held participatory meetings for the Agency Action Plan (its HUD resource investment strategy), or through public meetings for the agency's oversight of locally based projects. From planning through implementation, citizens are encouraged to participate in the process. Meetings are typically held outside of the traditional city or county council meeting and instead, are held in the community, at churches,

community organizations, or other places easily accessible to community members. Information about the meetings is also publicized through advertisement in local papers and also through more social methods, such as flyers at community buildings, outreach through faith-based organizations, and notices in public areas such as grocery stores.

In addition to efforts to engage community residents in neighborhood revitalization projects, DHCD has also led capacity building efforts to empower and engage the public. Through a recent initiative—Stronger Economies Together—DHCD led an effort with USDA Rural Development, the Virginia Cooperative Extension, Virginia Tourism Corporation, Virginia Tech Office of Economic Development, the Virginia Economic Development Partnership, the Virginia Association of Counties, and other state and local partners, in two rural multi-county regions. The program is designed to help regional teams develop new approaches to strengthen and enhance regional economic development activities, and the teams receive the latest tools, training, and technical assistance to help their region move forward and take advantage of positive growth and quality of life opportunities. Special efforts are made to engage community residents and to have these emerging leaders directly participate in the development and execution of regional plans. The program has yielded new projects in each region, focused on a variety of issues, from workforce capacity, asset-based development, and regional economic development.

DHCD requires the formation of a project management team and as part of this team, “sparkplugs” or community members participate. Sparkplugs are an effective means to gain trust of the community and these team members are used to directly liaison with local residents. This method helps ensure that local voices are heard and that project updates are regularly made available to residents. Use of sparkplugs has proven to be very effective for empowering citizens, particularly vulnerable populations who have not historically been included in the decision-making process.

VDHCD Management Team and Key Staff

The following staff and team members are integral to the design and implementation of the proposed Virginia Disaster Resiliency project:

Bill Shelton, Director of the Virginia Department of Housing and Community Development, is responsible for the management and policy oversight of the agency. Appointed in 1998, Bill works closely with the Secretary of Commerce and Trade and the Governor to advise on community development, economic development, affordable housing, and state uniform building code issues. Mr. Shelton will provide executive oversight and will represent VDHCD in Disaster Resiliency discussions at the agency head and cabinet levels.

Chris Thompson, Deputy Director of Housing, will serve as the Virginia Disaster Project Director, where he will provide primary oversight of operations. Mr. Thompson has 15 years of experience managing a variety of state and federal program resources, including most recently leading the Agency’s Policy and Strategic Development office.

Al Williams, Deputy Director of Administration and Finance Director, serves as VDHCD’s Finance Director. Mr. Williams has managed millions of dollars of state and federal resources during his tenure and he oversees all financial management and accounting functions for the agency, including drawing and allocating funds from HUD.

City of Norfolk

The City of Norfolk has a long record of successfully implementing a variety of projects similar in scale, scope and complexity to those proposed in this application. In the past three years, the City of Norfolk Public Works, which will be primarily responsible for NDRC project management, has managed \$267 million in infrastructure projects, including construction of the Court House (\$126 million), Slover Library (\$64 million), 5 new public schools (2 completed, 3 under construction – total \$130 million), and multi-modal facilities (\$8.6 million). In partnership with federal and community partners, the city

completed a number of leveraged green infrastructure projects which serve as flood defenses and amenities. One of the schools was funded largely by the Department of Defense and the city extensively coordinated with them to implement the project.

Since Hurricane Irene, the city tripled its wetland areas from 60,846 square feet in 2011 to 217,070 square feet by FY 2014. Since September 2014, the city managed, implemented or is currently implementing several major living shoreline restoration projects, including the Haven Creek, Knitting Mill Creek, Colley Bay Shoreline, and Willoughby Spit shoreline stabilization projects, valued at over \$9.3 million, which also included pathway elevation providing a recreational amenity to walkers, joggers and bikers. The city routinely coordinated implementation of wetland and shoreline restoration projects, as well as hard infrastructure projects, with federal, regional and local partners such as the US Army Corps of Engineers (USACE) and the Elizabeth River Project.

In recent years, the city's Department of Public Works, in conjunction with the Departments of Planning and Emergency Planning and Response, has elevated 35 residential structures above the 100-year floodplain using FEMA grants administered through VDEM. An additional 11 houses are currently approved, under contract, or under design.

Since Hurricane Irene, the city's storm water department completed approximately 27 Capital Improvement Projects related to storm water and city-wide flood vulnerability assessment engineering studies valued at over \$17 million. In 2014, the city also raised a tidal flood-prone primary arterial roadway to the Midtown Tunnel at a cost of \$3.5 million, ensuring the Sentara Norfolk General medical complex, the region's only level-one trauma center, remains accessible during flood events.

The City of Norfolk has extensive experience with successful neighborhood revitalization and highly leveraged development of affordable housing through its long-lasting partnership with Norfolk Redevelopment and Housing Authority (NRHA), one of the partners with over 70 years of experience in this domain. The most recent project of this type undertaken by NRHA in partnership with the city is an

extensive area revitalization program, Broad Creek Renaissance, to implement a HOPE VI grant. The Broad Creek project involved the relocation of 767 households, including total demolition, land assembly, development of new infrastructure, procurement, and the financing and construction of 1,115 new units. To date, total development exceeds \$357 million, with over 90% of the funding leveraged from other sources.

Capacity for Community Engagement and Inclusiveness

Hampton Roads has developed a strong network of multi-governmental stakeholders and other stakeholders working regionally on resilience issues related to climate change and economic vitality. Norfolk collaborates with regional partners through long-established committees and forums. The Hampton Roads Planning District Commission (HRPDC), the regional planning agency for its seventeen local government members, routinely convenes localities to discuss efforts related to coastal flooding and sea level rise adaptation since 2008. In March 2014, HRPDC approved creation of a Special Regional Committee on Recurrent Flooding and Sea Level Rise focused on addressing resilience problems on the regional scale. Committee representatives come from all Hampton Roads localities, regional universities, the Army Corps of Engineers, HRTPO, and numerous environmental organizations.

In December 2014 the regional group approved a proposed resolution encouraging localities to adopt new freeboard requirements. The capacity for regional collaboration was demonstrated in June 2015 when the Royal Dutch Embassy selected the region for a cross-disciplinary and cross-generational Dutch Dialogues workshop sponsored by the Dutch Embassy. This intensive, multi-day workshop (only the second held in the US since Hurricane Katrina) brought together more than 60 regional stakeholders, including the cities of Norfolk and Hampton, HRPDC, regional universities and community organizations. Since 2012, regional cities, governmental and non-governmental organizations, universities and other community groups have participated in a quarterly Hampton Roads Adaptation Forum. The ODU Mitigation and Adaptation Research Institute, in cooperation with HRPDC and area municipalities,

provides a place for regional dialogue to address concerns and best practices for dealing with sea level rise and climate change.

The Hampton Roads Community Foundation's Reinvent Hampton Roads 2012 initiative demonstrates their decades-long record of uniting broad coalitions, in this case to tackle a significant regional resilience challenge - economic competitiveness and creating a more diverse economy in southeastern Virginia. After an initial study in 2013, the foundation assembled a cross-section of citizens to assess the current situation and plan how Hampton Roads can become more competitive and grow jobs in the region. Phase I, which ran from late 2013 through the fall of 2014, united nearly 100 Hampton Roads regional stakeholders. It created four study groups focusing on civic leadership, entrepreneurship, industry clusters, and workforce development. Initial outcomes include *757 Angels* which matches angel investment sources in Hampton Roads with start-up and early-stage businesses and provides mentoring and support. The *E-64 Project* supports a network of start-up events, incubators, and maker spaces that can help entrepreneurs expand and create new jobs. A Regional Export Assistance Program has also been implemented.

The City of Norfolk has held extensive stakeholder engagement around its new bike master plan, zoning code rewrite, and the design of 5 new public schools. In 2009-2011, the city gathered community input on the programming for its new Slover Library that won a 2015 AIA/ALA Building award. Based on the tremendous community response, the project scope expanded with an increased donation from the Slover Foundation from the original \$20 million to \$44 million.

The City of Norfolk ensures input from residents, especially low income and other vulnerable residents, through extensive outreach via Neighborhood Specialists who are assigned to all neighborhoods in the city. To improve stakeholder involvement around needs determination, project design, and implementation and monitoring, the city became one of the Rockefeller Foundation's 100 Resilient Cities (100RC) and was able to hire a Chief Resilience Officer. Norfolk has benefited from 100RC's resources

on new engagement techniques.

Over the past two years, Norfolk's Chief Resilience Officer and her team have conducted extensive consultations and stakeholder engagement to understand the city's need, challenges and opportunities. This community-driven effort will culminate in Norfolk's Resilience Strategy to be launched on October 28, 2015. Over the past several years, the city in cooperation with its partners have conducted extensive and iterative stakeholder consultations to determine need and redevelopment as well as water management design preferences for the NDRC target areas that suffer from chronic flooding, underdevelopment and lack of economic development. For instance, the city, in partnership with NHRA has engaged the expanded St. Paul's community since late 2005 at the master plan level and for specific targeted areas of need.

The resulting vision of these parallel efforts formed the basis for the HUD-sponsored Choice Neighborhoods Initiative Transformation Plan in 2014. This planning process was refined through another layer of community meetings, charrettes, advisory committee meetings and one-on-one interaction with community members. In June 2015, these community-vetted plans were discussed as part of the Dutch Dialogues process, an innovative forum on water management issues. This multi-day workshop allowed over 40 local, national and Dutch design professionals to interface with the community and quickly test innovative ways to manage water.

The NDRC community outreach and design is the latest iteration of this process. In the Chesterfield Heights target area, the City of Norfolk is building upon a one-year community-led design initiative spearheaded by local and regional partners including Wetlands Watch, Hampton University and Old Dominion University. As described above, the resulting community-vetted designs were taken through the Dutch Dialogues, during which ideas were further refined with the community partners.

Management Structure

The Design Division of Public Works is responsible for managing the design, construction, and

procurement of a wide variety of capital improvement projects. It consists of five Bureaus (Construction Bureau, Structural & Waterfront Bureau, Management & Technical Support, Architectural Bureau and Engineering Bureau), reporting to the City Engineer and Assistant Engineer. The Engineering Bureau manages all infrastructure work and will be, together with the storm water department, primarily responsible for NDRC project management. The Bureau's construction inspectors have an average of over 20 years of experience in the industry.

Project Managers work with contractors, design project managers, construction inspectors, and a wide variety of stakeholders to ensure quality workmanship and to maintain project budget and schedule. Public Works has recently integrated a new CIP management system, e-Builder, to improve documentation and sharing of information in real time to enhance project coordination among all parties throughout design and construction. Construction Inspectors are completing daily inspection reports on newly purchased iPads, which allow instant transfer of information and issues to the project team from the field, which will yield timely problem-solving results. The Management & Technical Support Bureau handles procurement, ensuring compliance with public procurement laws and works with the Public Accounting Division to ensure accurate processing of all invoices.

B. City of Chesapeake

Past Experience of the Applicant

The City of Chesapeake brings a number of strengths to its NDRC partnership with the Commonwealth of Virginia. While the city has deep historic roots, Chesapeake was not incorporated until 1963. It has been one of the fastest growing cities in Virginia, and the shift from a mix of older urban communities and large areas of undeveloped rural land farms has been challenging to navigate. Chesapeake is also a city of water; as a result we have seen Chesapeake develop significant experience with citizen engagement and planning and implementation of large infrastructure projects. Chesapeake is also committed to assessment and planning for the future and its "Moving Forward Chesapeake 2035

Comprehensive Plan" advances capacity-building projects such as the Dominion Boulevard Improvements Project. The Infrastructure Chapter of the Plan states its vision as follows: "Chesapeake will have high quality infrastructure systems that enhance the city's vitality and promote economic development. As the city matures, deficiencies in the systems will be addressed to achieve superior service levels throughout Chesapeake. New facilities will be located in appropriate areas to efficiently serve the needs of residents and businesses in a manner that is sensitive to cost and to the city's natural resources." The Comprehensive Plan also advocates for enhanced quality of life for all citizens through well connected and vibrant residential neighborhoods, thriving commercial and industrial areas, and recreational and other amenities. Development of the 2035 Comprehensive Plan, which was adopted by City Council in February 2014, spanned a period of several years and involved over 30 public input meetings, a number of target stakeholder focus group meetings, and several surveys.

General Administrative Capacity

Chesapeake capacity is best illustrated by one of its current infrastructure projects, as evidenced by its US Route 17 Dominion Boulevard/Veterans Bridge project---a \$400 million bridge replacement and roadway improvement undertaking ---the largest locally administered project in Commonwealth's history, managed by the City of Chesapeake under the guidance of the Virginia Department of Transportation and Federal Highway Administration. This undertaking will result in a new 95' high fixed-span, four lane bridge and widening of the roadway to four lanes from Great Bridge Boulevard to just south of Cedar Road. Construction began in January 2013 and is expected to be completed in early 2017. Benefits of the project once completed will include: enhanced safety due to less congestion, fewer stops and better access; no bridge openings; no traffic lights between Grassfield Parkway and the interstate; four lanes of traffic with interchanges; improved hurricane evacuation route; faster public safety response times; and overall improved transportation flow and commerce for the region and ports from North Carolina and other points. A Hampton Roads Transportation Planning Organization Study ranked the Dominion

Boulevard Improvements Project as the top project in the region in terms of its ability to reduce congestion and improve safety, with an ability to accommodate anticipated traffic through the year 2034. To accommodate the widening of Dominion Boulevard to four lanes, the city undertook significant right-of-way acquisition, following established acquisition and relocation procedures for all affected parties. Throughout the construction period, full access has been maintained to all affected properties, with multiple sources of public notification used to make property owners and commuters aware of changing traffic patterns.

Technical Capacity

The City of Chesapeake's US Route 17 Dominion Boulevard/Veterans Bridge project has been selected as a demonstration of the city's technical ability in light of its: large scale engineering design; addresses critical public safety deficiencies; execution as a fully federalized project (including residential relocations), multiple sources of Local, State, Regional, and Federal funding; as well as other similar elements to many of the proposed projects. Construction began in January 2013 it will be completed in 2016.

The City of Chesapeake provided proactive management of the project development from initial execution of the Project Administration Agreement with VDOT in 2004 through construction of the project which is currently underway. The city will continue providing overall project management throughout completion of construction and eventual operation of the project. A description of some of the project development activities that have been actively managed by the city includes:

Right of Way Acquisition. Right of Way limits as well as utility and temporary construction easement requirements were established for the project during the final design phase. Based on these limits, acquisition plats were prepared by the city's design engineer and have been used by the city in negotiation and acquisition of required Rights of Way and easements. Another element of the right of way process is relocation of private utilities required as a result of the roadway construction. Private utility relocations

were coordinated by the city and were completed early in the project construction.

Construction Administration. The city has contracted with a construction management firm to provide Construction Engineering & Inspection (CE&I) services for the Project. Under the city's direction, this firm is providing construction inspection, Quality Assurance (QA) and Quality Control (QC) testing for construction activities. The city has a staff of personnel dedicated to oversight of the Project construction including a Project Manager, a Project Engineer, an Engineering Technician and an Office Specialist.

Environmental and Permit Monitoring. Under the city's direction, all environmental permits and approvals were received for construction of the Project. Environmental approvals included a Finding of No Significant Impacts (FONSI) from FHWA in March 2009, approval of a Joint Permit Application (JPA) in July 2011 and receipt of a permit from the U.S. Coast Guard in June 2012. The city, through its CE&I contractor, will provide the primary oversight for compliance with environmental and permit requirements.

The project includes implementation of a state of the art Open Road Toll system, which allows toll collection to occur without traffic stops at traditional toll booths. Design and integration of the toll collection system was included in the scope of the roadway contractor's work, and was overseen by city staff. In addition, the city has managed the procurement and will oversee the operation of the toll collection services or "back office" functions through a separate contract managed by city staff.

The project enjoyed outstanding support of the City Council who voted unanimously on every project consideration (with only one exception) over the years of development. The Commonwealth of Virginia has been an active partner in the project's success from its inception. As the city's partner, the Commonwealth provided a low interest Virginia Transportation Investment Bank (VTIB) loan of \$152 million as well as conveyed the underlying right-of-way at no cost to the city. The project's design was funded by the Federal Highway Administration, who has overseen/authorized every milestone of the project. The Hampton Roads region, through its Transportation Planning Organization (functions as

region's Metropolitan Planning Organization or MPO) provided significant funding as well included Dominion Blvd. in the Region's Long Range Plan, required under Federal air quality conformity.

Green (nature-based) infrastructure planning and implementation. As compared to other transportation projects of this magnitude, the Dominion Boulevard Improvements project will minimize overall environmental impacts associated with construction and operation of the facility. As evidenced by the fact that the project received a Finding of no Significant Impact (FONSI), the design endeavored to minimize overall environmental impacts. Impacts to wetlands were minimized to the extent practicable by utilizing innovative interchange geometry; eliminating the traditional toll plaza design in lieu of a fully open-road toll facility; and incorporating retaining walls to achieve a narrower footprint. This narrower footprint also resulted in fewer residential and commercial property impacts. The minimal wetland impacts associated with construction of the project will be mitigated through creating a combination of new off-site and on-site wetland areas. Once constructed, the project will result in reduced greenhouse gas emissions by reducing congestion and eliminating stop-and-go traffic. Construction of the project will reduce regional air pollution burdens, including CO, NO_x and other toxins, by approximately 0.31 percent.

In addition, the centerpiece of the project, the bridge over the Southern Branch of the Elizabeth River, will utilize concrete as the primary construction material, in lieu of more traditional steel girders that would be expected for this type of structure. Steel girders are much more energy intensive to fabricate, and also require significantly more effort and potential future environmental impacts to maintain. Utilizing lightweight concrete girders allowed span lengths to be increased, minimizing the number of piers to be constructed, thereby minimizing the "footprint" of the bridge on the landscape. In this way the project is more sustainable than similar transportation projects.

The Dominion Boulevard Project will significantly reduce noise and greenhouse gas emissions from congestion as a result of increased roadway capacity and the resulting reduction of vehicles in stop and go

traffic. CO emissions from motor vehicles generally increase with decreasing vehicle speed, traffic congestion, and disruption during construction or road maintenance. In these instances, elevated concentration of pollutants may be produced. The Dominion boulevard project will reduce congestion and increase average vehicle speeds. Greenhouse gas emissions reductions from the road improvements are expected to yield benefits in the amount of approximately \$1.4 through the year 2056.

Capacity for Community Engagement and Inclusiveness

The City of Chesapeake's inclusiveness with its citizens is a hallmark of our local government, and one that keeps city government close to the will of the people it serves. Chesapeake authorities, boards, commissions, and committees are established to advise the City Council and/or to seek public input on a variety of issues in the community. There are approximately 60 boards, commissions and authorities with more than 500 members appointed by the Mayor and City Council, ranging in purpose from the cultivation of cultural awareness to charting the city's growth and development, to coordinating expertise in mitigation and resiliency from our Natural Event Mitigation Advisory Committee (NEMAC). Boards, commissions and authorities are comprised of city officials and citizens who reside in the City of Chesapeake. This representative system allows consultation and a wide spectrum of stakeholder involvement from need determination and design to implementation, commissioning, and evaluation. This system likewise gives the City Council, City Manager, and all city departments and personnel the opportunity to listen to and work with all stakeholders.

An example of the city's experience in understanding, planning for, and implementing disaster recovery and economic revitalization programs and projects begins with its NEMAC and it is ongoing. NEMAC's eight citizens (who form the quorum) includes one member from the business community and one from a non-profit, plus nine city department representatives who meet six times a year in meetings open to the public to plan mitigation and resiliency efforts for natural events, to make recommendations to City Council for improvements in the Hazard Mitigation Plan (HMP), and to provide oversight on

accomplishing the actions recommended in the HMP. The NEMAC and the HMP instigate the city's ongoing disaster recovery and resiliency policy of purchasing properties flooded during hurricanes and nor'easters, demolishing the houses, and restoring the flood plain property to green space for perpetuity. In the past decade Chesapeake has used over \$6.6 million in Flood Mitigation Assistance (FMA) grant funds to acquire, demolish and returned to green space 25 properties, with five additional acquisitions expected in 2015. In the past three years 15 properties have been acquired, demolished and returned to green space and one home has been elevated with FMA grants in the total amount of \$3,579,899.00. Of these, eight of the properties are in Chesapeake's low-to-moderate income (LMI) MID-URN target area, and five additional homes are in the MID-URN target area, but are not LMI.

Chesapeake's project coordination for these acquisitions and elevations in partnership with other key implementing stakeholders includes the most important stakeholder, the public. An annual mailing at a minimum, and if funding is available, more often, educate the public on the dangers of living or working in the flood plain and on the necessity of flood insurance. Our public works department, emergency management department, and CDBG department attend community meetings, hold town hall meetings, and hold business continuity workshops throughout the year at which they encourage those in the floodplain to purchase flood insurance and explain mitigations and resiliency values. Our city's Development and Permits Department post a link from its home web page to FEMA FloodSmart.gov. The city provides printed material on flood insurance at community events throughout the year and post flood and flood insurance information on its web site and on its public access television station. Community Emergency Response Teams in CERT teams, under the leadership of a CFD/OEM part-time dedicated staff member, attend public events and provide information on all hazards, including flood zone information and flood insurance. City Council meetings are attended by residents who have incurred flood damages and City Council request department directors to respond to those citizens, which results in instructions on the necessity of purchasing flood insurance and how to do so. Finally, city department

personnel meet as needed w/residents in flood zone, including target area, to discuss problems and solutions; the Office of Emergency Management has a full time staff member who is assigned to work with flood-damage property owners to assist them in mitigating damages and building resiliency.

In 2013/2014 the NEMAC oversaw, participated in, and advised the city on, the update of the 2014 HMP which included an updated hazard identification and analysis, vulnerability and capability assessment, and mitigation strategy/action plan. Based on a vulnerability qualitative/quantitative assessment of critical hazards-high risks being flooding, hurricanes, winter storms and nor'easters, and critical hazards-moderate risk of sea level rise and land subsidence (moderate risk due to longer time to prepare), tornadoes, and severe thunderstorms, the NEMAC mitigation action plan began its update with resiliency; its number one goal is increasing community resiliency by reducing vulnerability to the economic and physical impacts associated with natural hazard events. The second and third goal exemplifies recognition of understanding how to build resiliency: enhance community-wide understanding and awareness of community hazards, and the third goal, reducing hazard impacts using methods that also achieve the preservation of natural areas, water quality, and open space. From these three goals and the Mitigation Action Plan (MAP) that will achieve them came the projects the City of Chesapeake is proposing in the HUD NDRC. Originating in a NEMAC brainstorming session that focused on aligning the MAP to HUD's Soundness of Approach and Needs, the NEMAC chose the following HMP actions around which to develop projects: acquire, elevate, relocate, retrofit or flood-proof structures in flood prone areas; improve storm water management infrastructure; support and maintain city's new Reverse-911 system; and continue outreach efforts through a strategically-developed Plan for Public Information (PPI).

Chesapeake's Moving Forward Chesapeake 2035 Comprehensive Plan, adopted by City Council in February 2014, was developed over a period of several years and involved over 30 public input meetings, a number of target stakeholder focus group meetings, and several surveys. The plan promotes capacity-

building projects and the stated policy vision for the Infrastructure Chapter of the Plan is as follows:

“Chesapeake will have high quality infrastructure systems that enhance the city’s vitality and promote economic development. As the city matures, deficiencies in the systems will be addressed to achieve superior service levels throughout Chesapeake. New facilities will be located in appropriate areas to efficiently serve the needs of residents and businesses in a manner that is sensitive to cost and to the city’s natural resources.” The Comprehensive Plan also advocates for enhanced quality of life for all citizens through well connected and vibrant residential neighborhoods, thriving commercial and industrial areas, and recreational and other amenities.

Management structure

Local Governance. The City of Chesapeake derives its governing authority from a Charter granted by the General Assembly of the Commonwealth of Virginia. The city is organized under a Council-Manager form of government in which the citizens elect the Council and the Council appoints the City Manager. Council also appoints the City Attorney, City Clerk, Real Estate Assessor, Planning Commission Members, Internal Auditor, and members of other boards and commissions. The Sheriff, Treasurer, Clerk of the Circuit Court, Commonwealth’s Attorney, School Board, and Commissioner of Revenue, are elected by the citizens. The city department heads are appointed by the City Manager. Virginia's cities are uniquely independent from counties and usually provide all local governmental services, including those typically provided by counties. As an independent city, Chesapeake is not located in a county. The city provides a full range of general governmental services for its citizens, including, police and fire protection, collection and disposal of refuse, water and sewer services, parks and recreation, libraries, and construction and maintenance of highways, streets, and infrastructure. Other services provided include social services, planning and zoning, mental health assistance, and general administrative services. Public education for students in grades kindergarten through twelve is provided by the separately-elected Chesapeake School Board. Since the School Board is fiscally dependent upon the city and the City

Council must appropriate all school funds, the school operating budget is included here.

Finally, certain services, including public health, agricultural services, and judicial services are shared with the Commonwealth of Virginia; only the city's portion of those agencies are included in the over \$933 million Fiscal Year 2015-2016 Operating Budget. The Fiscal Year 2016 Capital Improvement Budget is \$126 million. The five year Fiscal Years 2016-2020 Capital Improvement Plan is \$412 million. Like all Hampton Roads cities, the City of Chesapeake is governed under the Council-Manager form of government. The council-manager form of local government combines political leadership of elected officials with the managerial expertise of a professional city manager. Chesapeake has eight council members and a mayor elected at large, which means that members represent the entire city rather than specific districts.

The City Council is Chesapeake's legislative body. It sets policy, approves the budget, and sets the tax rate. Members also hire the City Manager, who is responsible for the day-to-day administration of the city, and serves as the Council's chief advisor. The City Manager prepares a recommended budget, recruits and hires most city department heads, and carries out the council's policies. While the City Manager may recommend policy decisions, he or she is bound by actions of the Council. The Council appoints four staff members: the City Attorney, City Clerk, Real Estate Assessor, and the City Auditor. Mayor Alan P. Krasnoff was first elected Mayor in 2008 and re-elected in 2012. He has served on City Council since 1990 and was re-elected in 1994, 1998, 2002, and 2006. Mayor Krasnoff graduated from Queens College and National College of Chiropractic. He has a Master's Degree from Norfolk State University in Urban Education and Counseling, K-12. Mayor Krasnoff is self-employed as a chiropractor. James E. Baker was appointed Chesapeake City Manager on January 14, 2013. He holds a Bachelor of Science degree in Chemistry from the University of Missouri and a law degree from Washington University in St. Louis. He has also completed an intensive training course for Senior Executives in State and Local Government conducted by the John F. Kennedy School of Government at Harvard University.

During his thirty-plus year career in the public sector, Mr. Baker has had the opportunity to oversee a number of initiatives, including the design of a light rail mass transit system expansion, voter approval for a bond issue and the subsequent construction of a 1,200 bed, high-rise jail and justice center, a public-private partnership leading to construction of a new baseball stadium for the St. Louis Cardinals, management of local capital improvement sales tax programs in both St. Louis and York counties for road improvements, the institution of multi-year budgeting, long-term budget forecasting and a planned initiative to upgrade county credit ratings.

Dr. Wanda Barnard-Bailey is the Deputy City Manager for Human Development and Community Initiatives in the City of Chesapeake, Virginia. She was appointed to her position in August of 2005. She oversees the departments of Human Services (Social Services, Juvenile Detention, and Community Programs), Parks, Recreation and Tourism, Public Library Services and the Customer Contact Center. She also serves as the City Manager's liaison to Chesapeake Integrated Behavioral Healthcare, Courts, Voter Registrar's Office, Health Department, Commonwealth's Attorney Office, and Clerk of the Circuit Court.

Mary Ann Saunders is an Assistant to the City Manager for the City of Chesapeake. She handles Federal relations for the city with Congress, military and Federal agencies. Her key policy area includes intergovernmental advocacy on major transportation issues specifically funding for large-scale projects, and assists with Departments of Police and Fire/Office of Emergency Management.

Current projects include Dominion Boulevard/Veterans Bridge (\$400 million), and AIW Deep Creek Bridge (\$50 million). Examples of past efforts include: the Chesapeake Expressway (\$125 million), the Oak Grove Connector (\$40 million) and US RT 17 South (\$42 million). Special projects include coordination of the development of the US RT South/Dismal Swamp corridor as a recreation/eco-tourism destination. Ms. Saunders also coordinated the opposition to the proposed mega-landfill in Camden County, NC due to its impact on the Northwest River Watershed and the surrounding Dismal Swamp area. Prior to coming to the City of Chesapeake in 1987, Ms. Saunders served the City of Suffolk, VA as

Director of Management Services, Senior Administrative Analyst and Acting Library Director. Ms.

Saunders has an undergraduate degree in Political Science and a Master's Degree in Public

Administration from Old Dominion University. She is a graduate of the University of Virginia Senior

Executive Institute.

City Attorney Jan L. Proctor was appointed Chesapeake City Attorney on June 1, 2013. She joined the

Chesapeake City Attorney's Office in 1988, and in 1992 she was promoted to Deputy City Attorney.

During her tenure with the city, Ms. Proctor has provided legal representation to many city departments,

boards, committees, and commissions, including the Planning Commission, Board of Zoning Appeals,

Historic Preservation Committee, Architectural Review Board, Chesapeake Bay Preservation Review

Committee, Drainage Review Committee, Transportation Safety Commission, Commissioner of the

Revenue, City Treasurer, and City Real Estate Assessor, and has served as lead counsel for matters

concerning the U.S. Navy, including implementation of JLUS and advancement of the REPI Program.

She has served on numerous city committees to develop ordinances, policies, and regulations dealing with

sensitive matters, including controversial environmental and development issues, such as zoning and

subdivision amendments, the 2026 Comprehensive Plan, Chesapeake Bay Preservation ordinance,

Historic Preservation Overlay, Fentress Airfield Overlay, Open Space and Agricultural Program, level of

service policy, transportation corridor policy, and many others. Ms. Proctor served as lead counsel for the

city's multi-million dollar Dominion Boulevard Improvement Project. She has also served on numerous

state and regional committees to study and address tax reforms, high growth initiatives, wetlands

regulations and housing initiatives.

The Chesapeake Redevelopment and Housing Authority Board of Commissioners consists of nine (9)

members, one of whom serves as Resident Commissioner. The members are appointed by City Council

and serve four (4) year terms from the date of appointment. The Commissioners are the governing officers

of the Authority, and their responsibilities include setting policies governing the operations of the

Authority, charting the direction of current and future programs and development, and approving contracts entered into by the Authority. The Board of Commissioners hires the Executive Director, who serves as Board Secretary and is responsible for managing the Authority's day-to-day operations.

The Department of Public Works has an annual operating budget of approximately \$75 million, and employs over 450 people, working in eight divisions. The Department has been accredited by the American Public Works Association since September 2006 and was re-accredited in November 2014.

Areas of operational responsibility include construction and maintenance activities for 3,428 lane miles of city streets, more than 3,800 miles of storm sewers and open ditch drainage systems, and construction and maintenance responsibility for 90 bridges and overpasses, including four movable bridges over navigable waterways. The Department also collects solid waste once per week from approximately 65,000 residences and small business in the city.

Engineering design and contract administration is performed by approximately 13 Department employees, including an engineering staff of 8 licensed professional engineers. Traffic Engineering is also a full time function of the Department under a city Traffic Engineer who is also a licensed professional engineer.

Eric J. Martin, P.E., served as Interim Director of Public Works from June 2008 to February 2009, and was appointed Director of Public Works on February 23, 2009. He previously served as the City Engineer since 2000 and prior to that served as Assistant City Engineer. Prior to joining Chesapeake, Mr. Martin was the Assistant City Engineer of Hampton, Virginia, for eight and a half years. Mr. Martin also gained extensive engineering and construction experience as a member of the U.S. Air Force from 1983 to 1990. He obtained a Master's degree in Engineering Management from Old Dominion University in 1990 and has a Bachelor's degree in civil Engineering from Washington State University in 1982. Mr. Martin is also a registered professional engineer in Virginia.

Earl Sorey, P.E., serves as the City Engineer and was appointed to the Assistant Director of Public Works in 2013. He was appointed as coordinator for the improvement of U.S. Route 17/Dominion Boulevard.

Mr. Sorey is a licensed professional engineer and earned a Bachelor's degree in Civil Engineering Technology and a Master's degree in Public Administration, both from Old Dominion University. Mr. Sorey began his career with the City of Chesapeake, and later served the City of Virginia Beach as an engineer in the traffic engineering division as well as the City of Portsmouth as the City Traffic Engineer. He returned to employment with the city in 2001 as the city's Transportation Engineer and was promoted to City Engineer in 2008.

The City Council is Chesapeake's legislative body, setting policy, approving budgets, and setting tax rates. Members also hire the City Manager, who is responsible for the day-to-day administration of the city, and serves as the Council's chief advisor. The City Manager prepares a recommended budget, recruits and hires most of the government's staff, and carries out the council's policies. While the City Manager may recommend policy decisions, he or she is ultimately bound by the actions of the Council. The Council appoints three additional staff members — the City Attorney, City Clerk, and City's Real Estate Assessor. Chesapeake's Mayor and City Council members are elected at large by Chesapeake citizens in elections held in May every two years. Currently, One Deputy City Manager position is vacant. All projects will be managed by the city's Departments of Public Works and Fire/Office of Emergency Management. Voluntary relocations will be managed by the Chesapeake Redevelopment and Housing Authority under contract to the city. Sam Sawan, Assistant City Engineer will have day-to-day management of the public works projects (Bainbridge Blvd. corridor projects and tidal flooding voluntary buyout); Martha Burns will have day-to-day management of the resiliency awareness program; Brenda Willis will have day-to-day management of the voluntary relocations projects.

Reference for the City of Chesapeake:

Scott A. Lovell, PE; Vice President - Area Manager, Parsons Brinckerhoff

Lovell@pbworld.com; 6161 Kempsville Circle, Suite 110, Norfolk, VA 23502

Office: 757-466-9608; Fax: 757-466-1493; Mobile: 757-639-8404

C. City of Newport News

General Administrative Capacity

Although the State of Virginia is the primary applicant, the City of Newport News as a subset of the State’s proposal brings extensive overall grant administration and project management to the table. The Newport News team is comprised of representatives from the following departments, including Fire, Emergency Management; Engineering; Planning; Codes Compliance and Development, and are listed below by name, job title and department:

- Chief Robert Alley – Fire Chief - Fire Department
- George Glazner – Deputy Coordinator – Division of Emergency Management
- Mohammad Shar – Engineer III – Engineering Department
- James Clark – Engineer II – Engineering Department
- Claudia Cotton – Manager of Current Planning – Planning Department
- David Harlow –Senior Codes Inspector – Codes Compliance Department
- Tricia Wilson – Business Development Specialist – Development Department

Each representative brings years of experience in city government; each with an average tenure in their field of expertise of approximately 27 years. The collective representatives have primary job functions that reflect a depth of all facets of program/project administration as reflected in successful awards and providing fiscal and program management of grants such as: Community Development Block Grant (CDBG) & CDBG-R, HUD Economic Development Initiative (EDI) Grant, HOME Investment Partnership Grant, Homelessness Prevention and Rapid Re-housing Program (HPRP) Grant, State Enterprise Zone Grants, Federal Highway Administration Grants, Virginia Department of Environmental Quality (DEQ) Storm water Local Assistance Fund Grant, MAP 21 Transportation Alternatives Program Grant, Federal Emergency Management Agency Grants, Virginia Department of Fire Program Grant, Virginia Department of Emergency Management Grant.

Technical Capacity

The technical capacity of the Newport News team is evidenced by the job functions and/or the successful certifications and accomplishments of the various department representatives as reflected below:

- The Fire chief has 42 years of experience, has served in numerous localities, served as Emergency Management Coordinator, has fire officer and instructor certification and provides oversight to staff that handles approximately 31,000 emergency calls on an annual basis, with 24,000 being for emergency medical service.
- The Deputy Coordinator of Emergency Management has 40 years of experience in multiple localities with a combination of emergency management and fire-rescue expertise. Certifications this representative holds include certified emergency manager, certified floodplain manager professional emergency manager and has successfully facilitated evacuation or rescue of persons for numerous extreme weather events to include hurricanes, wind and extreme rain due to nor'easters. In addition has been involved in management of multiple state and federal grant projects.
- The Engineering representatives, which will lead the project implementation for Newport News, have 37 years of combined experience in the field of engineering and have certifications as coastal engineers and in floodplain management. This department is responsible for implementation of design, construction, contractual award, construction inspection, project management and monitoring of all public projects undertaken by the city, reviews and approves the process of private development, ensuring compliance with city code. The two team members have managed projects that directly correlate to the HUD NDRC projects proposed for Newport News; ranging from small projects such as replacement and lining of existing closed drainage systems, to major projects such as watershed analysis, regional storm

water management facilities, redesign of entire drainage systems, and site and subdivision plan reviews for development and re-development throughout the city.

- The Planning Department representative has 20 years of experience in the area of municipal planning with undergraduate and graduate degrees in the field. This department is responsible for facilitating Planning Commission and the City Council decisions in all aspects of comprehensive and current planning in the city. This includes the development of the city's long-term comprehensive plan, known as *Framework for the Future 2030*.
- The Codes Compliance Department representative has 21 years of experience in building code inspections, is a State certified building maintenance official, and a certified zoning administrator. The department has responsibility for all code enforcement related issues citywide and facilitates proper construction permitting. Additionally, the department has utilized CDBG funds to provide demolition and clearance activities in the HUD NDRC targeted communities to eliminate slum and blighting conditions and facilitate redevelopment of affordable housing for lower-income persons.
- The Development Department representative has 24 years of experience in overseeing HUD grants such as CDBG, HOME, Emergency Shelter Grants, etc. Previous years of grant management and oversight have provided the department an opportunity to work very closely with the Newport News public housing and redevelopment authority; providing oversight to multiple local initiatives such as real property acquisition and relocation, housing construction and rehabilitation; all taking place largely in one of the NDRC project areas.

Capacity for Community Engagement and Inclusiveness

Community Engagement takes place at multiple levels and departments. Public meetings and facilitated discussions are held to obtain citizen feedback in the development of both public documents and projects. Regional collaboration takes place at the highest level of senior management to include

Assistant City Manager leadership and participation in a group known as the Mayors and Chairs. This group is comprised of city manager representatives from the region and meets on a regular basis to address regional issues common to the Hampton Roads cities, such as port issues, transportation and homelessness. The Mayors and Chairs team also has affiliations relevant to Newport News' NDRC proposal, including the Virginia Department of Emergency Management, Hampton Roads All Hazards Advisory Committee, Hampton Roads Regional Mitigation Planning Committee, Hampton Roads Special Committee on Recurrent Flooding and Sea Level Rise, and the Hampton Roads Planning District Commission, among others.

The Departments of Planning and Development primarily participate regularly in community outreach and engagement. The Planning Department, when updating its comprehensive plan called *Framework for the Future 2030*, created standing community groups. These community groups had representation from different parts of the city, as well as subgroups such as elderly, youth and lower income population advocates, such as the local housing authority. In addition citizen input meetings are held two to three times a year in the city's Southeast Neighborhood community, located in the Newport News target, and home to the majority of the city's low-income residents.

A good example of public-private partnership and stakeholder involvement is the city's recent commitment to the vulnerable Southeast Neighborhood community, with the construction of a police substation and the facilitation of a grocery store, in what is now considered a food desert. The city initiated public dollars and constructed a new police station, which was a catalyst to entice a private grocer to locate and operate a store in the most impoverished community of the city. The private partner, in collaboration with city officials, has held meetings in the low-income community, talked with key community leaders, and garnered support from the local nonprofit community and a local financial institution to provide ongoing nutrition and financial literacy classes inside the grocery store. This type of investment reflects commitment of the city to economic resilience and the need for a resilient project to

mitigate natural disaster damage in order to preserve investment in the lower-income area. This message is echoed by citizens as evidenced by comments from our most recent community meeting held on September 17, 2015.

Management structure

Newport News' management structure is a City Manager and City Council form of government. Council is the top decision making body and delegates to the City Manager who is considered the chief operating officer for the city. For specific projects, divisions or persons within each department are utilized for the specific expertise that is needed for a project and receive direction from the City Manager.

The team listed above will undertake the management and oversight of the two HUD NDRC projects proposed. The Engineering representatives will manage the daily operations for each proposed project, if awarded.

Reference

Newport News served as a partner on a project with the Newport News Shipyard Apprentice School (Huntington Ingalls Industries): 3101 Washington Avenue, Newport News, VA 23607.

II. NEED/EXTENT OF THE PROBLEM



II. NEED/EXTENT OF THE PROBLEM

Commonwealth of Virginia

Unmet Recovery Need and Target Geography

The Commonwealth of Virginia and its qualifying jurisdictions meet the eligible applicant criteria by invitation from the U.S. Department of Housing and Urban Development’s (“HUD”) National Disaster Resilience Competition (“NDRC” or “the Competition”) by being one of the 40 Eligible Applicants invited for Phase 2 of the Competition. The qualifying disaster for the Commonwealth’s application is Hurricane Irene (2011). Hurricane Irene caused widespread destruction from the Caribbean to Canada, including at least 56 deaths. The damage from Hurricane Irene is estimated at more than \$15.6 billion, making it the seventh costliest hurricane in United States history.¹ Those in the Hampton Roads region felt the effects of the Category 1 hurricane, with wind gusts topping 67 MPH.

Region of Hampton Roads

The Hampton Roads region is affected by hurricanes, tropical storms and extra tropical nor’easters. Over the past century (as recorded by the Sewell’s Point tide gauge in Norfolk, installed in 1927) about half of the 12 highest storm surges have been caused by tropical storms and hurricanes, and the other half of extreme storms have been caused by nor’easters.

The larger Hampton Roads region is subject to the highest rate of relative sea level rise on the East Coast – 14 inches since 1930.² The global sea level rise is 5 – 8 inches over the last century. The Hampton Roads area is second only to New Orleans for the largest population at risk from sea level rise. As

¹ <http://www.wunderground.com/hurricane/damage.asp>

² Atkinson, Ezer, and Smith, *Sea Level Rise and Flooding Risk in Virginia*, 2012

(<http://nsglc.olemiss.edu/sglpj/vol5no2/2-atkinson.pdf>)

discussed in the Hampton Roads Planning District Commission’s 2013 report, *Coastal Resiliency*:

Adapting to Climate Change in Hampton Roads, sea level rise has significant effects on the region even when using varied and conservative modeling.³ The threat of sea level rise and the effects of climate change in the region are very real threats.

Risk and Vulnerability Data. In the last decade Hampton Roads localities, universities, businesses, nonprofits, military commands, government agencies and the Port of Virginia have completed more than 40 studies focusing on current and future water-related risks, vulnerabilities, and solutions. This proposal leverages the findings of these analyses, including the recent US Army Corps of Engineers’ North Atlantic Coast Comprehensive Study, along with outputs from peer-reviewed tools including the Rockefeller Foundation-supported Climate Central’s Surging Seas Risk Finder, US Climate Resilience Toolkit and NOAA’s Digital Coast to define the region’s current and future risks.

Risks Seriousness and Likelihood. Due to land subsidence, Hampton Roads is experiencing the highest rate of relative sea level rise on the East Coast. This rise is significantly increasing both the region’s risk for flooding and the severity and resultant impact of storms. Seven of the ten most significant regional storms since 1933 have occurred during the last thirteen years. Based on the region’s history, Hampton Roads will experience significant storm surges every four to five years. Due to sea level rise, the amount of surge will increase. According to a recent Virginia Institute of Marine Science (VIMS) study, “Recurrent Flooding Study for Tidewater Virginia,” local sea level is projected to rise 1.5-7.5 feet by 2100, and conservative estimates project a 3-foot rise by 2100.

Risk to Vulnerable Neighborhoods. A large portion of the region’s citizens is vulnerable to the increasing risks associated with sea level rise. Using the intermediate/low scenario from NOAA’s Climate Central model, there is a better than even chance the region will experience floods exceeding 5 feet of the

³ Coastal Resiliency: Adapting to Climate Change in Hampton Roads, HRPDC, 2013

high tide line by 2030-40. Climate Central’s Surging Seas risk finder estimates that more than 107,000 Virginians live in homes below 5 feet of the high tide line. Close to 77,000 of those residents are ranked as high or medium for Social Vulnerability. 17,000 of those individuals live in Norfolk alone. According to US Census data, 13% of the region’s citizens live in poverty, 9% of Hampton Roads residents report no access to a vehicle leaving them unable to evacuate the region without assistance, increasing the burden on public shelters and public transportation networks in the event of a disaster. A survey of 7,000 regional households by Old Dominion University to determine the impact of Hurricane Irene indicated that large pockets of the population are medically fragile, financially unprepared and/or social disconnected putting them at risk for surviving a disaster.

Risk to Economic Assets. Virginia’s economy also will face challenges from rising sea levels. A study by Sandia National Laboratories notes failure to mitigate the effects of climate change in Virginia could result in \$45.4 billion in lost Gross Domestic Product and the loss of more than 314,000 jobs by 2050.

Trade and Commerce: In Hampton Roads, our economic wellbeing depends on the same bodies of water that place it at risk. Rising sea levels will impact nearly every sector of the regional economy and that will impact the world. Home to the third largest commercial port on the east coast, in 2013 approximately 81 million tons of cargo, valued at \$53 billion, moved through its facilities. Port-related industries employ more than 343,000 Virginians.

The Port of Virginia Master Plan 2040 estimates its facilities can currently withstand 1 foot of sea level rise. Hampton Roads also is home to Newport News Shipbuilding, sole designer, builder and refueler of US Navy aircraft carriers and a provider to US Navy submarines. With approximately \$4 billion in revenues and over 23,000 employees, it is the largest industrial employer in Virginia and the largest shipbuilding company in the US. According to a recent study by the HRPDC, the large number of businesses and employees working in Category 1 (flood) zones indicates “a significant amount of economic activity will have to shift around the region to cope with sea level rise by the end of the

century.” A recent Wetlands Watch study estimates that by the end of the 21st century sea level rise could result in direct economic costs of between \$12 and \$87 billion, with up to 877 miles of roads in the region permanently or regularly flooded.

Military Facilities. Hampton Roads hosts major Navy, Air Force, Army, Marine Corps, and Coast Guard facilities, including Naval Station Norfolk, the largest military base in the world, with a plant replacement value of over \$4.2 billion. Nearly a quarter of the nation’s active-duty military personnel are stationed here, and 31% of US naval shipbuilding and repair capacity is housed in the region. At an average elevation of 8-1' above mean sea level, many of these assets already experience storm-related flooding. Studies show that the 1.5-foot sea-level rise projected between 2032- 2062, combined with a mild 3 foot storm surge, would impede roadway access to nine of the region’s military facilities.

Economic Vulnerability

Shifting demographics, social inequity and changing economic conditions compound the region’s exposure to sea level rise. Historically, the high concentration of federal investments in the Hampton Roads has buffered the region from economic fluctuations. For example, the region weathered the recent Great Recession better than many other regions due to the steady influx of Federal funds to support military operations. However, sequestration and the resulting slowdown in defense spending have left the region lagging the rest of the country in the recovery. Between May 2013 and May 2014 Hampton Roads and Detroit were the only two of the 38 largest employment markets to see a decline in jobs. In 2016, Hampton Roads could lose more than 33,000 jobs as a result of the downsizing of regional defense assets.

The region’s other economic driver, the Port of Virginia, is unlikely to compensate for the decline in Federal spending. While the Port is projected to grow in total traffic volume, due to its use of advanced mechanization, this growth is unlikely to drive job creation or significant additional economic activity in the region.

Finally, the region's current business creation climate is not well positioned to drive future economic growth. The region has the lowest level of business creation rates in the Virginia and is second to last in the U.S. for venture capital invested.

The lack of economic vitality impacts populations differently across the region. Historic forces have created neighborhoods and communities with high rates of poverty. The flight of wealth to the suburbs and the concentration of poverty in many of the urban core cities combined to create a permanent underclass of citizens with little employment or educational opportunities. To reverse this trend the region must implement development strategies that result in communities where housing is affordable for a wide range of incomes, where residents live close to job opportunities, where high quality educational and workforce development opportunities and quality of life amenities are accessible to all.

Because the region floods with increased frequency, Hampton Roads communities must reconfigure communities to better manage water. This proposal diagrams how we will use this change point to not only reduce flooding risk, but to strengthen our economy and our neighborhoods as we become a leader in building resilience and innovatively integrating systems to effectively manage water.

The Commonwealth's **THRIVE** proposal aligns closely with Virginia's Consolidated Plan. The Commonwealth's plan has identified priorities that address both the lack of affordable housing and the need to create more economically competitive and sustainable communities, two objectives also at the heart of the **THRIVE** proposal. The full Commonwealth of Virginia Consolidated Plan can be found online at <http://www.dhcd.virginia.gov/images/ConPlan/Con-Plan-ActionPlan-Final-5-2013.pdf>. Also noteworthy is Governor McAuliffe's Executive Order 32, which recognizes that sustained economic and social vitality of communities throughout Virginia depends upon the quality, availability, and affordability of housing. This Executive Order sets forth the importance of housing, particularly affordable housing and directs agencies to collaborative to further this priority.

City of Norfolk

Due to the City of Norfolk's positioning (almost completely surrounded by bodies of water, including bays, rivers, and tidal creeks), low drainage gradients due to its near-sea level topography, and approximately 144 miles of shoreline, the city is at greater risk for coastal flooding than other parts of Virginia.⁴ During Hurricane Irene, in Norfolk, the combined tide and surge water level reached 7.54 feet at 8:00 pm on August 27th 2011, just short of record levels.

Although Norfolk has flooded throughout its history, over the past several decades Norfolk residents have endured increased stresses due to the impacts of climate changes, such as sea level rise and more frequent and intense coastal storms. The changing climate and resultant rising sea level, combined with localized land subsidence, has created in Norfolk, and the larger Hampton Roads region, the highest rate of relative sea level rise on the East Coast of the United States. Seven out of the ten of the most significant storms that affected Norfolk since 1933 have occurred in the last 13 years. Nuisance tidal flooding in the city has increased by 325% since 1960, clearly demonstrating that the risk is accelerating. With local sea level projected to rise between 1.5 and 7.5 feet by the year 2100, and with 25% of Norfolk's parcels already located in the 100-year floodplain, the flooding risk will continue to increase.

Norfolk is considered the 4th most vulnerable U.S. city to hurricanes by Climate Central⁵ and is second only to New Orleans as the largest population center at risk from sea level rise in the country. Sea level at Sewell's Point in Norfolk, VA, in the last 80 years has risen 80% higher (14.5 inches) than the global average (8 inches) from the last 140 years.

Due to constant and recurrent flooding, the Norfolk's target area faces continued risks of decreased population, increased blight, decreased community connectivity, increased concentration of poverty,

⁴ PlaNorfolk2030: The General Plan of Norfolk (2015), pg. 6-1

⁵ <http://www.climatecentral.org/news/top-5-most-vulnerable-us-cities-to-hurricanes>

decreased quality of life, and decreased economic and social well-being. Hurricane Irene exposed, once again, a need for greater resiliency throughout the target area identified below, the City of Norfolk and the Hampton Roads Region as a whole.

Unmet Recovery Need and Target Geography

As Norfolk demonstrated in Phase I, the MID-URN target area qualified through Hurricane Irene, encompassed almost the entire city. Unmet recovery needs (URN) for Phase II builds upon the Phase I URN, to meet the needs of residents of neighborhoods located within the Ohio Creek and Newton’s Creek Watersheds. These watersheds lie along the Elizabeth River and are largely located in the FEMA floodplain.

The target area contains the following census tracts: 35.01, 41, 42, 46, 47, 48, and 49. The Ohio Creek Watershed contains census tracts (whole or partial) 46 and 47. Newton’s Creek Watershed contains census tracts (whole or partial) 35.01, 41, 42, 47, 48, and 49. The target area includes the southern Norfolk neighborhoods of St. Paul’s Quadrant, Tidewater Gardens, South Brambleton, Harbor Park, and Chesterfield Heights.

During Phase 1, a windshield survey conducted by the City of Norfolk demonstrated that 93 homes in the Phase 1 target area (the entire City of Norfolk is included within this target area, thus the Phase 2 target area is included) remain damaged from the Qualifying Disaster. Repairs to these homes did not include resilient measures, such as house elevation or external utility relocation from basements or first floors. All houses lie within the FEMA designated floodplain. Ten (10) surveyed residents confirmed that they had inadequate resources from insurance/FEMA/SBA for completing their repairs. Within the Phase 2 target area, there are three (3) structures that remain unrepaired.

The target area contains a total population of 11,840 persons according to the US Census Bureau. Of this population, approximately 86% households meet the low- to moderate-income (“LMI”) requirements for the Commonwealth of Virginia. The target area is comprised of twelve US Census block groups, with

a combined median income of \$25,350 per household, an income level that is only 48% of the national median household income. The median household income for the City of Norfolk is \$44,474. Within the census block groups, 43.2% of households with the target area live below the poverty line.

In the target area, 32% of the jobs earn less than \$1,250 per month, with 38.4% of the jobs held by individuals with a high school degree or less. Over 46% of the outflowing jobs make less than \$1,250 per month, while only 37.4% of the inflowing jobs make \$1,250 or less. Of the interior flow, 69% makes less than \$1,250 per month.

Certain populations are particularly vulnerable and face unique challenges before, during, and after disasters, such as Hurricane Irene, due to social, economic, and educational factors, which are exacerbated during disaster recovery and impede resiliency. The target area contains multiple vulnerable populations: LMI residents, seniors, children, individuals with disabilities, and non-English proficient individuals. These populations require greater focus on increased access to resources and economic, social, and educational resiliency to ensure that natural disasters do not continue to detrimentally affect these populations.

Resilience Needs Within Recovery Needs

Hurricane Irene once again exposed a need for greater resiliency within the target area and throughout the region. Due to constant and recurrent flooding, the target area faces continued risks of decreased population, increased blight, decreased community connectivity, increased concentration of poverty, decreased quality of life, and decreased economic and social well-being. The communities within the target area are threatened by chronic disruptive flooding during relatively minor rain events, aging and outdated infrastructure, limited connections to other communities, and increasing social and economic hardship. As seas continue to rise, nuisance flooding accelerates and coastal storm events similar to Hurricane Irene happen with greater frequency, the risks to the target area will continue to increase. The

target areas-- the Newton's Creek Watershed and the Ohio Creek Watershed--require enhanced resilience strategies to protect vulnerable residents and businesses from future extreme weather events.

Norfolk uses the Rockefeller Foundation's (and/or International Panel on Climate Change's) definition of resiliency: *"The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions."*⁶

This definition provides a framework for redevelopment following Hurricane Irene, as well as future extreme storm events and other shocks and stresses. In particular, within the target area and the city at-large, resilience must be focused on a number of different, but intertwined, areas. First, resilience against flooding and damage from flooding is a vital need for the target area. Additionally, resiliency efforts must be in place for economic revitalization and social cohesion. As Norfolk works with the larger Hampton Roads region to develop replicable and efficient measures, the measures for increased resiliency planned and implemented in the city will have a ripple effect throughout the region, as work done in the target area will be a model for future measures.

The City of Norfolk has taken steps to ensure that needs are met among its vulnerable populations through plans (Norfolk 2012-2016 Consolidated Plan) and programs (The STOP Organization, CDBG and HOME funding, the Choice Neighborhoods program, and capital program investment) to develop more affordable housing and to increase economic opportunity for residents within the target area. Norfolk's commitment to achieving resiliency within the target area is outlined by its commitments to the above goals, as well as through its neighborhood improvement plans, state and city legislative action, advocacy with the Commonwealth, and planned capital expenditures.

⁶ http://www.ipcc.ch/pdf/special-reports/srex/SREX-Annex_Glossary.pdf

Hurricane Irene also revealed a need to develop a comprehensive strategy and plan to protect and recover from future extreme rain flood events. Such a strategy needs to be fully integrated in the urban fabric through multi-purpose flood defense mechanisms. These mechanisms include multi-functional coastal barriers and green storm water infrastructure such as rain gardens and bioswales. Norfolk plans to design the flood protection systems to incorporate the year 2050 90th percentile sea level rise projection, and will meet or exceed all FEMA recommendations for design elevations within the mapped flood hazard areas. Measures support existing plans for flood protection in the neighborhoods, as discussed in the Coastal Resilience Strategy released by the City of Norfolk in 2014, the 2012 St. Paul's Area Action Plan, and 2014 CNI Transformation Plan. The proposed activities will reduce the threat of coastal and storm water flood risk to housing, buildings, and infrastructure, and thereby enabling holistic community revitalization of this economically distressed target area of Norfolk.

Vulnerable populations suffer the most during extreme flooding events. LMI residents are at greater risk from lack of electricity, transportation, restricted access to income and employment, and the effects to homes and businesses following the flood event. As many LMI residents and businesses owners are unable to repair or rebuild properly following a storm, due to no flood insurance or access to grant funds, homes and businesses remain damaged. In addition, Hurricane Irene affected critical facilities throughout the City of Norfolk, include damages to critical infrastructure (transportation, communications and electricity), reduced economic activity, and negative effects to vulnerable populations within the target area, leading to a ripple effect of adverse impacts to neighboring communities and the city as a whole. A majority of jobs (97%) are held by commuters to the target area, meaning transportation links are critical for this population as they travel from areas such as Virginia Beach, other areas of Norfolk city, Chesapeake, Portsmouth, Hampton city, Newport News, and Suffolk into the target area each day for work.

Hurricane Irene also revealed vulnerabilities to Norfolk's infrastructure and capacity to protect its citizens from extreme weather events. Flooding in many parts of the city required residents and visitors to remain where they were, unable to travel.⁷ In addition, the target area contains 43 critical assets. These include 4 light rail stations, 3 elementary schools, a middle school, 7 historical churches, a City Hall complex, a courthouse, a police station, a fire station, a library, a theater, a post office, 4 recreational centers, and various other critical infrastructure. The reduction or loss of such facilities, for even a short time, adversely affected the residents and operations of Norfolk.

The Newton's Creek Watershed also contains seven historic buildings, all of which are listed on the National Register of Historic Places. In addition, the historic African-American district located within St. Paul's Quadrant, on Church Street, is culturally important and in need of improvement to increase connection and access. The Ohio Creek Watershed houses one elementary school, a recreational center, and one group home. Additionally, the Chesterfield Heights area (contained within the Ohio Creek Watershed) is designated as a national historic district on the National Register of Historic Places.

Hampton Roads is home to several United States defense installations, including Naval Station Norfolk, which supports the operational readiness of the U.S. Atlantic Fleet, and provides facilities and services to allow for mission accomplishment. Norfolk serves as the headquarters to the Fifth Naval District of the Atlantic Fleet and the Second Fleet, and is the district headquarters of the Coast Guard. The U.S. Navy stations thousands of naval personnel at Naval Station Norfolk. Greater protection and resiliency of the Norfolk coast will extend and provide protection to the Naval Station Norfolk, especially with regard to the housing of its employees and to continued access to the site during or after extreme weather events. This, in turn, provides protection to the United States Armed Forces and is of critical importance to national security.

⁷ <http://www.wfaa.com/story/news/nation/2014/08/14/13774938/>

Norfolk is a large business and financial center of the Hampton Roads region, with shipping, shipbuilding, rail transportation and healthcare as the largest industries. Norfolk is home to the global Port of Virginia, and also serves as the headquarters of Norfolk Southern Railway, a Class I railroad, operating 20,000 route miles in 22 states and the District of Columbia. Norfolk Southern's rail yard, on the Elizabeth River at Lambert Bend, is just south of where the Elizabeth and Lafayette rivers meet, making it especially vulnerable to the flooding threat. Sentara Healthcare, a not-for-profit healthcare organization, serves more than two million Hampton Roads residents and employs about 20,000 people. As a city with more than 40% of all census tracts designated Medically Underserved Areas the need for healthcare to remain, and grow, within the city is vital.

The target area has an unmet public and affordable housing need. The current public housing stock is unsatisfactory, and within the St. Paul's Quadrant of the target area there are 618 public housing units that need to be rebuilt. The city hopes, in conjunction with the St. Paul's Area Plan, to replace the public housing units one-for-one within the existing neighborhood or within nearby communities. In addition, current affordable housing is inadequate, causing economic segregation within the St. Paul's Quadrant, and the larger target area directly adjacent to economically vibrant downtown, and does not afford adequate protection against extreme flood events.

The target area requires economic revitalization and reconnection to downtown. Guided by the Transformation Plan, sponsored by HUD as part of its Choice Neighborhoods Initiative, the city is currently preparing for various efforts to revitalize, specifically through development of city-owned land in the St. Paul's Quadrant. Norfolk is soliciting for a Master Developer, who will assist in maximizing the city's real estate assets and economic development opportunities; creating non-competing land uses, a new tax base and emphasizing short and long term job creation in the target area and beyond. However, for the revitalization to occur, chronic flooding issues and inadequacy of the storm water infrastructure in the area must be first addressed.

While this target area will be the direct beneficiaries of the proposed projects, the entire city and region would indirectly benefit due to the target area's strategic location next to Norfolk's downtown and its role as transportation hub. The proposed activities will reduce the threat of coastal and storm water flood risk to housing, buildings, and infrastructure, and thereby enabling holistic community revitalization of this economically distressed target area of Norfolk.

Seniors, young children and the disabled are especially vulnerable during disasters, as they often depend on family care and may also be more susceptible to the stress of disasters. In the Ohio Creek Watershed, 12% of the population is over the age of 65 and 12% is under the age of five. In the Newton Creek Watershed, 7% of the population is over the age of 65 and 13% is under the age of five. Individuals with disabilities generally require dedicated assistance from caretakers or emergency personnel during and after disasters, including the inability to evacuate themselves before or during a disaster, and may suffer traumatic impacts from the overwhelming nature of the disaster. According to the 2013 American Community Survey 5-year estimates, approximately 16.6% of residents in the Newton's Creek Watershed and 17.2% of residents in Ohio Creek have a disability.

In addition to social and economic vulnerable populations, the target area contains educationally vulnerable populations. Residents with low English proficiency may not be equipped with the communication skills needed to respond to evacuation measures. Residents with limited education have more limited job opportunities, earn lower incomes, and may have less access to information about hazards and preparedness. 10% of the residents in the target area have low English proficiency, and 15% of residents have less than a high school education, as determined by the U.S. Census ACS 5-year Survey estimate. The target area is also home to the two worst performing schools in Virginia.

Norfolk's security and safety from an extreme flooding event has a larger impact on the health, wellbeing, and safety of the Hampton Roads region, as it is a keystone in the economy of the region. On a larger scale, Norfolk's safety and uninterrupted operation impact national security and economic

wellbeing as a naval and shipping base for the East Coast and the United States.

Appropriate Approaches

In Phase 1, the Commonwealth of Virginia proposed a regional approach entitled **THRIVE**: *Resilience In Virginia*. The **THRIVE** framework is a five-pronged approach to achieve resiliency, guided by the National Preparedness System, to Unite the Region, Create Coastal Resilience, Strengthen Vulnerable Neighborhoods, Improve Economic Vitality, and Build Water Management Solutions. **THRIVE**'s five areas of effort align with HUD's goal for the National Disaster Resilience Competition, as they are each designed to achieve a major critical objective, address unmet need, and provide replicable and scalable solutions to identified vulnerabilities within the target area.

Using **THRIVE**'s approach to resiliency, Norfolk's projects in the Ohio Creek Watershed and Newton Creek Watershed protects the coastal communities and the vulnerable populations within those communities whilst creating economic, social, and environmental opportunities for the target area, with benefits to the surrounding areas. Based upon Virginia's Phase 1 application, the Phase 2 application plans to meet the five principals of the **THRIVE** approach:

1. *Unite the Region* – The projects developed in Phase 2 connect the target area to downtown Norfolk with improved streets, a revitalized economic future and improved resident and visitor quality of life. In a larger sense, the replicability and scalability of the projects will be feasible within the Hampton Roads region and elsewhere, allowing for greater connection across the region.
2. *Create Coastal Resilience* – The proposed projects will have a direct, positive effect on coastal flood resilience, as well as social and economic resilience, through protection schemes to significantly reduce flooding in coastal areas. The proposed projects, will create coastal resiliency for residents and businesses along the Elizabeth River in the Newton Creek and the Ohio Creek Watersheds through multi-functional flood protection and storm water management systems, greatly reducing flooding from extreme flood events including extreme rain events and coastal flooding.

3. *Strengthen Vulnerable Neighborhoods* – Through the projects proposed within this application, the neighborhoods contained within the target areas will be strengthened through greater flood protection, increased economic and social opportunities, improved connections, and increased quality of life.
4. *Improve Economic Vitality* – The proposed projects will increase economic opportunity throughout the target area through protection against flood risk, new places that provide greater resident and visitor interaction, such as parks and recreational areas, improved area street connections, new and risk-protected commercial spaces, and a greater sense of social cohesion within neighborhoods.
5. *Build Water Management Solutions* – The proposed projects are state-of-the-art, proven, flood risk reduction solutions to protect the target area from extreme flooding events, both coastal and storm water. Green infrastructure, including bio-swales, rain gardens, on-site retention, "complete streets" and permeable surfaces, will combine with traditional storm water management techniques to provide the resiliency afforded by overall flood risk reduction.

To properly provide these residents with a safe place to live, a local economy protected from flooding and a higher resilience to disaster, the City of Norfolk is requesting the necessary funding to protect target area vulnerable populations, while creating opportunities for growth among all area populations, both within and outside of the target area.

City of Chesapeake

Unmet Recovery Need and Target Geography

The target area identified as most impacted and distressed in Chesapeake, Virginia as a result of qualifying disaster Hurricane Irene (2011), a sub-county area within a county including census tracts 214.03, 200.02, 200.03, 201, 202, 203, 204, 205, 206, 207, 209.03, 209.04. Chesapeake has nine planning areas; the target area census tracts fall into the following planning areas: Camelot Planning Area: 214.03; Indian River Planning Area: 200.02 and 200.03; South Norfolk Planning Area: 201, 202, 203, 204, 205, 206, and 207; and Rivercrest Planning Area: 209.03 and 209.04.

As a result of Hurricane Irene in 2011, 335 residential properties sustained damage. 166 of these damaged houses are concentrated in the contiguous sub-county target area – 82 residential dwellings affected, 21 residential dwellings sustained major damage, and 63 residential dwellings sustained minor damage as recorded by the city’s damage assessment team during windshield survey in the aftermath of the Qualified Disaster, using FEMA’s Individual Assistance Damage Assessment Level Guideline.

More than 50% of people in the target area earn less than 80% of the area median income. The population of the target area is 50,025. Of that population, 25,940 individuals, or 51.85%, are low and moderate-income (LMI), as indicated by CDBG low and moderate-income summary data.

The City of Chesapeake has Unmet Recovery Needs, including 59 houses with remaining damage in need of resilient repair, such as house elevation, to mitigate similar future damage (windshield survey, January 2015). All of these houses lie within FEMA designated floodplain. Ten (10) surveyed residents confirmed that; (i.) the damage was due to the disaster, and (ii.) they had inadequate resources from insurance/FEMA/SBA for completing their repairs. Twenty-five (25) of the 59 houses have had multiple flood insurance claims according to historic flood claims data.

For Phase 2, Chesapeake considered additional data for our analysis of need and extent of problem. Data included in the analysis are: *Risk and Vulnerability Assessment* from the FEMA approved *City of Chesapeake 2014 Hazard Mitigation Plan (HMP)*; *2014 Neighborhood Quality of Life Study Update (NQL)*; and Chesapeake’s *2012 Statistical Profile*. Chesapeake considered all damages from Hurricane Irene within the MID-URN target area census tracts, and considered other needs based on the risk for all populations in the target area, both low-to-moderate census tracts and those who are not low-to-moderate.

The HUD MID-URN target area contains populations that Chesapeake’s risk and vulnerability study show as located in critical hazard-high risk and critical hazard-moderate risk areas and in a flood-prone area. Additionally, our studies show that our HUD MID-URN target area received the rating of high priority needs in Chesapeake’s NQL study. Based on the data from the three studies, Chesapeake

recognizes additional resilience needs for the broader MID-URN area and the broader population.

Chesapeake also identifies in Phase 2 an additional risk to the MID-URN population: hazardous spills and volatile materials. Based on the study of our data, we have expanded our unmet recovery need to include the following vulnerable communities:

- Two of the city’s most flood prone neighborhoods (Crest Harbor (Mains Creek) and Fernwood Farms), in the city’s repetitive flood loss areas.
- Several MID-URN neighborhoods that are linked to the interstate highway by Bainbridge Boulevard, a road that pre-dates modern construction codes and regularly undergoes tidal flooding. This north-south road corridor is a major business and evacuation route, and the flooding endangers citizens in that area, inhibiting their ability to safely travel to work, school, and for daily requirements, as well as inhibiting first responders’ ability to make calls along the five-mile corridor.
- Another Mid-URN South Norfolk community relies on a single road, Freeman Avenue, which serves as the sole connecting road between the peninsula of the Money Point industrial area/Western South Norfolk and the greater Hampton Roads area, including Interstate 464 and the surrounding Hampton Roads interstate system. Freeman Avenue is intersected by an at grade railroad crossing that conveys an integral part of the roadway transportation network. Trains block this major road for up to one-and-one half hours, preventing residents living on the west of the railroad crossing from getting to work on time, blocking first responder access to the area, and creating diminished economic opportunity in the South Norfolk area, as the Money Point industrial traffic loses a most valuable asset, time, due to this untenable traffic pattern. The train cars carry chemicals and volatile materials, which also pose a threat at the crossing.
- A blighted South Norfolk residential neighborhood in an area zoned M-2 Heavy Industrial. South Hill is a 15.91 acre site with 38 residences and was originally part of a larger community, but was cut off when Interstate 464 was built. Surrounded by the interstate, railroad tracks, and a large tank farm,

there is one road in and out of this industrial area. In 2008, the residents of South Hill experienced mandatory evacuations, cleanup, and damages to their property after a chemical fertilizer spill at one of the tank farms.

- Erosion along the Southern Branch of the Elizabeth River and in the industrial area of Money Point contributes to flooding since the natural shoreline was stripped of its filtering vegetation. These waterfront areas are unsightly and make recreation along the river unavailable to the LMI residents who live nearby.
- There is also a need to build greater resiliency awareness and develop neighborhood alert programs coupled with tidal flooding evacuation zone designation. Residents who have been engaged in the NDRC planning process need to be empowered to further increase resilience in their homes and communities.

The 2014 NQL applies dimensional priority scores on four dimensions (social, crime, physical and economic) calculated on 26 quality of life variables within neighborhood statistical areas (NSAs). The 2014 NQL study identifies that within our HUD NDRC MID-URN, three NSAs meet the high priority criteria for four dimensions; 11 NSAs meet the high priority criteria for three dimensions; and nine NSAs meet the high priority for two dimensions.

The 2014 HMP Vulnerability Assessment gives in-depth information on current and future threats and hazards, and analyzes the needs and solutions of not only the population of the HUD MID-URN target area, but all of the city's populations. Chesapeake's critical hazard-high risk is flooding, hurricanes and nor'easters, and our critical hazard-moderate risk includes sea level rise and land subsidence (moderate risk due to the longer period of time to respond), tornadoes and severe thunderstorms. In the plan, city officials identified specific local areas in Chesapeake subject to historical flooding along the Southern Branch of the Elizabeth River, including the planning areas of Camelot, Indian River, Rivercrest and South Norfolk, which are located in the MID-URN target area.

Water-related infrastructure is prevalent throughout the city's waterways for commercial, industrial, and recreational uses. Located approximately 20 miles inland from the Atlantic Ocean, the city has over 120 miles of commercial waterfront land, including over 12 miles of deep draft channels.

Chesapeake's elevation is nearly level, with the highest elevation point being 25 feet above sea level. The overall elevation for the City of Chesapeake averages about 12.2 feet above sea level. Several scientist-authors have highlighted data from the gauge at Money Point, Virginia, on the southern branch of the Elizabeth River near Portsmouth. *In Sea Level Rise and Coastal Infrastructure: Prediction, Risks and Solutions*, Bilal M. Ayyub and Michael S. Kearney observe that during Hurricane Irene in 2011, the VIMS Tidewatch tool showed Money Point experienced the highest water levels in the area, at 4.4 feet above highest astronomical tide.

Excluding the Great Dismal Swamp, Chesapeake has 167 miles of coastline, and approximately one-third of its land area consists of wetlands. The City of Chesapeake contains portions of two significant watersheds: the James River Watershed and the Albemarle Sound Coastal Watershed. The Eastern Branch, Western Branch, and Southern Branch of the Elizabeth River are located within the City of Chesapeake. The Eastern Branch is located in the northeast portion of the city, while the Western Branch is located in the northwest. The Southern Branch is the main stem of the Elizabeth River, and is located towards the southwest and southeastern portions of the city. The North Landing River is also a part of the Intracoastal Waterway, and serves as the easternmost boundary for the city. Other significant bodies of water within the city's jurisdictional boundaries include the Northwest River and Lake Drummond.

Flooding can occur along all waterways in the City of Chesapeake including branches of the Elizabeth River, the Indian River, the Northwest River, and the North Landing River. Localized riverine flooding can occur in areas of the city not adjacent to a major body of water. Large sections of the city are low and subject to tidal flooding during hurricanes and severe nor'easters. Flood duration is typically shorter for hurricanes and tropical storms than for nor'easters. The main impacts from severe floods or

floods that might exceed the 500-year frequency event are expected to be:

- Inundation of low-lying residential neighborhoods;
- Impassable road crossings and consequential risk for people and cars attempting to traverse flooded crossings;
- Damage to public and private infrastructure, possibly including but not limited to water and sewer lines, bridge embankments, and both small and large drainage ways;
- Wave action responsible for shoreline damage, and damage to boats and facilities; and
- Inundation of critical facilities, possibly including some fire stations, police facilities, public shelters, and several city buildings. Public shelter availability is limited by the expected severity of flooding.

Areas identified as vulnerable to flooding are depicted on FEMA’s Flood Insurance Rate Maps (FIRMs), which were developed through the National Flood Insurance Program (NFIP), show the existing potential flood hazard areas throughout the city based on the estimated 100-year floodplain. The 100-year floodplain represents the areas susceptible to the 1% annual flood. The maps also show the 0.2% annual flood, or 500-year flood. The 100-year flood, or base flood, has at least a 26% chance of occurring over the life of a typical 30-year mortgage.

Areas in Chesapeake subject to frequent flooding include numerous areas along the Southern Branch of the Elizabeth River, including the streets and neighborhoods in our HUD MID-URN target area: Freeman Ave., Bainbridge Blvd, Money Point, South Norfolk, and many homes in Mains Creek and Fernwood Farms where repetitive flood loss is documented through the National Flood Insurance Program, as well as through citizen comments from those who do not have flood insurance.

In addition to the financial loss caused by flooding, Chesapeake’s proposal is addressing another threat existing for a portion of the population along the target area that includes the Bainbridge Blvd. corridor: the threat of hazardous materials and volatile element that are highly flammable and/or explosive in the Money Point and South Hill industrial areas. The hazardous spills and volatility are a danger to the

life and safety of our citizens, but this is coupled with the effects flooding from the Elizabeth River can have on the rail system that serves Money Point and our region's intermodal network. The potential after-effects of unstable train cars loaded with chemicals poses a great risk to citizens, the employees in the Money Point area and possibly beyond, US military and other ships in the Elizabeth River and nearby Norfolk Naval Shipyard.

The South Hill community suffered a liquid fertilizer spill in 2008 that required evacuation of the residents of the low-income neighborhood during the incident and later during cleanup. There is one ingress egress street for South Hill, which was inundated with liquid fertilizer during the spill, cutting the community off from emergency crews during the spill. The state has since provided an emergency pedestrian egress on to I-464, but this does not ensure the life and safety of the residents.

The unmet recovery need for residents who suffered damages from Hurricane Irene were calculated in Phase 1 on survey results that showed damaged homes have not incorporated resilient measures, such as house elevation, to mitigate similar future damage. In Phase 2 Chesapeake's proposed projects take a holistic and regional approach to our MID-URN area, considering the risks of flooding from hurricanes, nor'easters and nuisance flooding; the future flooding predictions resulting from sea-level rise and land subsidence; and the risks of hazardous spills and volatile chemicals and elements. We consider all income categories in our MID-URN target area, and we propose projects that can be scaled and replicated throughout the MID-URN area and areas in Chesapeake outside the MID-URN that undergo repetitive flooding. We base our project proposals on the risks explained above, the plans identified in the *2014 Consolidated Plan*, *2014 Hazard Mitigation Plan*, and the *2014 Neighborhood Quality of Life Study Update*, all which "talk to each other" to accomplish increased resiliency in physical, social, and economic dimensions. Our designs at all time consider the desire of the citizens and the necessity of businesses that we work smart to maintain their connection to the water as a place of leisure, recreation, and business growth. Our resiliency design meshes with and supports the Commonwealth's THRIVE

approach for living with the water in all five of its goals: Unite the Region; Create Coastal Resilience; Strengthen Vulnerable Neighborhoods; Improve Economic Vitality; and Build Water Management Solutions.

In Hurricane Irene, the city identified 45 repetitive loss areas by referencing maps of the historically flooded properties on old and new NFIP RL lists and the SRL list. There are 391 properties on FEMA's repetitive loss list and an additional 2,024 structures identified as being within those repetitive loss areas. The definition of structure, in this case, is very broad and includes any structure listed in the county assessor's database such as garages and sheds. Chesapeake's Crest Harbor (Main's Creek) and Fernwood Farms neighborhood are located in the repetitive loss area and are the neighborhoods targeted for our project *Tidal Flooding Community Voluntary Buyout Assistance Fund And Micro Mitigation Projects for Added Resiliency for Flood Loss Properties*.

Other flood-prone areas that are in our MID-URN target area and that will be positively affected by our project titled *Bainbridge Blvd. Corridor Projects: Freeman Ave Overpass; Bainbridge Boulevard Road Elevation; Voluntary Relocation of South Hill Community* are 1. Money Point and 5. Bainbridge Blvd. Areas in the MID-URN target area that will be positively affected by the projects but not specifically named in the project are 3. Sunnybrook Apartments, 6. Crestwood, 11. Riverwalk. The remaining repetitive flood loss areas in Chesapeake share the need for road elevations and voluntary buyout programs with living shorelines as a co-benefit. Our Phase 2 projects are replicable and holistic in approach and can and will be applied to the other flood loss areas as funding becomes available.

South Norfolk, a community located along the Bainbridge Blvd. Corridor project area, is an example of a sound approach addressing comprehensive recovery and future risk. As Chesapeake experienced population increase beginning in 1970, the historic area of South Norfolk lost its appeal as the suburbanization trend took hold and residents move outward from the denser city centers into suburban areas in southern Chesapeake. With that trend came blight, creating an urgent need for revitalization of

the South Norfolk area. South Norfolk consists of such neighborhoods as Campostella Square, Providence Terrace, South Norfolk, South Hill, and Portlock and consists of the following census tracts: 201, 202, 203, 204, 205, 206, and 207. With a 2012 population of 25,203, the median household income in South Norfolk is \$32,205. South Norfolk has a poverty level of 19.4% measured for number of persons living below the poverty level (the percentage of persons living below the poverty level for the city is 7.4%). Within the 19.4 %, 31.7% are children and 11.8 % are seniors over the age of 65.

Resilience Needs Within Recovery Needs

The 2014 hazard mitigation plan (HMP) incorporates hazard mitigation principles and practices into routine government activities and functions. The plan recommends specific actions designed to protect residents, business owners, and the developed environment from those hazards that pose the greatest risk. Mitigation actions go beyond recommending structural solutions to reduce existing vulnerability, such as elevation, retrofitting, and acquisition projects.

Local policies that guide community growth and development, incentives tied to natural resource protection, and public awareness and outreach activities are considered in order to build resiliency and reduce the city’s future vulnerability to identified hazards. Additionally, to optimize disaster recovery and to improve resilience, the 2014 HMP is aligned to Chesapeake’s updated Comprehensive Plan, Land Use Plan, and Master Transportation Plan, all which were updated in 2014 and all of these plans “talk to each other.” Chesapeake’s Comprehensive Plan supports the 2014 HMP by affirming “The city will continue to devote available and applicable resources to implementing the City of Chesapeake All Hazards Mitigation Plan...and its overarching goal to ‘develop and maintain a disaster resilient community that is less vulnerable to the economic and physical devastation associated with natural hazards events.’”

The HUD MID-URN target area contains populations that our risk and vulnerability study shows located in critical hazard-high risk and critical hazard-moderate risk areas and in a flood-prone area. Additionally, our studies show that our HUD MID-URN target area received the rating of high priority

needs in Chesapeake's NQL study.

The 2014 NQL study summarizes the quality of life in Chesapeake in the four dimensions used in the study: Social Dimension: High Priority NSAs are clustered in two areas, north of S. Military and just east of the Dismal Swamp; Crime Dimension: the primary clusters of High Priority NSAs are located north of S. Military Highway and south of S. Military along I-64; Physical Dimension: In 2014, the majority of High Priority NSAs are similarly distributed through the northern half of the city, with just two located in the southern half of the city. There are several clusters in the middle of the area north of S. Military Highway; Economic Dimension: There is a cluster of High Priority NSAs located north of S. Military Highway. Other High Priority NSAs are dispersed throughout the northern half of the city, with just three located south of S. Military Highway. The area north of S. Military Highway is located within our MID-URN target area, and as previously stated, the 2014 NQL study identifies that within our HUD NDRC MID-URN, three NSAs meet the high priority criteria for four dimensions; 11 NSAs two dimensions. The study goes on to evaluate these NSAs "...as most in need of quality of life investments." The city recognizes that resilient, livable residential communities are the backbone of a successful city and routinely assess progress toward healthy NSAs to address the individual needs of each neighborhood. Chesapeake looks for opportunities to build economic, social, and physical resiliency with targeted investments in initiatives that address interrelated concerns across multiple dimensions.

The Chesapeake 55 and Better Comprehensive Plan reveals the older population's concern about affordable housing. The Department of Housing and Urban Development defines affordability as housing that cost no more than 30% of income and that persons who pay more than 30% are considered "housing burdened". According to the Census Bureau's American Community Survey, in Chesapeake 10.8% of all householders are age 65 and older; 6.9% of persons age 65 and older have income below the poverty level; and a large percentage of Chesapeake renters age 65 and older in Chesapeake have a high housing burden. Surveyed seniors also expressed concern that aging housing presents additional maintenance and

preservation challenges, making the cost of maintaining a home prohibitive for those on fixed incomes.

The Weldon Cooper Center for Public Service is the state's official demographer and projects a growth of 114.5% in the number of those aged 65 and older compared to an increase of 39.4% in the city's population overall between 2012 and 2040. The number of residents 65 and older, who are veterans (another segment of the population that presents unique needs), is projected to grow from 8,200 in 2012 to 16,000 in 2040. Additionally, it is estimated that 21% of veterans suffer from Post-Traumatic Stress Disorder and other trauma induced conditions, making them more likely to have challenges in finding and maintaining affordable housing.

The city's Neighborhood Quality of Life Study was first published in 2006 and relied primarily on U.S. Census data, augmented by local public safety/crime statistics, building code enforcement data and other local factors, all of which was organized by Neighborhood Statistical Areas created by the project consultant. The Quality of Life Study was updated in 2014, with the Neighborhood Statistical Areas re-organized to correspond to census tracts and block groups for more efficient statistical analysis.

South Norfolk consists of such neighborhoods as Campostella Square, Providence Terrace, South Norfolk, South Hill, and Portlock and consists of the following census tracts: 201, 202, 203, 204, 205, 206, and 207. With a 2012 population of 25,203, the median household income in South Norfolk is \$32,205. South Norfolk has a poverty level of 19.4% measured for number of persons living below the poverty level (the percentage of persons living below the poverty level for the city is 7.4%). Within the 19.4 %, 31.7% are children and 11.8 % are seniors over the age of 65.

The unmet recovery needs are building resiliency for the LMI and vulnerable populations by building resilient structures and infrastructure in flood-prone areas, and/or offering a voluntary buyout program for homeowners in areas subject to flooding and in areas subject to hazardous spills and volatile materials. Unmet recovery needs and resilience needs also include micro-mitigation to assist LMI and vulnerable populations to retrofit their homes.

The economic development trend for the South Norfolk Area is very good: Chesapeake will use HUD NDRC grant funds to continue with its sound approach in resiliency by continuing its work on positive economic, social, and physical resilient actions in the vulnerable community of South Norfolk. City Council has already confronted the challenge of revitalizing South Norfolk by creating the South Norfolk Business Overlay. The purpose and intent of creating the South Norfolk business overlay district is to establish special zoning standards for the area which accomplish the following: (1) enhance those physical and architectural aspects of the area which make it attractive and consistent with the historic character of the community it serves; (2) limit uses in the area to those that are consistent with promoting commercial revitalization; (3) provide development flexibility that allows and encourages the improvement and upgrading of the area.

Economic, social and physical success is being attained with such projects as the South Norfolk Jordan Bridge, which brought 150 new construction jobs to the area; reconnected two revitalizing communities in new commercial enterprises, including commercial and defense-related traffic; and provided a new park and pedestrian and bicycle crossing. In 2012, the city spent \$2.1 million on vacant space in the Village at Gateway to prevent the planned retail and residential development from going into foreclosure and blight.

The South Norfolk Memorial Library has exceeded expectations since its new location opened in July 2013. The Great Recession derailed most of the plans for the residential project built next to the library, but buyers are now showing interest in the condominiums and numerous units have sold. There are additional businesses in the building that houses the library, more parking is planned to accommodate the increase in library and business customers. Several national retail chains, which have shown interest in the Poindexter Street, Liberty Street, and Campostella Road corridors. Chesapeake has invested millions in capital improvements projects from a new and highly visited public library to a new boat landing and park, from streetlights to road repaving. The Bainbridge Blvd. corridor projects will complement the

city's ongoing efforts to keep this historic community intact and more resilient for the risks of the future.

The 2035 Comprehensive Plan places great emphasis on economic vitality throughout the city and expanded economic opportunities for all citizens. Specific goals and action strategies include expanding the inventory of commercially zoned property and meeting the infrastructure and technology needs of its businesses and citizens. The activities proposed under the city's NDRC grant application would help to meet these goals by improving access to commercial areas through elevating portions of Bainbridge Boulevard and Freeman Avenue, particularly to the vital Money Point industrial area. Similarly, the environmental improvement projects in South Hill, Mains Creek and Fernwood Farms would facilitate efforts by property owners to protect their investment and prevent economic instability and disruption due to recovery from floods and other related natural disasters.

The Bainbridge Blvd. project, coupled with the Freeman Ave. overpass project detailed below will provide long-term resiliency from the threats of flooding, including a safe transportation and life-saving evacuation routes for hurricanes and hazardous spills and volatile materials; bring an improved intermodal transportation system to the area, securing economic well-being and social improvement; and will underpin continued revitalization for the neighborhoods of South Norfolk and Rivercrest. The projects will bring additional construction jobs to the area, and the city will maintain its commitment to HUD's Section 3 regulations. As has been the case with Chesapeake's recently completed South Norfolk Jordan Bridge, an improved transportation system with its accompanying public works and public utilities projects is vital to the revitalization of neighborhoods.

Chesapeake's 2012 Statistical Profile suggest the revitalization will be successful, as the prediction for growth in South Norfolk is predicted to be 21.96 percent, increasing from the 2012 population of 24,197 to a 2034 population of 29,510. The statistics that Chesapeake has given reveal our MID-URN area to be a low-income area with high poverty and numerous vulnerable populations, and high priority criteria for all four dimensions. Therefore, social, governmental, educational, environmental and economic factors

hinder the ability of this target area to recover from a disaster and to build their own resilient environment.

Appropriate Approaches

The response of Chesapeake's citizens to the city's proposed projects has been overwhelming positive. At the two public input meetings, in phone conversations, in written comment sheets and letters from citizens, and in email responses from citizens, the support is overwhelmingly positive for the three voluntary buyout projects with the co-benefits of the living shorelines and bio-filtration systems, and for the Bainbridge Blvd. road elevation and Freeman Ave. as a way to prevent or reduce flooding of the road and the adjacent properties, as well as the subsequent positive effects the road projects are anticipated to have on the South Norfolk revitalization efforts. Chesapeake residents in these two planning areas are extremely hopeful their projects will be funded by HUD NDRC and that their lives will be improved by our proposed projects.

The optimal program is to elevate Bainbridge Blvd., so it acts as a berm to protect the residents from flooding; to create living shorelines to absorb more flood waters; to create bio-filtration systems to protect the living shorelines and Elizabeth River from unhealthy waste; to assist residents of Chesapeake through a voluntary buyout program that allows communities in flood-prone areas and hazardous spill and areas housing volatile materials to move to another, safer area; and finally, to educate citizens about resiliency efforts and the Commonwealth's model to thrive with the water.

City of Newport News

Unmet Recovery Need and Target Geography

Newport News is long and narrow in shape, approximately 22 miles long, 7 miles at its widest point and only 1 mile wide at its narrowest point. The city is located along one of the world's largest natural harbors and it has approximately 244 miles of shoreline, including inland areas and a military base. These features add to the attraction of the city but also make it very vulnerable to natural hazards. At least one-

third of the city's population is considered low-income and unfortunately the majority of this population resides in the older, more deteriorated part of the city, including the Southeast Neighborhood, which is an area that will benefit from the proposed NDRC projects.

The Newport News target area includes both the Southeast Neighborhood and the Newmarket Creek Watershed area. The census tracts included in the Southeast Neighborhood project are: 301, 303, 304, 305 and 306. The relevant census tracts for the Newmarket Creek project are: 308, 309, 312, 313, 314, 316.01 and 316.02. In the Southeast Neighborhood the average of low/moderate income persons is 77.77% and in the Newmarket Creek Watershed area the average low/moderate income is 60.16%

Regarding unmet recovery needs for Newport News, there were a total of 229 properties damaged during Irene. Of the 229, 91 were in the project areas. Of the 91, 8 properties were demolished by the City Of Newport News. The windshield survey revealed the remaining properties in the project areas were repaired to minimum standards. There was no indication of any resilient repairs for high wind events (high wind nailing patterns on roofing shingles, Truss/Rafter strapping). Based on this information, we (Codes and Fire Department) are surveying the 24% of the remaining owners of the properties, approximately 20, for information on what (if any) resilient repairs were made to the properties. It is anticipated that results from a survey will reflect that although structures were restored, they were not restored in a more resilient manner, as it was cost prohibitive. Therefore, the lower-income residents are still in a vulnerable situation if similar weather events occur in the future. Newport News is proposing two different projects that would encompass two MID-URN areas, the Southeast Neighborhood and the Newmarket Creek Watershed area.

Ten percent (18,910 people) of the city's total population (181,025) lives in the Southeast Neighborhood. Ninety-one percent of the population identifies as minority, with 85.5% identifying as African-American. The unemployment rate for the Southeast neighborhood is 12.2%, higher than the citywide rate at seven percent. The median household income this target area is \$25,917, well below that

of the city as a whole at \$51,027. The median family income for this area is \$31,076; again well below that for the city as a whole at \$59,514.

The Southeast Neighborhood area adjacent to and included in the proposed project is the city's largest designated Title 36 or redevelopment area. This redevelopment area is in the oldest part of the city, which means the public facilities and infrastructure in this area is the oldest and most in need of repair and replacement. The city, as a CDBG and HOME entitlement community spends the majority of grant funds in this area. Some years ago HUD also approved much of this area as a Neighborhood Revitalization Strategy Area.

This area is home to the majority of the city's minority population and the most economically disadvantaged, where over 70% of the residents are considered low-income. It is plagued by joblessness, lower educational attainment, and crime. Many of the residents do not own a vehicle, thus they are dependent on other means of transportation, such as public transportation, a bike or walking.

The Southeast Neighborhood has the lowest percentage of retail services in the city, based on the number of citizens in close proximity. To further depress this community, just last year the only grocery store in the area closed unexpectedly, leaving residents without adequate fresh produce or meats. To reach a full service grocer, residents had to travel more than four miles, which unfortunately qualified the community as a "food desert".

This community also is the location of the majority of public housing complexes and numerous project-based Section 8 complexes. It also is victim to an overabundance of single-family homes with absentee landlords, often used as substandard rental properties. These substandard rental properties combined with abandoned derelict structures create many streets with slum and blighted conditions.

Over 5% percent (9,981 people) of the city's total population (181,025) live in the Newmarket Creek Watershed area. Over 78% of the population identify as minority, with almost 71.2% identifying as African-American. Over 12% percent of the eligible workforce in the area is unemployed. Like the

Southeast Neighborhood, the unemployment rate for the Newmarket Creek Watershed area is also higher than the citywide rate at seven percent. The median household income for the area is \$33,388, well below that of the city as a whole at \$51,027. The median family income for the area is \$43,647, which is again well below that for the city as a whole at \$59,514.

The Newmarket Creek Watershed area is also in an older part of the city. Although the area has a majority of older, 1940 era, single-family homes, 47% are renter occupied. There is very limited new private investment in this area and many of the resident businesses and homes need rehabilitation. This area also has its challenges when it comes to emergency calls, as often police, fire and rescue have to converse with a citizen longer than on average to ascertain in which jurisdiction they are located or in which jurisdiction there is a need for public service.

Resilience Needs Within Recovery Needs

To help mitigate some of the issues in the Southeast Neighborhood community, the city has made a major commitment and investment over the last two years. This is evidenced by the undergrounding of utilities and street-cape along Jefferson Avenue, one of the major commercial corridors in the community, which cost approximately \$12 million. The first phase is complete and phase two has been initiated. Additional investment is evidenced by the presence of a new police substation constructed and situated in the “heart” of the community at a cost of \$6.6 million. The station is almost complete and should be occupied by November of this year.

The city also took on the responsibility of obtaining a full service grocer for the area. A private entity was identified but only after the city committed to substantial public funding, in the amount of \$9 million for the project. The site work for the store has begun and scheduled to be completed sometime before the end of calendar year 2016. All of these projects are in conjunction with Brooks Crossing, an overall larger mixed-use \$21 million project located also in the “heart” of the southeast community.

In addition, some of the proposed projects/activities have been implemented in other areas of the city and have proved to be beneficial and could be for our proposed projects as well. Several projects implemented successfully in Newport News are similar to the proposed project for Newmarket Creek Watershed. The city currently has two locations where detection systems operate warnings signs in locations when storm water runoff inhibits the passage of roadways. The systems are in the north and central parts of the city and were installed due to a concern for citizens' safety and property (vehicles) losses. Implementation of a similar system in the Newmarket Creek Watershed area would provide the city a means to alert the community of rising water levels and activate Evacuation and Response Plans, once they are developed and accepted. With the installation of the early warning/detection system, citizens will be better prepared for a natural disaster, leading to a reduction in risk to and loss of life and property.

The city's Flood Assistance Program has assisted seventy-two property owners since its inception and have also acquired properties, razed structures, and returned land to its natural state. Additionally, funding for the project will increase the capacity of the city to implement the options of raising and/or relocating structures or purchasing of property to become a natural state. The program will move more residents in vulnerable and flood prone areas to safer and less risk locations.

Current watershed modeling has determined that flood protection is necessary and practicable in all drainage basins for Newmarket Creek. Further refinement will focus on attainable projects involving storage BMPs, system upgrades, natural restorations, and have the potential to include other water features and amenities such as trails/paths, parks, and sporting events.

The city has taken steps to assist in the redeveloping of areas in the Southeast Neighborhood area of the city to revitalize areas with businesses and affordable housing, as well as improvements in infrastructure such as streetscaping. A new grocery store, daycare center, satellite banking facility and police station are currently under construction to provide safety and supplies to the local community. A similar endeavor can

be achieved in the Newmarket Creek watershed where current commercial sites and businesses can be re-developed or expanded and be connected to the neighborhoods through offering of services and goods to the local residents.

In looking at the costs of the various resilience activities/projects proposed, it would cost a total of approximately \$104 million to appropriately benefit the communities now and in the future. If these resilient improvements are made, it would protect and support at least \$200 million in capital improvements undertaken in the last 23 years. This figure was determined from looking at budget spreadsheets reflecting expended funding and completion dates for projects.

Additional needs in the Southeast neighborhood include: availability of additional services to include retail, medical and financial facilities; job training programs and better job options; more efficient public transportation; funding sources to maintain and rehabilitate older existing homes. Additional needs in the Newmarket Creek Watershed area include: more efficient public transportation; funding sources to maintain and rehabilitate older existing homes.

Any change in the demographic trends of the target area would be very gradual, so the basic demographic mix will likely remain static. The economic trends are somewhat more promising as more economic development projects are in process. With the grocery store development and the Brooks Crossing mixed-use development more job opportunities will be available, thus raising the income levels for the area and decreasing the unemployment rate.

In discussions with our local independent living center, it appears reliable and appropriate transportation is a need. Additionally, more accessible affordable housing in the area that is fully equipped for independent living is also needed. At this point our local housing authority by themselves, or them working in conjunction with other affordable housing providers, are the developers that are providing universal apartment designs that will be appropriate for disabled persons.

These trends will likely not affect recovery and resilience needs, as the land areas will remain vulnerable to the same issues prevalent now in the target area. Although the trends are moving in the positive direction, neither the demographic nor economic characteristics will improve rapidly enough to eliminate the low-income designation of the areas.

The fact that the two areas proposed are primarily low-income areas contributes to the lack of resilience. Since government cannot step in and cover all losses after a natural disaster, many improvements rely on the homeowner to take place, many times with little disposable income to spare.

Appropriate Approaches

Probably the most appropriate approaches or actions identified through consultation with residents deal directly with drainage and storm water improvements, as these were mentioned most by residents at meetings. An example of feedback from consultation with neighborhood groups is noted below:

- Correct the drainage and constant flooding of these areas of their neighborhoods. Water damage occurs several times a year to their homes and property.
- Include bike paths and walking trails in these areas of the community to improve mobility and healthy lifestyles.
- Place power lines underground where possible to better reduce the length of power outages due to downed trees on the power lines.
- Build grocery store in the community as residents do not have a food store in the community for supplies to sustain themselves for extended periods of time. This issue will be greatly improved when Jim’s Grocery store opens in 2016.

However, a majority of our other proposed activities were also very strongly supported by the impacted communities. The community supported bike trails that could be used for bikes or walking to improve required mobility and healthy lifestyles. Also supported were any actions to prevent direct water damage to homes and personal property and actions that would protect power lines to limit power

outages. Additionally, in the southeast neighborhood meetings it was stressed that retail services, such as a grocery store, within walking distance was important in order to access necessary food and supplies.

Newport News' proposed projects are in line with the Commonwealth of Virginia's regional five-pronged approach, **THRIVE: Resilience In Virginia**:

- **Unite the Region** – the Cities of Newport News and Hampton are working together to solve flooding issues along Newmarket and Salters Creeks, from both storm water and tidal effects.
- **Create Coastal Resilience** – the city has performed computer modeling of the Newmarket Creek watershed and participated in the Dutch Dialogues workshop; that studied the creek and provided a vision of what the waterway could become.
- **Strengthen Vulnerable Neighborhoods** – the city is preparing to implement an emergency evacuation plan for an apartment complex, which can be a model for a plan for the entire southeast community. The projects strengthen the appearance and safety of the neighborhoods by providing better shoreline structures, a bike trail, and a tide gate and pump station.
- **Build Water Management Solutions** – the city is evaluating warning systems, as well as designing and constructing drainage improvement projects, to reduce flooding issues and risk to community residents.

III. SOUNDNESS OF APPROACH



III. SOUNDNESS OF APPROACH

Hampton Roads Region

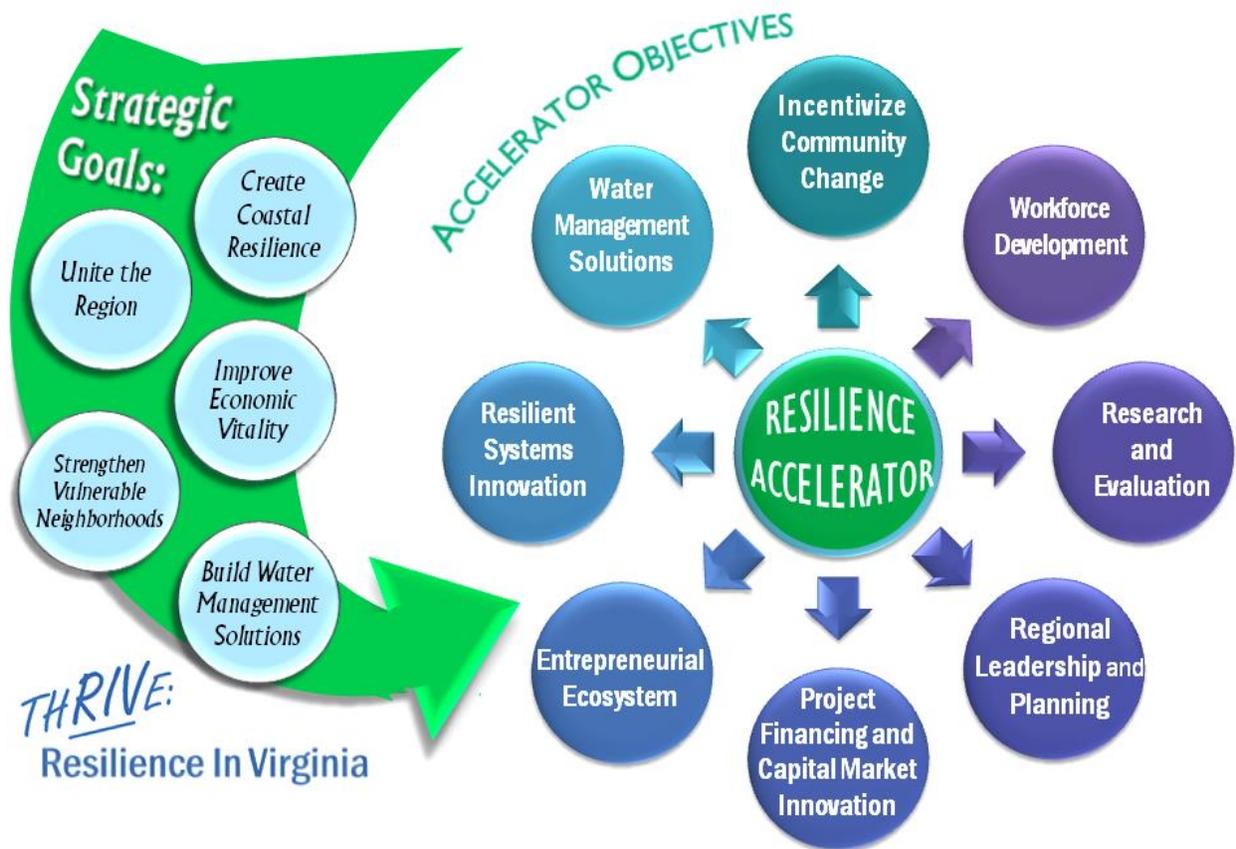
Coastal Resilience Laboratory/Acceleration Center

The Commonwealth of Virginia Hampton Roads will maximize its location at the gateway to the Chesapeake Bay to develop a resilience model for seacoast communities that uses our position on and exposure to water to transform our current sea level-rise challenges into economic opportunities for the region. The Center will serve as the nexus for technological, organizational and conceptual innovation around identified regional resilience issues including increased flooding, economic vitality and equity of opportunity.

The Center is aligned with a wider effort to *Re-Invent Hampton Roads* (Re-Invent), a community initiative led by the Hampton Roads Community Foundation (HRCF). Re-Invent seeks to revitalize the regional economy by focusing on efforts that will generate high-paying, satisfying jobs including workforce development, export expansion, identifying and supporting existing business clusters and developing regional civic leadership talent. HRCF and its Re-Invent partners including the Regional Economic Development Authority, CEO Roundtable, Old Dominion University, Norfolk State University, Hampton University, Tidewater Community College, NASA Langley Research Center, and Jefferson Lab will play important roles including oversight, research, innovation, strategic insight, investment, and connecting major employers to the Accelerator.

In turn, the Accelerator will advance the Re-Invent effort by focusing on innovation and economic development in the water economy. The Accelerator is designed not to control innovation in the region, but as a network of public, private, educational and nonprofit organizations, coordinated by a small staff to leverage the region's business, people and geography to create a risk tolerant environment in which innovation and entrepreneurship can flourish. Its objectives cascade from the Accelerator's strategic goals.

Coastal Resilience Accelerator



- **Water Management Solutions Acceleration:** The Accelerator will concentrate on the development and evolution of businesses that contribute to regional resilience by providing innovative water management solutions.
- **Accelerating Incorporation of Resilient Principles in Existing Systems:** The Accelerator will act as the center for resilience thinking accessible to all of the cities across the region. A prime focus will be identifying via big data analysis, those sectors, projects and actions that most quickly build the region’s ability to bounce forward from disruptions. Key areas will include business continuity and recovery, critical infrastructure recovery, reduction of burden on emergency management, building neighborhood cohesion and Naval Station Norfolk operational continuity.
- **Entrepreneurial Ecosystem:** Focusing on a water resilience cluster, accelerate the timeline between research to product and product to market to increase regional economic vitality.

- **Financing and Capital Market Innovation: Working with 100 Resilient Cities Platform Partners** including SwissRe, Re.Bound, Social Finances and others, create innovative financing to ensure the region’s ability to implement needed resilience projects. Innovations may include catastrophe bonds, tax increment financing (TIF) and innovations to capture disaggregated cost savings from mitigation interventions.
- **Regional Leadership and Planning:** The region has already exerted a national leadership role in adaptation to sea level rise through the Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Pilot Project convened by ODU, , the ODU Mitigation and Adaptation Research Institute (MARI), Virginia Institute of Marine Science (VIMS) at William and Mary and the adaptive work of local nonprofits including Wetlands Watch, Lafayette River Partnership, the Elizabeth River Project and others. As a result of the Dutch Dialogues, the cities of Hampton and Norfolk have committed to work together to advance common challenges of increased flooding due to increasing precipitation and sea level rise. Through the Hampton Roads Planning District Commission (HRPDC), the regional City Managers are exploring new leadership mechanisms to drive this work in the future. The Accelerator will support and advance that work where appropriate and where value is added.
- **Research and Evaluation Accelerator:** Working with local, state, university and private organizations including Old Dominion University, Resilience Corporation, Indra, Virginia Tech and others, the Accelerator will support the innovation and market readiness of resilience building strategies.
- **Workforce Development Accelerator:** Working with existing local efforts to ensure a workforce capable of filling the needs of a growing water innovation sector, the Accelerator will assist Opportunities Inc., Tidewater Community College, Old Dominion University and other educational institutions to ensure alignment of high quality low-cost training opportunities that quickly move the unemployed and underemployed as well as transitioning veterans into living wage jobs.

- Accelerate change through K-12 Educational Opportunities: the Accelerator will assist a partnership of educational institutions including local public school districts, Old Dominion University, Norfolk State University, Hampton University, Tidewater Community College to create and implement programs that educate students about climate change, sea level rise and its impact on the region. Programs will emphasize real life impacts and mitigating activities that can allow citizens to **THRIVE** in a coastal environment including: hazard identification, the role of the environment in mitigating impacts, the importance of strong social networks in a high-risk environment, and the role of science, mathematics, technology and innovation in creating solutions to system level challenges.

Innovation

Community College Partners. As we focus on building workforce skills and an affordable path to a four-year degree through our community colleges locally and nationally, Tidewater Community College (TCC) and other interested community college partners throughout Virginia must be primary partners in the Accelerator providing faculty support and membership dues. TCC and others will provide on-site workforce training including Innovation and Entrepreneurialism in collaboration with non-profit and private sector partners and four-year universities. Modeling of the successful TCC Center for Workforce Solutions partnerships, the Accelerator partnership will create customized training and specialized academies in the area of Coastal Resilience.

TCC will utilize the Accelerator labs as well as offer courses at the Accelerator in areas related to Coastal Resilience while students pursue Associate Degrees and Professional Certificates in Coastal Resilience creating a low-cost education opportunity in an emerging market as well as access to Virginia's four-year institutions. TCC faculty based at the Accelerator will collaborate with the K-12 program as well as the universities, creating an accessible bridge between the two for interested students, or a path to a successful career in two years.

University Partners. Colleges and universities, including Old Dominion University, Norfolk State University, Hampton University, and all Commonwealth Universities interested and able to participate will house research faculty at the Accelerator to staff the innovation component of the center, which shall serve as leverage. Anchor institutions are home to a substantial portion of students with LMI household backgrounds. For example, undergraduate students at both Old Dominion University and Norfolk State meet HUD's LMI criteria. Student success offices at participating universities would ensure that LMI background students with interests in engineering, technology, and other related fields participate in courses, labs, internships, and mentorships at the Accelerator. The affiliated faculty would pursue applied research in designated areas of coastal resilience utilizing innovation labs at the center while teaching and training students. That applied research should have measureable benefits to LMI communities in Hampton Roads and NDRC qualifying localities. Faculty will have the opportunity to work across institutions with other center faculty as well as with businesses also housed at the Accelerator.

Innovation labs occupied by colleges and universities will be required to meet a threshold requirement ensuring LMI student access from across institutions, thus providing training to students while developing new technologies and providing technical expertise and facilities for startups and small companies. Research will be focused on benefit to technologies and methods piloted in LMI communities in the pre-commercial stage. The commercialization process undertaken by the Accelerator also will include pathways for utilization in LMI target areas locally, and through coordinated workforce training. Therefore, targeted LMI communities would benefit from education, innovations, and commercialization, creating economic vitality and reducing flood risk to target communities.

Faculty and staff from Old Dominion University, and other colleges and universities in Hampton Roads and the Commonwealth, will each provide innovation support and training by committing at least four faculty and by involving LMI students in real-world innovation and in the commercialization process

for new technologies. Academic projects will, when possible, develop technologies and processes that benefit LMI communities during the commercialization phase.

Hampton Roads is the host to many other research institutions, including NASA Langley and Jefferson Labs, which are key partners in the Accelerator. The research institutions will be members of the Accelerator, provide mentorship to students, and collaborate with faculty and private sector partners to develop technologies with regional impact.

Commercialization. Following the National Institute of Aerospace (NIA) model, the Accelerator will support pre-competitive collaboration within the domain of coastal resilience research, and will serve as the holding entity for IP generated by partner academic or research institutions. An Innovation Intermediary (and staff) will be responsible for engaging startups, VCs, mid-sized companies, and others who would be willing and able to license and commercialize IP packages.

The Innovation Intermediary will work day-to-day with member institutions to identify IP with commercial potential, facilitate the collection of IP from several partner members into packages of related IP that can be licensed, and work on behalf of members to create and administer IP policies that protect their interests. Further, the staff will focus on regional opportunities, thus building capacity in Hampton Roads.

Much like the Commonwealth Center for Advanced Manufacturing (CCAM), which operates to develop technology with key industry-academic partnerships, Accelerator partners will pay annual dues serving as a substantial source of annual operating funds. Additional sources of funding for early stage technology development will include the Small Business Innovation Research Program (SBIR) and the Small Business Technology Transfer (STTR) program as well as other similar SBA programs that may arise to facilitate innovation and cooperation between small businesses and research institutions.

Geographic Location. The Accelerator will provide an economic anchor in the newly revitalized St. Paul's area, in the innovation district between Old Dominion University and Norfolk State University.

City of Norfolk

The proposed NDRC project activities will protect the Norfolk target area containing the Newton's Creek Watershed and the Ohio Creek Watershed from chronic and extreme flooding events and the effects of sea level rise. The Newton's Creek Watershed contains South Brambleton, Harbor Park, St. Paul's Quadrant, and Tidewater Gardens and the Ohio Creek Watershed contains the historic neighborhood of Chesterfield Heights. The design for these neighborhoods consists of various integrated flood protection measures, including coastal surge defense systems designed in tandem with upland storm water management actions to protect from sea level rise and recurrent nuisance flooding, coastal storms and heavy rain events.

The multi-purpose system will enhance public space and create economic and social opportunity along the waterfront. Permanent structures include floodwalls and berms to shield the target area neighborhoods from flooding as well as event-deployed elements such as flood gate panels. Economic and social opportunities along the Elizabeth River include, but are not limited to, new development space including retail and commercial spaces, open space amenities and recreational space including jogging and bike paths, recreational fishing, mixed-use athletic space, and passive recreational space. Environmental benefits include expanded or improved wetlands and shoreline restoration.

The Phase 2 projects connect the Ohio Creek Watershed and the Newton Creek Watershed to each other and to downtown. This connection will be the result of the integrated flood protection measures, resiliency strategies for each neighborhood, greater physical and social connectivity, increased standard of living, quality of life improvements, increased walkability and access to the waterfront for all.

In the Ohio Creek Watershed, improvements and upgrades will include multiple interventions on different scales: riparian improvements to the shoreline including further coastal flood protection

measures, conversion of existing open space into recreational public space along the waterfront, wetlands protection and expansion to restore habitats and replace tidal marshlands, new and improved storm water storage to capture storm events, installation of bicycle paths throughout the neighborhood, pervious and permeable pavement installation to improve storm water collection, and development of rain gardens to intercept runoff and improve aesthetics.

In the Newton Creek Watershed, improvements and upgrades will include: storm water control benefits, permeable pavement, new and improved park spaces, adjustment of the light rail location to improve connectivity, new east-west and north-south roads, new plantings, coastal flood protection measures, riparian improvements and protected shorelines, improved waterfront access and areas, new inland wetland areas, new site for development within the study area, and multiple updates to community facilities, bike and pedestrian paths.

The City of Norfolk has developed a Watershed and Community Transformation Plan, which seeks to substantially improve several locations along the East Branch of the Elizabeth River. The project is partitioned into two components: modifications within the Ohio Creek Watershed and a large-scale renovation of the Newton Creek Watershed. While the overall strategy is the same – to use innovative storm water management to nurture healthy and resilient neighborhoods – the two project components require different tactics to achieve the same strategy given the unique characteristics of each area.

The Ohio Creek watershed contains two thriving neighborhoods, the historic Chesterfield Heights neighborhood and Grandy Village (home to 363 public housing units), both of which have a cohesive community personality and desire to remain intact. Thus, the water management tactics deployed in these neighborhoods must be integrated into the existing landscape while maintaining the character of place and the location of existing homes and road networks.

In contrast, the Newton's Creek watershed contains several areas that are ideal for a more comprehensive renewal. The South Brambleton neighborhood is a mix of industrial waterfront activities,

a few apartments, and many vacant lots. The Harbor Park area is an underutilized waterfront location that contains extensive gravel parking lots which function as infrequently used overflow parking for the Tides Ball Park. The St Paul's neighborhood is an isolated HUD housing development from the 1960's, which has reached the end of its design life and contains many aging apartment buildings in need of replacement. Thus, the tactics envisioned for the Newton's Creek watershed will take advantage of extensive areas that can be completely transformed to create an innovative water management foundation upon which a new, resilient community will be built.

The project will implement a comprehensive set of flood protection measures that will mitigate flood risk to affordable housing and critical systems (such as public transportation) in the target areas. Beyond flood protection, social and economic inequities will be addressed by connecting neighborhoods with each other and the downtown, which will promote economic revitalization and a sense of pride in the improved quality of life in the affected neighborhoods.

Increased accessibility and road elevations within the Ohio Creek Watershed will allow for adequate ingress and egress before and during storm events. Accessibility is critical for emergency services to be able to reach vulnerable populations, such as seniors or those with disabilities, who are more likely to need assistance. Within the Newton Creek Watershed, new roads paired with improved flood protections and critical facilities protections will allow for increased accessibility within the watershed's neighborhoods.

Resiliency value includes protection from the effects of future disasters, including flood, wind, fire, and earthquakes, with a reduction of expected property damages, reduction of expected casualties, the value of reduced displacement, or the reduced vulnerability of energy and water infrastructure to large-scale outages.

Norfolk Resiliency Metric 1: Measure the reduction in property damage and loss of service impacts after the next Presidentially-declared flood disaster in Norfolk. Use the “Losses Avoided Study” methodology to determine reduction in flood losses compared to previous similar flood events.

Baseline: Past flood losses, per incident

Change expected: Reduction in dollar value of flood damages

Method of measurement: Losses Avoided Study

Tracking period: Post project completion, post flood disaster

Because this metric cannot be implemented until after project completion, and until a flood event has occurred, Metric 2 is offered as a means of measuring resiliency in the interim.

Norfolk Resiliency Metric 2: Measure the reduced loss of service days for transit services and reduced number of road closures in the target areas.

Baseline: Annual past number of days that the Light Rail was out of service due to flooding in the target area; annual past number of incidents of road closures due to flooding in the target area

Change expected: Annual reduction in the number of days of lost Light Rail service; reduction on the number of incidents of road closures due to flooding in the target areas

Method of measurement: Counted number of days the Light Rail service had to be suspended for any length of time due to flooding in the target areas; counted number of road closure incidents due to flooding in the target areas

Tracking period: Annually

Norfolk Environmental Metric 1: Measure an increase in the land area of wetland and/or shoreline restoration projects

Baseline: Current number of acres of wetlands and shoreline restoration in the target areas

Change expected: An increase in the number of acres of wetlands and shoreline restoration in the target areas

Method of measurement: Counted area of increased wetlands or shoreline restoration once project is complete

Tracking period: Upon completion of project

Because this metric is a one-time count of increased environmental benefit, Metric 2 is offered as a long-term environmental value measurement.

Norfolk Environmental Metric 2: Percent of building permits issued for projects employing “Green” building techniques

Baseline: Percent of permits issued for green storm water management or building techniques issued in 2016 (percent based upon all construction permits issued by the City)

Change expected: A percentage increase in permits issued for green storm water management or building techniques issued in subsequent years (percent based upon all construction permits issued by the City)

Method of measurement: Counted number of permits issued for green storm water management or building techniques (tracked by City permit department)

Tracking period: Annually, beginning in 2016

Project goal: Reconnect the missing links in the transportation infrastructure of the St. Paul’s area, including improved connections at the perimeter and improved bicycle and transit access. Encourage connections of open green spaces throughout the City through the development of pedestrian and bicycle corridors. This metric also relates to the following comprehensive plan transportation metrics:

- Percent change in bicycle racks and storage areas
- Percent change in mileage of bicycle facilities (sharrows, delineated bike lanes, or multi-use trails).

Norfolk Social Metric 1: Identify and measure how many perimeter connections have been improved by the project. Measure increase in new linear feet of bicycle lanes or paths in the target area. Identify and measure number of new/ improved transit access points provided by the project.

Baseline: Current number of challenging or poor existing perimeter connections in the target area; current number of linear feet of bicycle lanes or paths in the target areas; current number of transit access points needing improvement in the target areas

Change expected: Fewer poor perimeter connections; increased number of linear feet of bicycle lanes or paths; fewer transit access points needing improvement in the target areas

Method of measurement: Counting numbers of perimeter connections and access points; counting linear feet of bicycle lanes or paths (tracked by City planning department)

Tracking period: Upon completion of project

Because this metric is a one-time count of increased social benefit, Metric 2 is offered as a long-term measurement of the social value of the project.

Norfolk Social Metric 2: Increase in the use of recreational, community gathering spaces and park space throughout the target area

Baseline: a) current acres of recreational and community open space in the target area, and b) current usage of these areas

Change expected: a) increase in the number of acres of recreational and community open space in the target area, and b) increase in identified usage of these types of areas by the community

Method of measurement: a) increased number of acres in the target area for recreational and community open space, and b) utilize existing data such as community requests for reservation of pavilion space, fees paid for use of recreational items/spaces in public areas (ice skates, basketball courts, tennis courts, etc.) and/or take inventory of numbers of users on specific days throughout the year (such as first and third Saturdays or counts on same holidays every year) (tracked by City parks department)

Tracking period: For measurement a) Upon completion of project, and for b) annually over project life.

Norfolk Economic Value Metric 1: Demonstrate decrease in numbers and amounts of flood insurance claims for properties in the target area

Baseline: Current FEMA NFIP records showing historic claims in the target areas

Change expected: Decrease in both numbers of flood claims and in amounts of flood damages claimed by insured owners in the target areas

Method of measurement: Comparison of annual FEMA records, which can be requested by the City's floodplain manager

Tracking period: Annually

Because many properties that have flooded in the target area have not been covered by a flood insurance policy, the above metric will only capture a glimpse of improvement in flooding. Therefore, a second Economic Value Metric is offered below.

Norfolk Economic Value Metric 2: Measure the increase in employment opportunities in the target areas over time after project completion.

Baseline: Current number of jobs located in businesses in areas to be protected from flooding by the project.

Change expected: Increase over time of number of jobs in businesses within the areas protected from flooding by the project (same area as described above)

Method of measurement: Count the number of jobs added each year in all areas to be protected from flooding by the project

Tracking period: Annually (tracked by the City's office of economic development)

Logical development from Phase 1 project framing

The City of Norfolk's increasing vulnerability to flooding disrupts regional transportation connectivity, and undermines commercial and military activities. Phase 2 project objectives are consistent with the Commonwealth's Phase 1 **THRIVE** approach. Innovative water management is the goal as well as the fundamental driver making other objectives possible. There is reluctance to invest in a region which floods with growing frequency. In this way, the recurrent flooding is seen as an underlying threat to

regional economic vitality.

An additional objective of the proposed activities is to demonstrate modern, green infrastructure methods for managing storm water management throughout the region and to promote a new paradigm about citizen involvement with storm water management. Once implemented in the Newton's Creek and Ohio Creek Watersheds, Norfolk intends to promote deployment of similar green infrastructure throughout the City.

The tactics proposed here are scalable and can be implemented across larger regions over time. Moreover, Norfolk hopes to change the way residents think about water management through the use of small, parcel scale storm water management techniques, which can be retrofitted into existing communities. Rather than thinking about flooding and water management as something imposed upon them, residents are provided with pragmatic examples of constructive actions they can take. They are encouraged to embrace self-reliance and involvement with water management. For communities like Norfolk to thrive as vibrant coastal places, residents need to participate in improving the city's resilience. The proposed projects will highlight the importance of citizen involvement in community resilience.

Current Risks. Norfolk is an older colonial city with some original historical infrastructure dating back to the 1800's. Infrastructure improvements were most recently performed in the 1950's due to rapid urbanization following World War II. The 1950's era infrastructure is currently approaching the end of its serviceable life and is due for upgrades. Early storm water system designs did not consider future development or tidal impacts.

The existing municipal storm sewer system is separate from the sewer system and is managed by the Norfolk Public Works Storm Water Division. The portions of the system designed before the 1950's were sized to accommodate a 2-year rainfall event, while the newer portions were designed to accommodate a 10-year rainfall event. Both the 2-year and 10-year rainfall magnitudes are below present day design standard for municipal storm water systems. Storm water in Harbor Park is managed by an underground

collection and conveyance pipe network that discharges storm water directly into the Elizabeth River or to a system of concrete lined ditches and culverts under the elevated section of Interstate 264. The concrete lined ditches discharge to a waterway near the Norfolk Southern railroad tracks.

Future Risks. Scientists predict global sea levels will rise two to four feet in the next 80 years. Relative sea level rise in Norfolk will be among the highest in the United States due to post-glaciation settling and compaction from groundwater withdrawals. Flooding will range from nuisance flooding due to high tides to severe flooding due to hurricanes and nor'easters.

The Virginia Institute of Marine Science and the Center for Coastal Resource Management presented a chart in 2013 showing that sea levels in Norfolk could rise more than 5 feet by the year 2080 (highest prediction levels.) Even now, the City is experiencing the highest rate of relative sea level rise on the East Coast, with a total of 14 inches since 1930. For the target areas, where nuisance flooding is experienced during even relatively mild rainfall, the disruptions to daily life and travel in the area are becoming more frequent and of longer duration. It appears that without intervention, this type of flooding will only increase in frequency, depth and duration.

The City presents their proposed projects as a solution to the flooding over the next 50 years, and as the way in which resilience can be achieved for residents, employers and employees in the target areas. For more specific information on the resiliency provided by the proposed projects, please see the Benefit-Cost Analysis Report.

Hurricane Irene revealed the social and economic vulnerabilities of several working class neighborhoods that are particularly vulnerable to flooding from storm surge. For Norfolk to become more resilient to natural disasters, the City must reduce flood risk, protect those most vulnerable to the impacts of disasters, and address environmental, social, and economic inequities. The water management approaches and development to be implemented, as part of this project, will work in concert to address flood vulnerabilities, enhance the health and wellbeing of residents, and stimulate economic growth. LMI

households will be protected, as well as critical infrastructure such as utilities and public transportation systems. The protection of such assets will cause less disruption to everyday life and allow vulnerable populations in the target areas to recover more quickly after disasters. Social benefits are quantified and qualified in the Benefit-Cost Analysis.

New green spaces and water park amenities, bicycle and walking paths, and mixed-use areas promote strong, connected, neighborhoods and encourage healthier lifestyles through the use of enhanced recreation spaces. Upgraded thoroughfares, designed to serve all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities, will be integrated with green infrastructure elements to manage storm water, improving the aesthetic quality and safety of the neighborhoods and roadways.

Economic equity and resilience can be achieved via broadening and diversifying the types of jobs, as well as the opportunities available. The project will enhance and protect the vitality of downtown, as infrastructure and amenity improvements provide flood protection and may stimulate economic revitalization. For example, the Harbor Park protection berm will be a landscaped promenade to promote the development of tourism, recreation, and commercial opportunities around existing attractions such as the minor league ball field. By mitigating flood risk, new investment and economic revitalization opportunities will be created, thereby making undeveloped parcels attractive to developers. Furthermore, desirable neighborhoods entice new businesses and industries. New businesses and commercial establishments will provide new sources of LMI jobs and spur economic growth in the target area.

To help alleviate the effects of sea level rise and the risks posed by more frequent and intense rain events and coastal storms such as Hurricane Irene, Norfolk prepared its “Coastal Resilience Strategy” outlining resources and preparation strategies for evacuation situations. For example, Norfolk has adopted a higher standard of three (3) feet above the 100-year estimated flood level for new construction located in the flood plain. Additionally, new construction within the 500-year flood zone requires the lowest floor (residential) or flood-proofed (non-residential) be one and a half (1.5) feet above the 500-year elevation.

Although regional and state coordination regarding resiliency commenced prior to Hurricane Irene (2011), following the storm the Hampton Roads region, and Norfolk in particular, increased the focus on resiliency. State and local resolutions were put into place regarding development of resiliency committees and activities. Further discussion of Norfolk's commitment to resiliency can be found in Section 5: Regional Coordination and Long-Term Commitment.

Meet a National Objective. The proposed activities fulfill the HUD-NDRC national objective of benefiting low- to moderate-income (LMI) persons, aiding in the prevention of slums or blight, and having a particular urgency. The projects will offer the qualified areas with protection from the effects of extreme weather and flood events, support the resiliency of families and businesses, and improve quality of life for the community. These benefits include the introduction of risk reduction and environmental resilience amenities, creation of mixed-use, mixed-income environments, and greater economic and social opportunities for residents.

Establish a Tie-Back. The tie-back to the qualifying disaster is established by the extent of the damages in Norfolk's target area. The proposed project will support investments in social, economic, and environmental quality of life by significantly reducing or eliminating flood damage risk, preserving affordable housing units, revitalizing the economy, and increasing resilience against extreme flood events within the target area. Further damages demonstrating tie-back to the qualifying disaster are described in the Benefit-Cost Analysis.

Vulnerable populations within the target area suffer during and following extreme flooding events, such as Hurricane Irene. Winds from storms take down power lines, limiting or eliminating electricity to homes and businesses. In addition, residents often rely heavily on public transportation which may be unavailable, such as the Light Rail running through the target area. The inability to travel to work may result in lost income. Following a storm, schools may also be closed, requiring residents to care for children during school hours.

In addition to lost income, damages from flood events can pose significant financial burdens to rebuild or repair damaged homes. In Norfolk, many LMI residents within the target area do not have flood insurance, due to either a lack of financial resources or that a majority of residents rent their properties, and not required to purchase flood insurance. Without insurance financing or grants from organizations such as HUD, residents are unable to resiliently repair properties following flood events.

Benefit Cost Analysis

A comprehensive benefit-cost analysis (BCA) of the proposed projects was prepared by the City of Norfolk. The BCA considered losses to structures, households and businesses in the target area, as well as social, environmental and economic benefits that would accrue locally and regionally once the project is complete. Results of the BCA indicate that the proposed activity offers tangible benefits to the local communities, the region, and the nation as a whole. These benefits use a conservative approach including fifty years of projected maintenance and operations costs.

Consistency with Other Planning Documents

City of Norfolk’s 2012-2016 Consolidated Plan

Efforts to Enhance Coordination to the Department of Economic Development Strategy Response:

The City of Norfolk, through its Department of Economic Development, works with a number of partners to attract new businesses and to strengthen existing businesses in the City of Norfolk area. The office works with local community leaders to find ways to develop growth and address challenges and opportunities. The City of Norfolk also coordinates and integrates development of a mix of neighborhood businesses that serve residents such as:

- Encourage site improvements for non-housing activities for commercial and industrial projects;
- Preserve the unique historic character of City of Norfolk;
- Institute sustainable green building standards and environmental design for homes and businesses;

- Expand neighborhood businesses that are convenient and safe for residents and visitors to easily access and enjoy;
- City government that is more responsive to the needs of the neighborhood.

Efforts to Co-ordinate its Housing Strategy for Residents of Affordable Housing to Public

Transportation Response: The City of Norfolk works with partners and city neighbors to enhance the aesthetics of the area by improving sidewalks and road infrastructure to create a safe and friendly environment for pedestrians, motorists and bicyclists. The city strives to improve its transportation goals through the following actions:

- Create safe connections for walking and bicycling between residences, parks, and cultural activities;
- Create a pedestrian safe and friendly environment;
- Improve safety and mobility along neighborhood streets and to downtown;
- Beautify the area to add upon and reflect the character of the area;
- Reduce flooding in the neighborhood through maintenance of the drainage system.

The proposed project accomplishes these goals by

- Reducing flooding and its impacts in the overall target area including historic streets, buildings, and sites (more resilient recovery and sustainable long-term quality of community life, safer and less mold-prone structures, less disruption of daily life/business, protection of historic assets and overall improved emergency response and mental health post-disaster)
- Adding new or enhanced community spaces for recreation, cultural activities and community gathering events (promoting social cohesion and neighborhood pride of place, opportunities for healthier lifestyles, increased desirability of neighborhood for business, area beautification)
- Adding new or enhanced commercial space (economic revitalization and additional jobs for LMI households)

- Adding new and greater connectivity between neighborhoods and the downtown area through the realignment and elevation of roadways, redevelopment of streets with green storm water infrastructure and the addition of new bicycle and walking paths (which promote social and economic equality, increased property values, safer/improved access to a wider area of the region, enhanced attraction for commercial opportunities)
- Improving overall drainage in the target area (providing a foundation for future best practice development such as mixed use buildings and mixed income housing, innovative commercial enterprises and a long-term sense of community health)

2011 Southside Hampton Roads Hazard Mitigation Plan

2011 Regional goals and objectives:

Goal 1: Protect critical facilities and infrastructure, including bridges, utilities, and evacuation routes, from high risk hazards.

Goal 3: Protect property, including neighborhoods, homes and businesses.

Objective 3.1: Focus efforts on repetitive flood loss protection.

Goal 5: Identify opportunities to implement green, environmentally-friendly and energy-efficient technologies as part of the mitigation strategy.

The proposed project is consistent with these regional goals as it protects critical facilities in the target area, including the Light Rail system, sewage pump stations, three elementary schools, the City Hall complex, the Norfolk Courthouse, a sheriff's office, a post office and a fire station from flood risk (Goal 1). The project also protects property and neighborhoods from flood risk due to high tides, heavy precipitation and coastal or riverine storm surge (Goal 3). Finally, the proposed project identifies opportunities to implement green and environmentally-friendly technologies as part of the mitigation strategy in the form of green storm water management techniques (green street enhancements), restoration

of portions of the Elizabeth River shoreline and re-creation of portions of the historic Newton Creek, and improvement of storm water quality entering the Chesapeake Bay (Goal 5).

The City of Norfolk also has a separate section in the mitigation plan for their proposed activities.

The three city mitigation measures consistent with the Phase 2 NDRC proposed project are:

Norfolk Mitigation Action No. 1: Maintain and protect the city's beaches and shorelines.

The proposed action restores portions of the Elizabeth River shoreline by increasing wetland habitat areas in the Ohio Creek watershed that drains into the river, and by environmentally integrating flood protection measures with ongoing offshore marsh restoration activities conducted by the Elizabeth River project.

Norfolk Mitigation Action No. 8: Continue to implement capital improvements that improve storm water management and control flooding, especially for undersized and out-of-date drainage systems and patterns.

The NDRC proposed project addresses the existing storm water drainage systems in the target area and seeks to improve storm water storage capacity by upgrading the surge protection and storm water conveyance system, along this reach of the river, in order to address flooding of the vulnerable communities and to fortify the overall flood protection system.

Norfolk Mitigation Action No. 9: Identify and improve critical facilities and infrastructure to minimize flood and wind damage, specifically targeting schools, EOC and emergency shelters. Mitigate flood damage for three local hospitals through flood proofing and/or elevation.

In the target area, the following critical facilities will be protected against the 100-year flood by the proposed project: the Light Rail system, sewage pump stations, three elementary schools, the city hall complex, the Norfolk Courthouse, a sheriff's office, a post office and a fire station.

City of Chesapeake

The unmet recovery need for residents who suffered damages from Hurricane Irene were calculated

in Phase 1 on survey results that showed damaged homes have not incorporated resilient measures, such as house elevation, to mitigate similar future damage. In Phase 2 Chesapeake’s proposed projects take a holistic and regional approach to our MID-URN area, considering the risks of flooding from hurricanes, nor’easters and nuisance flooding; the future flooding predictions resulting from sea-level rise and land subsidence; and the risks of hazardous spills and volatile chemicals and elements.

The City of Chesapeake’s 2035 Comprehensive Plan places great emphasis on economic vitality throughout the City and expanded economic opportunities for all citizens. Specific goals and action strategies include expanding the inventory of commercially zoned property and meeting the infrastructure and technology needs of its businesses and citizens. The activities proposed under the City’s NDRC grant application would help to meet these goals by improving access to commercial areas through elevating portions of Bainbridge Boulevard and Freeman Avenue overpass, particularly to the vital Money Point industrial area. Similarly, the environmental improvement projects in South Hill, Mains Creek and Fernwood Farms would facilitate efforts by property owners to protect their investment and prevent economic instability and disruption due to recovery from floods and other related natural disasters.

Based on data previously provided (Need and Extent of the Problem), Chesapeake is proposing a combination of resilient recovery projects:

Tidal Flooded Community Voluntary Buyout Assistance Fund And Micro Mitigation Projects for Added Resiliency for Flood Loss Properties

Project Description

Voluntary buyout programs in two of the city’s most flood prone neighborhoods (Crest Harbor (Mains Creek) and Fernwood Farms), coupled with a micro-mitigation program to offer homeowners help in retrofitting homes for greater protection against flood in the city’s repetitive flood loss areas.

Chesapeake has several low-lying neighborhoods along the Southern Branch of the Elizabeth River (a tributary of the Chesapeake Bay) that experience tidal flooding. Many of these communities have houses

and roads ranging in elevations of 3 to 6, well under elevation 8 (the 100 year base flood elevation). They include a number of repetitive flood properties. This project includes the property acquisition of the most vulnerable areas in Chesapeake namely Crest Harbor area (also known as Mains Creek area, an LMI area) and the Fernwood Farms subdivision, both neighborhoods are located within the MID-URN target area.

The project also includes the demolition of all homes acquired (to get people out of harm's way), the utilization of this area for wetlands restoration to enhance environmental benefits for the surrounding areas including the attenuation and treatment of the storm water flow before discharging to the shorelines of the Elizabeth River (located within the Chesapeake bay watershed).

In tidal flooded neighborhoods many homeowners are taking part in FEMA mitigation grant opportunities. Unfortunately some homeowners are unable to participate, unable to obtain flood insurance, unable to maintain the property and subsequently are foreclosed upon by the bank, sold for back taxes or the property is abandoned. This project would include purchasing distressed, blighted, or foreclosed properties to convert the property to green space for perpetuity. Removing the damaged, properties that have unmet recovery needs will remove blighted properties and stabilize the remaining homes' values.

For those homeowners who do not want to sell, we will offer micro-mitigation opportunities. The city would procure contracts for micro-mitigation projects to protect the more expensive necessities in their home (electrical panel box, HVAC system, water heat, and washer/dryer). This includes installation of flood vents in the foundation to relieve hydrostatic pressure on foundation walls during a flood event and allow for the automatic entry and exit of floodwaters without human intervention so the floodwaters can flow through without damaging the home.

Integral to the voluntary buyout and/or micro-mitigation project is a conceptualized living shoreline project located within each of the two communities in the areas where residents have participated in the voluntary buyout. The proposed 7.88-acre Fernwood Farms Living Shoreline project will be located at or

near the terminus of Shore Side Road and Fernwood Farms Road, directly contiguous to the Southern Branch of the Elizabeth River.

The living shoreline project to be located within the Mains Creek neighborhood community will be a 10-acre project located near an area just south of Mains Creek Road and Malbon Drive, and contiguous to Mains Creek. The project sites will have access to navigable waters within the Elizabeth River; therefore, in addition to providing critical living shoreline ecosystem services, the sites will provide extensive recreational components for the community's enjoyment. The project sites will be graded landward from the water's edge to accommodate various zones of intertidal emergent plants and riparian shrubs/trees. The elevations of the project sites will accommodate sea level rise.

Additional improvements include observation platforms, wooden walkways, and interpretive signs constructed on site to provide community education. An ADA kayak launch and fishing pier will be installed at the southern seaward edge of the Fernwood Farms living shoreline project site, providing non-motorized access and fishing within the Elizabeth River. A second ADA kayak launch will be installed along the southwestern edge of the Mains Creek living shoreline site, providing non-motorized access to Mains Creek.

Prior to project implementation, all necessary local, state and federal permitting will be secured from the Virginia Marine Resources Commission (VMRC), US Army Corps of Engineers (Corps), and Virginia Department of Environmental Quality (DEQ).

Alternative(s) Considered

The city evaluated the construction of floodwalls and tide gates but concluded that these projects provide only partial protection and will be costly with many environmental concerns (wetlands and stream impacts). Also, the voluntary buyout project addresses the future problem of sea level rise and land subsidence by getting people out of harm's way in a 50 to 100 year flood scenario, and for perpetuity, as the property will be returned to green space and living shore lines.

Benefit to Vulnerable Populations

Removing people from this area will remove their risks of, and cost associated with, recurrent flooding, and the properties will be returned to green space for perpetuity. LMI residents who have not previously had affordable options will be able to relocate to safer areas, improving their economic, environmental, and social resiliency. Using the area for wetlands restoration afterwards will enhance environmental benefits for surrounding areas including attenuation and treatment of storm water flow before it is discharged to the Elizabeth River’s shores (within the Chesapeake Bay watershed).

Metrics

The proposed metrics that will be used to track and evaluate the success of the *Tidal Flooded Community Voluntary Buyout Assistance Fund and Micro Mitigation Projects for Added Resiliency for Flood Loss Properties Propose* include:

Resilience: The metric will be “value of protection from the effects of future/repeat disasters from flooding,” and “reduction of expected property damages due to future/repeat disasters.”

Environmental: Ecosystem and bio diversity effects (e.g. from wetlands restoration or

Social: Benefit to LMI persons and/or households and improved living environment.

Economic Revitalization: Direct effects on the economy (The City of Chesapeake supports and will take advantage of the regional Resilience Lab-Business Accelerator to be located in Norfolk for the creation of water-management job innovation and training, and this project will also lead to the creation of jobs in the environmental component).

Project Eligibility and National Objective

This project is located in Chesapeake’s HUD-NDRC approved MID-URN target area and is eligible. It meets a HUD national objective of assisting low- and moderate-income area, eliminates blight (houses abandoned or in disrepair due to unmet recovery needs due to flood damage, and meets community development needs, as existing conditions of abandoned and blighted property pose a serious and

immediate threat to the health or welfare of the community. Other financial resources are not available.

The Bainbridge Blvd. Corridor Projects: Freeman Ave Overpass; Bainbridge Boulevard Road Elevation; Voluntary Relocation of South Hill Community project.

This project consists of a combination of actions for a north-south road corridor that is a major business and evacuation route (Bainbridge Blvd.) for the populations in the MID-URN area, and which pre-dates modern, safe and more resilient building codes.

One component of the project is the elevation of Bainbridge Blvd., which regularly encounters regular tidal flooding, endangering the population in the neighborhoods of Rivercrest and South Norfolk, inhibiting their ability to safely travel to work, school, and other daily requirements, prohibits their ability to safely evacuate, and inhibits first responders ability to respond along the approximately five-mile corridor. Bainbridge Blvd. is a major north south corridor and serves as an emergency evacuation route. This roadway was built around the 1940s and roadway elevations range from 3 to 6 (above mean sea level). A significant portion of Bainbridge Blvd. and surrounding areas are within the 100-year floodplain and is impacted by tidal flooding even during small events throughout the year. Critically, Bainbridge Blvd. connects residents to bridges for evacuation purposes, and it is important to note that the region's tunnels close in advance of major storm events.

The Bainbridge Blvd. roadway elevation project will elevate the road to above the current 100 year base flood elevation of 8 and project design will look into further elevation to address sea level rise for the next 100 years. In addition to protecting the boulevard from flooding, the elevated road will effectively serve as a berm to prevent flooding of homes along the corridor.

The elevation project includes a road diet concept in order to convert the road surface from a four-lane roadway to a three-lane road to allow for the addition of bike lanes within the current pavement width. Other major infrastructure improvements along this road include major utility work, such as the utility undergrounding of significant number of poles and overhead lines providing power and

communication services in this area. The city also has current plans to replace and upgrade waterlines, sanitary sewer and storm water facilities. The proposed work along and directly off Bainbridge Blvd. will support the resiliency project being introduced here and provide this community with the community resiliency needed to address current and future threats.

Integral to the Bainbridge Blvd. elevations are two living shorelines: one at the intersection of Bainbridge Blvd. and Burrow Ave., within the Portlock area of South Norfolk; the second at along Lakeside Park, a city-owned community park located off of Bainbridge Blvd., located in the South Norfolk community and directly connecting to Scuffeltown Creek.

At the Bainbridge Blvd. and Burrow Ave living shoreline, Chesapeake will construct approximately 0.46 acres of living shoreline from a city-owned property. The project site is directly adjacent to Milldam Creek, which is a tidal tributary to the Southern Branch of the Elizabeth River. Much of these shoreline areas within South Norfolk have been historically filled; therefore, the city anticipates removing some fill from this area that may have the potential to leach contaminants into the groundwater and local waterway. The Lakeside Park living shoreline project will be 0.21 acres of living shoreline and located directly adjacent to Truitt Middle School. The project sites will be graded landward from the water's edge to accommodate various zones of intertidal and brackish emergent plants and riparian shrubs/trees. The elevations of the project site will accommodate sea level rise.

Observation platforms, wooden walkways, and interpretive signs will be constructed on the sites to provide community education. Furthermore, due to the proximity of the Lakeside Park living shoreline site to Truitt Middle School, the project site will incorporate a teaching marsh with wooden walkways connecting to the school property and interpretive signs for the students. The proposed bike and pedestrian path along Bainbridge Blvd. would integrate into these living shoreline sites thus providing a resilient urban habitat that gives connectivity between the living shoreline and the local community.

Prior to project implementation, all necessary local, state and federal permitting will be secured from

the Virginia Marine Resources Commission (VMRC), US Army Corps of Engineers (Corps), and Virginia Department of Environmental Quality (DEQ).

The second component for the Bainbridge Blvd. corridor project is the construction of a roadway overpass along Freeman Avenue that would eliminate the existing at grade railroad crossing of the Norfolk Portsmouth Belt Line (NPBL) railroad. Currently, Freeman Avenue offers the only roadway into the Money Point industrial area, which also serves as a residential area. When this railroad crossing is blocked due to railroad operations, there can be serious impediments for residents traveling to work and first-responder access to the area.

Integrated into the Freeman Ave. project are two bio-filtration management facilities, located within the industrial area of Money Point. Individual bio-filtration areas can serve highly impervious drainage areas less than two acres in size. Surface non-point source storm water runoff is directed into a shallow landscaped depression that incorporates many of the pollutant removal mechanisms that operate in a natural forested or wetland ecosystem. The primary component of a bio-filtration practice is the filter bed, which has a mixture of sand, soil, and organic material as the filtering media with a surface mulch layer. During storm events, runoff temporarily ponds six to twelve inches above the mulch layer and then rapidly filters through the media bed.

Bio-filtration facilities provide excellent runoff reduction, filtration, biological uptake, microbial activity, and provide high pollutant removal. According to the Virginia Department of Conservation and Recreation (DCR), bio-filtration methods can provide annual runoff volume reduction of 40 percent, total phosphorus reduction of 25 percent and total nitrogen reduction of 40 percent.

The innovative Buckeye Storm Water Bio-filtration storm water management facility is located within a highly industrial area of Money Point. The site is currently owned by Buckeye Terminals, LLC, but the City of Chesapeake has received a letter of partnership from Buckeye to provide in-kind donation of the land for the project. The 0.74-acre storm water bio-filtration facility will be located adjacent to

Buckeye Terminals, and pre-treated storm water runoff from the site will discharge across intertidal wetlands into the Southern Branch of the Elizabeth River. The Buckeye project site currently collects non-point source storm water runoff from a petroleum tank farm through the Buckeye Terminals' oil/water separator in addition to storm water sheet flow from Colton Drive. The project site is currently undeveloped, and Buckeye Terminals has no planned use for the property.

The second storm water bio-filtration storm water management facility will be located at the intersection of Freeman Avenue and Felton Street, within the highly industrialized area of Money Point. The 0.79-acre bio-filtration facility will provide storm water management for Chesapeake's Freeman Ave. overpass project, as well as providing pre-treatment to non-point source storm water runoff from Freeman Ave.

The storm water bio-filtration facilities will utilize existing topography to create a storm water bio-filtration cell and forebay area to facilitate operations and maintenance. The forebay areas will provide initial treatment and storage of storm water in a location that is easily accessible for maintenance. Storm water will then flow into the bio-filtration cells. The bio-filtration cells will be prepared by removing the existing surface and portions of the subsurface materials and installing of a mixture of sand, topsoil, and compost (i.e., soil media). The bio-filtration cells will be covered with hardwood mulch and planted with a variety of hardwood species. A denser than typical planting of the trees and use of larger stock will aid in the uptake of priority pollutants. The Buckeye project will also include a maintained clear zone along the fence line around the entire site for both security and invasive species control.

The Freeman Ave. bio-filtration storm water management facility will incorporate an underdrain system and infiltration sump. The filtered runoff will be collected within the underdrain system and returned to the storm drain system, and the infiltration sump will help recharge the groundwater. The underdrain consists of a perforated pipe in a gravel layer installed along the bottom of the filter bed. The infiltration sump is also designed to provide extra storage for larger storm events.

The third component of the Bainbridge Blvd. corridor project is a voluntary buyout for a blighted residential area in South Norfolk. South Hill, a 15.91-acre site encompassing 38 residences within an area zoned M-2 Heavy Industrial. South Hill encountered a chemical fertilizer spill in 2008 that created hardship on all South Hill residents as they encountered mandatory evacuations, cleanup, and damages to their property. Therefore, in the Freeman Ave. overpass and South Hill voluntary buyout projects, Chesapeake is addressing the additional risks of hazardous spills and volatile materials, which is created by threat of volatile materials in the nearby Money Point rail yard area.

The City of Chesapeake worked closely with the Commonwealth of Virginia, and pursued amending regulation of non-petroleum storage tanks, as well as providing emergency pedestrian egress on to I-464. While these measures will help mitigate the risk to the South Hill Community, they do not address in the incompatibility of the land uses and resulting risks to life and property.

Benefit to Vulnerable Populations

For the voluntary buyout program, removing people from this area will remove them from the risks of, and cost associated with, flooding and hazardous spills and volatile materials and will return the property to green space for perpetuity. It will allow populations in LMI and outlying areas to relocate to safer areas, improving their economic, environmental, and social resiliency and fulfilling the HUD national objective of benefitting low-and-moderate income persons as well as preventing or eliminating blight. Lastly it meets HUD's objective of other urgent community development needs because existing conditions pose a serious and immediate threat to the health or welfare of the community, and other financial resources are not available.

The Bainbridge Blvd. elevation benefits low- and moderate-income persons by protecting their property from flooding and by providing an evacuation route. It also meets other urgent community development needs because existing conditions pose a serious and immediate threat to the health or welfare of the community (by protecting their property from flooding and by providing an evacuation

route) and other financial resources are not available.

The Freeman Avenue overpass project will eliminate the at-grade rail crossing; therefore, all vehicular delay (passenger car and truck) associated with the train crossing will be eliminated, which will in turn reduce fuel use and greenhouse gas emissions. Thus improve air quality by reducing the release of criteria pollutants into the atmosphere such as nitrogen dioxide (NO₂), ozone (O₃), and sulfur dioxide (SO₂). The co-benefits of less priority pollutant emissions are reduced asthma related health complications with fewer patient visits to physicians and better quality of life for the surrounding community. Therefore, the HUD objectives meet are benefits low- and moderate-income persons and meets other urgent community development needs because existing conditions pose a serious and immediate threat to the health or welfare of the community, and other financial resources are not available.

The living shorelines and the bio-filtration systems meet HUD’s objective of benefits low-and-moderate income persons.

Metrics

The metrics to track and evaluate the success of the *Bainbridge Blvd. Corridor Projects: Freeman Ave Overpass; Bainbridge Boulevard Road Elevation; Voluntary Relocation of South Hill Community* project include:

Resilience Metrics:

- The metric for the Freeman Ave. overpass will be the value of protection from the effects of future/repeat disasters from flooding, hazardous spills and effects of volatile substances; Reduced vulnerability of infrastructure (road and public utilities).
- The metric for the Bainbridge Blvd. road elevation will be reduced vulnerability of infrastructure.
- The metric for the voluntary relocation of South Hill Community buyout program will be value of protection from the effects of future/repeat disasters from flooding or other disaster and reduction of

expected property damages due to future/repeat disasters.

- The metric for the living shorelines and bio-filtration will be value of protection from the effects of future/repeat floods.

Environmental Metrics:

- The metric for Freeman Ave. overpass will be air quality due to less wait time from railroad crossing blocking.
- The metric for Bainbridge Blvd. road elevation will be water quality – reduced storm water runoff (from less flood waters, living shorelines and bio-filtration and Chesapeake’s capital improvements).
- The metric for the South Hill voluntary buyout program Ecosystem and bio diversity effects (e.g. from wetlands restoration or reforestation).
- The metric for the living shorelines and bio-filtration system will be the buyout programs and the living shorelines and bio-filtration system will be: Ecosystem and bio diversity effects (e.g. from wetlands restoration or reforestation); Water quality: reduced storm water runoff

Social Metric:

- The metric for Freeman Ave. overpass will be benefits to low- and moderate-income persons and/or households and improved living environment.
- The metric for Bainbridge Blvd. road elevation will be benefits low- and moderate-income persons and/or households and equal access to resilient community assets.
- The metric for the South Hill voluntary buyout program will be benefits to low- and moderate-income persons and/or households and improved living environment (elimination of slum and blight conditions),
- The metric for the living shorelines and bio-filtration system benefits low- and moderate-income persons and/or households; Improved living environment (improve recreational value)

Economic Revitalization Metric:

- The metric for Freeman Ave. overpass will be direct effects on local or regional economy net of opportunity costs.
- The metric for Bainbridge Blvd. road elevation the value of property other than through enhanced flood protection, independent of increases in property value captured by other benefits in the BCA or that might otherwise have occurred without the proposed project.
- The metric for the South Hill voluntary buyout program will be the value of property other than through enhanced flood protection, independent of increases in property value captured by other benefits in the BCA or that might otherwise have occurred without the proposed project.
- The metric for the living shorelines and bio-filtration system will be the value of property other than through enhanced flood protection, independent of increases in property value captured by other benefits in the BCA or that might otherwise have occurred without the proposed project.

Resiliency Awareness Program and Neighborhood Alert and Tidal Flooding Evacuation Zone.

The city will work with the Hampton Roads Planning District Commission and other cities in the Hampton Roads region to engage residents in a continual conversation regarding solutions for a more resilient region, focusing on the Commonwealth’s **THRIVE** concept and actions; encouraging the connectivity to the water with a proactive message of the paradigm shift from merely responding to disaster to planning resiliency with and economic vibrancy from the Chesapeake Bay and Elizabeth River Watershed. Community coalitions will be used to assist in changing the paradigm shift from merely responding to disaster to planning resiliency for the city’s threats and risks, and planning resiliency before disaster strikes.

In mandatory tidal flooding evacuation zones, this project will create an educational and alert program to identify the zones to its residents and educate them about their responsibilities in the event of a declared evacuation. The program may include signage designating the areas (special zone signage on street name sign posts), public outreach through various forms of media, targeted educational materials,

and enrollment in Alert and reverse 911 systems. For those living in areas subject to chemical spills and danger from industrial/residential mixed zoning, information will be distributed that is customized to their situation.

Benefit to Vulnerable Populations

The *Resiliency Awareness Program and Neighborhood Alert and Tidal Flooding Evacuation Zone* program responds to and addresses our Unmet Recovery Need and the framed recovery issues as updated from Phase 1 by engaging residents in a continual conversation of implementable solutions for a more resilient region, focusing on the Commonwealth's *THRIVE* concept and actions, encouraging the connectivity to the water with a proactive message of the paradigm shift from merely responding to disaster to planning resiliency with and economic vibrancy from the Chesapeake Bay and Elizabeth River Watershed. Community coalitions will be used to assist in changing the paradigm from merely responding to disaster to planning resiliency for the city's threats and risks, and planning resiliency before disaster strikes. Chesapeake will engage citizens in planning for more resilient efforts rather than planning for response and recovery.

Metrics

The resilience metric will be reduction of expected property damages due to future/repeat disasters.

The social metric will be benefits low- and moderate-income persons and/or households.

Section 3 Residents and Businesses

The City of Chesapeake will contract with Chesapeake Redevelopment and Housing Authority (CRHA) for assistance in post-award grant management. CRHA has a policy that incorporates Section 3 in its existing Procurement Policy and adopted a Section 3 Contracting Policy and Procedure to be included in all procurements generated for use with HUD funding. This policy and procedure contains goal requirements for awarding contracts to Section 3 Business Concerns.

All contractors/businesses seeking Section 3 preference may before submitting bids/proposals to CRHA be required to complete certifications as appropriate, as acknowledgement of the Section 3 contracting and employment provisions required by this section. Such certifications shall be adequately supported with appropriate documentation as referenced in the form.

The existing CRHA Procurement Policy also contains goal requirements for awarding contracts to Small Disadvantaged Businesses, formerly Minority and Women Business Enterprises. It is the policy of CRHA to utilize residents and other Section 3 eligible persons and businesses in contracts partially or wholly funded with monies from the Department of Housing and Urban Development (HUD). CRHA has established employment and training goals that contractors and subcontractors should meet in order to comply with Section 3 requirements. (Reference 24 CFR 135.30 – Numerical goal for meeting the greatest extent feasible requirement). The numerical goal is thirty percent (30%) of the aggregate number of new hires in any fiscal year.

It is the responsibility of contractors, vendors and suppliers to implement progressive efforts to attain Section 3 compliance. Any contractor that does not meet the Section 3 numerical goals must demonstrate why meeting the goals were not feasible. All contractors submitting bids or proposals to CRHA are required to certify that they comply with the requirements of Section 3.

Model for Other Communities

Chesapeake’s projects are models for others, and scalable and replicable. The model combines infrastructure and environmental engineering with a voluntary buyout program that will be conducted using a model used locally with HUD and FEMA grant funding. It is scalable because each of the components can be accomplished independently of the other, or together, depending on funding. It is replicable because infrastructure projects and environmental projects are done nationwide and as a part of localities capital improvements.

Consistency With Other Planning Documents

The proposed projects have been developed with input from the areas’ citizens, and are also guided by plans and data presented in Chesapeake’s *2014 Consolidated Plan*, *2014 Hazard Mitigation Plan*, and *2014 Neighborhood Quality of Life Study Update*. Together, these plans and assessments “talk to each other,” ultimately increasing resiliency in physical, environmental, social, and economic dimensions.

City of Newport News

Newport News is proposing two projects to be located in the target area, the Southeast Neighborhood Improvements Project and the Newmarket Creek Watershed Project.

Southeast Neighborhood Improvements Project

Project Description

Proposed projects in the Southeast neighborhood are designed to enhance and stabilize shorelines and roadway embankments along Chesapeake Ave, and reduce the impact and risk of flooding to private and public properties. It will increase water quality by implementing dredging and stream restoration projects, and minimizing erosion and sediment transport. It will improve the neighborhood’s resilience and sustainability by improving the safety and appearance of the neighborhood, attracting recreational, as well as commuter pedestrians and cyclists, in order to improve the quality of life for citizens. Further, the improvements will improve the neighborhood’s access throughout the city to create a more sustainable and safe pedestrian atmosphere. Descriptions of the proposed projects are below:

- **Chesapeake Avenue Seawall Stabilization:** The seawall is approximately 3,550 lf in length. It extends from Monitor Merrimac Overlook Park to the south of Hampton/Newport News city limits. The seawall protects the shoreline adjacent to Chesapeake Avenue from Hampton Roads body of water. The water body has semidiurnal tides with fluctuations of 2 to 3 feet between high and low tides. It is not known when the original Chesapeake Ave seawall was constructed. In 1984, the original stone rip-rip was covered with a layer of concreted reinforced with wire-mesh.

In September of 2003, hurricane Isabel destroyed a 540 lf section of the seawall. The damaged section was removed and replaced in 2004 at an approximate cost of \$1,000,000.00

- Chesapeake Avenue Bike Trail and Sidewalk: The city is planning on constructing a separated bike path and a sidewalk along the shoreline of Chesapeake Avenue. The bike trail and sidewalk of 0.64 miles will improve the safety of the cyclists and pedestrians by removing them from interfering with the 1,694 vehicles per day traveling along Chesapeake Ave.
- 16th Street Tide Gate and Pump Station: Installation of a tide gate and pumping station to control the back flow of water from Hampton Roads Bay into Salters Creek before, during and after storm events to reduce the numbers of properties affected by flooding in the drainage basin. A secondary benefit will allow better control of storm flow in Salters Creek.
- Hampton Avenue Channel Improvements and Constructed Wetlands: Restoration and stabilization of an existing open drainage channel along an existing city right-of-way. Improvements range from hard and soft stabilization, such as stone riprap, channel benching, wetlands vegetation, and adding bends to the channel flow. Replacement of the culverts under Buxton, Poplar, and Maple Avenues will be included with the overall project. Project also includes the construction of tidal wetlands as part of the channel improvements, and constructed wetlands as water quality BMPs for TMDL credits.

The new channel will provide improved flow of storm water runoff as well as flood control in the area. Area will become more aesthetically pleasing and reduce nuisances of undesirable animal life. An additional benefit with the BMP and a natural channel design is the reduction of pollutants such as sediment, nitrogen, and phosphorus from entering the Chesapeake Bay.

Replacing the culvert increases the stability and lifespan of the structure, which will reduce the cost for maintenance and repair. The length of the channel is approximately 1300 LF.

- **Salter Creek Stream Restoration:** Restoration and stabilization of an existing open drainage channel along an existing city right-of-way. Improvements range from hard and soft stabilization, such as stone riprap, channel benching, wetlands vegetation, and adding bends to the channel flow. The new channel will provide improved flow of storm water runoff. Area will become more aesthetically pleasing and reduce nuisances of undesirable animal life. An additional benefit with the BMP and a natural channel design is the reduction of pollutants such as sediment, nitrogen, and phosphorus from entering the Chesapeake Bay. The length of the channel is approximately 1400 LF.
- **Flood Assistance Program:** The City Council established a Flood Assistance Program in July 1999. This program is funded annually in the city's storm water operating budget at \$200,000.00 for voluntarily acquiring properties located at the city's lowest lying areas with a goal of reducing or eliminating losses, reducing flood insurance costs and restoring wetlands.

Alternatives Considered

For the Southeast Neighborhood project several alternatives were reviewed by the Engineering Department that could have reduced overall disaster recovery needs in the impacted area. All the alternatives will have an effect in reducing recovery needs in the impacted area, but combining several or constructing all will have the greatest outcome for reduction. Alternatives considered include:

- **Alternative 1;** replace approximately 3000 linear feet of existing seawall with an improved cross-section of material to better protect the existing roadway, utilities, and properties adjacent to the wall. The city previously repaired seawall from an earlier natural disaster.
- **Alternative 2;** installation of a bike trail and sidewalk along Chesapeake Avenue. Amenity will provide safety for bicyclists and pedestrians to travel along a street that runs between Hampton and Newport News and is a vista for the Hampton Roads Bay.

- Alternative 3; drainage system along a tributary of Salters Creek floods due to tidal action and storm water runoff as well as within the current floodplain. The city right-of-way and several properties acquired through the Flood Assistance Program are being utilized to create tidal and runoff storage, wetlands, and channel improvements to minimize flooding of surrounding properties.
- Alternative 4; provide a natural channel design for a portion of Salters Creek to enhance the current natural aesthetics of the area as well as provide positive drainage for existing systems discharging to the channel. New stream channel will reduce backflow into existing systems causing flooding of roadways and properties. Soft armament will augment the natural state of Salters Creek.
- Alternative 5; installation of a tide-gate and pump station along Salters Creek to protect upstream properties. The city hired a consultant to assess the possibility of a tide gate and pump station on the creek; determined project was too costly without other funding sources. Project would reduce the number of structures affected by storm surges and significant rainfall events.
- Alternative 6; additional funding and outreach for city's Flood Assistance Program (FAP). Attract more homeowners to consider and enroll in program and provide additional areas for city projects or creating natural environment within an urban community.

Benefits to Vulnerable Populations

The Southeast Neighborhood component improvements will create coastal resilience by improving stability of shorelines along the roadway, reduce neighborhood flooding through construction of stream restorations and wetland areas and tide gate and pump station construction. These actions strengthen appearance, quality of life and safety attributes of the area by providing more protected shorelines, sidewalks and a bike trail.

The City of Newport News uses the same or similar techniques in other areas of the city for stream and channel restoration. The same design techniques of seawall replacement were used for replacing the portion of the Chesapeake Avenue Seawall that was damaged by Hurricane Isabel. Similarly impacted cities and counties in Virginia could also use these techniques. In addition, a tributary of Salter's Creek extends upstream into the City of Hampton. Stream restoration benefits such as flood control and water quality can be beneficial to Hampton. The expected life of the project is 25-50 years.

Metrics

Resiliency Metric: Seawall stabilization will increase resistance against future storms similar to Isabel (September 2003), where the city removed and replaced a 540 ft section of the damaged seawall at approximate cost of \$1,000,000. Improving streams and creating wetlands reduces flooding and increases water quality.

Environmental Metric: Proposed project components are Channel Restoration, Dredging and wetland construction, which will enhance ecosystem and bio diversity for the creeks and channels, and ultimately to the Hampton Roads body of water and Chesapeake Bay.

Social Metric: Improved living environment (The bike trail along Chesapeake Avenue will enhance the safety and appearance of the neighborhood and enhance the residents' quality of life. Improvements in the living shoreline, including the Chesapeake Avenue Seawall repair, will protect a more than 3,500 foot of a roadway that conveys a traffic volume of 1,694 vehicles per day, including private properties and future bike trail/sidewalk).

Economic Metric: The proposed projects will contribute to increased property values by providing a more stabilized structure against storm surges and wave actions, less conflict of pedestrians and bike riders with a roadway that carries 1,694 vehicles per day. Increasing ecosystem and stream restoration using soft nourishment techniques will enhance the quality of life of the Neighborhood.

Newmarket Creek Watershed

Newport News has multiple low lying areas in the Newmarket Creek Watershed that regularly flood during rainstorm events, such as hurricanes and nor'easters, affecting private property, commercial areas and businesses, and emergency response/access to areas using local roadways. The 6.02 square mile watershed is unique as 3.89 square miles in the Upper and Lower drainage basins are directed west to the James River through a large drainage canal called the Government Ditch. The Government Ditch has an overflow controlled by a concrete diversion weir that allows storm water runoff from large rainstorm events (10-year and above) to discharge south into the Birdella Lake drainage basin, 2.13 square miles, which is the original floodway of the creek. The city has completed computer modeling of the three drainage basins individually and at different levels of detail (Upper/Lower larger scale, Birdella Lake at a more detailed scale). The city also has implemented a Flood Assistance Program (FAP) to help homeowners in flood zones either become less of a risk for flooding, or purchasing of properties to establish a more natural environment within a community.

The Birdella Lake section is within the oldest section of the city and is fully developed with the majority being residential areas, both single and multi-family, with a few zones of commercial properties. The watershed was developed prior to regulations and restrictions regarding storm water management, thus the design of drainage systems was to a very low standard (if any). There are areas where development was allowed to occur prior to the establishment of Base Flood Elevations (BFE) within the creek. An apartment complex adjacent to the creek ranges in elevation from 5 to 7 feet mean sea level. There are approximately 538 homeowners within a flood zone designation. Recent storm events such as Hurricane Irene continue to expose vulnerabilities and deficiencies with the drainage and storm water management in the watershed. Due to inefficient and deteriorated drainage systems, city streets and intersections can become impassible creating a dilemma for city emergency responders such as fire and police to access certain areas within the watershed.

The city is currently investigating projects, programs, and plans to improve drainage systems and storm water management, to detect significant rainfall events and quickly address the safety of community residents, and to enhance the economic development, quality of life, and sense of community within the watershed. There are several areas in the watershed for opportunities to create a ‘living with water’ aspect within the residential and commercial hubs, provide innovative designs for the conveyance and storage of storm water, enrich the economic growth and connectivity between neighborhoods, and reduce the risk of repetitive losses within the community. The city is in need of assistance to take those opportunities and desires from the drawing board to actual implementation. The proposed project descriptions are below:

- Computer Model of Newmarket Creek Watershed: A computer model of the entire watershed to determine specific flooding issues/locations for project implementation such as improvements to drainage systems within the watershed as a whole.
- The design and construction of drainage/storm water management projects for reduced risk of flooding and promote ‘living with water.’ All drainage improvements will be designed to current standard practices of conducting a 10 year storm event. The expected life of the project at a minimum is 50 years.
- Evacuation procedures for specific sites and neighborhoods, both as a city effort and community involvement for the safety of residents. This project component can also include a community outreach program to identify these procedures and how to disseminate among the population.
- Installation of an Early Warning Detection System to alert city staff, property managers, and homeowners when water levels in the creek rise to certain heights.
- Redevelopment of commercial areas for flood protection and resiliency, enhanced economic growth, and connectivity with adjacent neighborhoods.

- Support the city’s Flood Assistance Program that provides residents in flood prone areas alternatives for becoming less of a risk to losses caused by flooding.

Alternatives Considered

In looking at the project in the Newmarket Creek Watershed area there were several alternatives considered by Newport News that were explored that could have reduced overall disaster recovery needs in the impacted area. These alternatives were not viable mainly due to cost other factors, which could not be appropriately controlled. The alternatives are listed below:

- Alternative 1; purchase all properties that lie within the current 100-year floodplain, raze all structures, and revert areas to a natural environment. This alternative was considered too costly and the city believes not all property owners would be willing to sell and relocate.
- Alternative 2; construct levees or floodwalls to protect repetitive loss properties. This alternative was also considered too costly, potentially create problems in other areas of the watershed (both in Newport News and in Hampton), and not environmentally sound.
- Alternative 3; construct a series of gates to control flow of storm water runoff. This alternative provides little benefit compared to the cost of installation of the devices and purchase of additional area for the storage of water, and is not engineering or environmentally sound.
- Alternative 4; modify existing structures at an apartment complex to remove ‘livable area’ at the first floor level of units, and/or provide a berm adjacent to the creek. Coordination and implementation is on private property controlled by a management company.

Benefits to Vulnerable Populations

Vulnerable populations will benefit from the CDBG- NDR projects proceed through a more secure community, decreased property damage and lower risk of displacement, lower susceptibility to health issues from mold/mildew.

Metrics

Resiliency Metric: There will be a reduction in cost of property damage and better preparation for when rainfall events occur

Environmental Metric: The proposed projects will promote ‘living with water,’ offer better designs in storm water management and reduce quantity issues and increase quality controls

Social Metric: The proposed projects will help to reduce flooding, mold accumulation, and health issues in the community, as well as enhance community amenities/recreational sites

Economic Metric: There will be renewed viability of commercial/business sector in watershed

Section 3 Residents and Businesses

When funded, the city will bid out construction work with language that will encourage participation by Section 3 persons or persons from the community. The city will advertise procurement opportunities directly in the impacted community and in media utilized by residents in the community. The city will collaborate with the local housing authority to advertise procurement opportunities in public housing complexes and in their newsletter. Additionally, the city can utilize the housing authority’s contractor list of those that have worked on previous CDBG and HOME projects. The city also has longstanding relationships and financially supports a local community action agency working with the LMI community to further self-sufficiency and aids small and minority contractors in getting licensed and bonded.

Model for Other Communities

The computer model component of the Newmarket Creek Watershed project can be replicated in other areas of the city. A similar approach could be replicated for other cities and counties in the State. The computer modeling presents an opportunity for a holistic approach for entire watershed, which can be scalable to reflect individual drainage basins and sensitive areas. Creation of an evacuation plan and early warning detection system can be used as template for other communities as well.

Consultation with Other Jurisdictions

Consultations with other jurisdictions happened during the Dutch Dialogues. In addition, regular discussions with our neighboring City of Hampton happen regarding flooding, drainage and storm water runoff issues. There is also collaboration when it comes to rescue and emergency management issues.

Scaling and Scoping

Newmarket Creek Watershed: Drainage improvements in the watershed can be prioritized and placed into Phases. Priorities for consideration are: immediate impact to resolving flooding; water quality enhancement; and property/easement acquisitions. The early warning detection system should be at a minimum 1 location; other locations within the watershed can be added at initial integration or at later times for a complete system of checking water levels in watershed.

Consistency with Other Planning Documents

The proposed Newport News projects are consistent with the city's Consolidated Plan for Housing and Community Development. The proposed projects follow the recommendations found in the Hampton Roads Planning District Commission's The Coastal Resiliency Final Report adopted by the Commission in August, 2013. The report states: "Existing and ongoing local planning processes can effectively incorporate planning for sea level rise. Existing state law already enables local governments to address the impacts of flooding in their plans, specifically in their comprehensive plans, capital improvement programs, and zoning ordinances."

The City of Newport News is in the process of updating its comprehensive plan. As required by Virginia Code, the comprehensive plan update will address coastal resource management and sea level rise, providing goals, strategies and implementation actions necessary to ensure that Newport News has the capacity to maintain or regain functionality and vitality following natural, climate-induced, or man-made stressors or disturbances. Planning staff is working closely with Division of Emergency

Management staff to potential hazards and land use to ensure that the city is proactive and better able to respond and adapt to changing conditions.

As part of this effort, the comprehensive plan will support the hazard mitigation plan by identifying the most impacted and distressed areas and providing recommendations to mitigate issues related to land use and transportation policies. The comprehensive plan, a community-based effort, will be ready for adoption in 2016 and will align with regional resilience actions facilitated through the Hampton Roads Planning District Commission's Metropolitan Planning Organization.

IV. LEVERAGE



IV. LEVERAGE

The Coastal Accelerator will leverage private foundation, corporate investment, state and federal support, including the Department of Defense and other organizations to ensure long-term sustainability and focus for the work. Similar to the Commonwealth Center for Advanced Manufacturing (CCAM), which operates to develop technology with key industry-academic partnerships, the Accelerator partners will pay annual dues serving as a substantial source of annual operating funds. Additional sources of funding for early stage technology development will include the Small Business Innovation Research Program (SBIR) and the Small Business Technology Transfer (STTR) program, as well as other similar SBA programs. The Virginia Equipment Trust Fund, accessible to university partners, may serve as a key source of leverage through the contribution of lab equipment.

The City of Norfolk and the US Army of Corps of Engineers will be working on a major \$18.4 million beach nourishment project in the MID-URN qualified area. The City of Norfolk has secured leveraged funding to implement eight shoreline restoration projects valued at \$4.6 million in the targeted area. The city has allocated significant resources to implement recommendations from the Mayor's Commission on Poverty Reduction that will have a direct impact on the qualifying neighborhoods. Norfolk's New Investment Pools create new funds to support local businesses and local neighborhood revitalization projects that will directly benefit the MID-URN qualified areas.

The City of Chesapeake is providing the following leverage through Capital Improvement Projects:

- The 22nd St. Bridge provides a vital link between the Poindexter Corridor in Chesapeake's target area of South Norfolk and the Berkley-Campostella area of the adjoining City of Norfolk. The existing bridge was constructed in 1937 and is structurally deficient with a sufficiency rating of 2 on a 100 point scale. Due to the diminished structural capacity, bridge traffic is currently limited to five (5) tons. This bridge continues Chesapeake's commitment to its LMI populations and will be important to the continued economic resiliency of the South Norfolk area. The bridge is designed for two travel

lanes with bicycle and pedestrian accommodations to create the co-benefits of increased health benefits through more public access to walking and biking paths in the South Norfolk community.

The amount budgeted for the 22nd Street Bridge is \$18 million.

- Additionally, the city has committed \$1.5 million for public works infrastructure system replacement and upgrades in the South Norfolk/Liberty Street area to protect and enhance drainage for this flood-prone area.
- The City of Chesapeake has committed a total of \$5 million to a five-year public works project that increases resiliency in the South Norfolk/Oakdale area.
- The city is also in the conceptual stage of a drainage improvement project totaling \$800,000 in the South Norfolk/Portlock area, which will be under construction in 2016. The outcome will be to alleviate the repetitive flood problems in that area, to build social and physical resiliency for the LMI population, and to encourage economic resiliency through infrastructure that encourages and supports economic revitalization in the South Norfolk area.
- The South Norfolk target area will also see increased resiliency from a Chesapeake/ Hampton Roads Sanitation District (HRSD) project. \$8 million will be spent in South Norfolk to replace the 100-year old wastewater transmission lines.
- Chesapeake has budgeted \$7 million for the Bainbridge Blvd. corridor five-year public utilities project. By burying utilities along that the Bainbridge Blvd. corridor, the city will eliminate the risk of utility interruption created during floods. This will create a more resilient infrastructure that will generate greater social and economic benefits in the South Norfolk LMI community.

V. REGIONAL COORDINATION AND LONG-TERM COMMITMENT



V. REGIONAL COORDINATION AND LONG-TERM COMMITMENT

Commonwealth of Virginia

The Commonwealth’s **THRIVE** proposal aligns closely with Virginia’s Consolidated Plan. The Commonwealth’s plan has identified priorities that address both the lack of affordable housing and the need to create more economically competitive and sustainable communities, two objectives also at the heart of the **THRIVE** proposal. The full Commonwealth of Virginia Consolidated Plan can be found online at: <http://www.dhcd.virginia.gov/images/ConPlan/Con-Plan-ActionPlan-Final-5-2013.pdf> . Also noteworthy is Governor McAuliffe’s Executive Order 32 which recognizes that sustained economic and social vitality of communities throughout Virginia depends upon the quality, availability, and affordability of housing. This Executive Order sets forth the importance of housing, particularly affordable housing and directs agencies to collaborative to further this priority.

State-level Collective Action

Sea Level Rise

- In 2013 The Secure Commonwealth Panel established the Sub Committee on Recurrent Flooding to provide strategic and tactical recommendations for how the Commonwealth can respond and otherwise adapt to the threat of recurrent flooding and sea level rise.
- In 2014 Governor McAuliffe created a State-level Chief Resilience Office
- In 2014 the state convened a National Disaster Resilience Competition Steering Committee comprising state, regional and local agencies and governments to cooperatively create the region’s resilience strategy.
- In 2015 the Commonwealth’s Chief Resilience Office began convening regional representatives to assist in developing a resilience dashboard – infrastructure vulnerability analysis, which will support resilience investments by ranking the infrastructure, vulnerabilities and cascading impact potential.

Economic Vitality

- In 2015 Governor McAuliffe created the *Go Virginia* initiative providing state-funded incentives to promote regional action including incentives for start-up capital for projects that promise substantial economic impact; regional cooperation in recruiting new business; efficiency-enhancing and cost-saving collaboration between local governments, school divisions, and higher education institutions; private and other research and development investments; capital projects of regional significance.

Region

Regional Collective Action

Sea Level Rise

- In 2014 the Hampton Roads Planning District Commission established a Sea Level Rise Advisory Committee comprising the senior leadership of the region's seventeen municipalities to develop a regional strategy and policies to address the impacts of sea level rise.
- In 2014 Old Dominion University convened a regional Pilot to explore a whole of government approach to addressing the impacts of Sea Level Rise. The Pilot will recommend a mechanism for integrating the work of all levels of government to drive outcomes.
- In 2013 the Hampton Roads Transportation Planning Organization working with the military, universities, the Hampton Roads Planning District Commission and regional cities produced a study that identified transportation corridors critical to military operations that are vulnerable to disruptions due to increased flooding. In 2015 a study of all transportation corridor potential disruption is underway.

Economic Vitality

- In 2014 the Hampton Roads Community Foundation launched Reinvent Hampton Roads, a community leadership initiative focused on generating high-paying, satisfying jobs to underpin a vibrant economy. The initiative is focused on four core areas: expanding business clusters, developing

leadership, supporting entrepreneurship and improving workforce development. Early successes include the establishment of a new angel investment network to support startups, and creating mechanisms to speed the transition of military veterans into the regional workforce.

City Collective Action

Sea Level Rise

- In 2015 the cities of Hampton and Norfolk formally agreed to work collaboratively to find solutions to increased recurrent flooding from sea level rise.
- In 2015 the Royal Netherlands Embassy in cooperation with the Hampton Roads Planning District Commission and the cities of Hampton, Newport News and Norfolk convened the Virginia Dutch Dialogues to create innovative solutions to regional flooding issues.

Economic Vitality

- The cities of Newport News, Virginia Beach and Norfolk are working with Tungsten to develop a mechanism for streamlining vendor payments and generating resources for economic development investments.

Citizen, NGO and Government Collective Action

Sea Level Rise

- Regional governmental, nongovernmental and citizen organizations including Wetlands Watch, Elizabeth River Project, local civic leagues, Old Dominion University, Hampton University, Virginia Institute of Marine Science and National Oceanic and Atmospheric Administration regularly collaborate to research, evaluate and implement innovative solutions for reducing risk to or speeding recovery from disaster.

Economic Vitality

- Universities, cities and the private sector are collectively strengthening the entrepreneurial ecosystem by increasing networks, mentorship support, access to legal and financial experts, access to capital, access to new markets and introducing new tools to increase efficiency and effectiveness.

Norfolk

Following Hurricane Irene, Norfolk developed a coastal resilience strategy to plan and prepare for coastal flooding events. The coastal resilience strategy outlined previous flood protection measures for Norfolk - a half-mile long floodwall in the downtown district with five tide gates and a pump station to drain runoff - built in the 1970's. Following Hurricane Irene, Norfolk elevated Brambleton Avenue, allowing for continued access to the medical complex in the event of an extreme flooding event. Norfolk partners with the US Army Corps of Engineers (USACE) to develop “engineered beaches” as well as flood studies (such as the flood protection study in the Hague) to determine the best means of protection from coastal storm surge and extreme rain events.

Norfolk was a catalyst for a vigorous conversation among Mid-Atlantic leaders, and in 2012 the city lobbied the state legislature to conduct a comprehensive SLR study, which was ultimately tasked by the state to the Virginia Institute of Marine Sciences. In 2013, the city hired a consultant to facilitate a state-level multi-agency panel to discuss regional flood risk, SLR and recurrent flooding. This forum was convened by the Commonwealth in May 2013 and led to the 2014 publishing of the Recommendations to the Secure Commonwealth Panel on the Issue of Sea Level Rise and Recurrent Flooding on Coastal Virginia report. Post-Irene, the city updated its storm water master plan and developed a coastal adaptation strategy through regional, state and federal partnerships.

In the summer of 2013, the city received the RE.Invest America grant from the Rockefeller Foundation to help implement flood resiliency initiatives. RE.Invest helps cities attract private investment and use public resources more efficiently to upgrade their infrastructure. In 2014, Norfolk was selected as

one of the first 33 cities to participate in the Foundation’s “100 Resilient Cities” program, which allowed the city to hire its first Chief Resiliency Officer and to pursue a portfolio of resiliency measures in programs, projects and policies.

Regional Coordination Efforts Post-Hurricane Irene

Hurricane Irene reinvigorated the city’s interest in sea level rise (SLR) and caused a resurgence in city leadership involvement in state and regional opportunities to assess and incorporate SLR into planning and mitigation actions. Over time, Norfolk began to take the lead on significant efforts. In September 2013, Norfolk leaders attended a 2-day forum in New York, where a city leader spoke about Norfolk’s perspective on coastal adaptation issues. The city met with representatives from the Rockefeller Foundation, as well as with other regional and national leaders and other Dutch coastal management leaders. After this and other events, national and international leaders called upon the city for their expertise, which resulted in strengthening “the Dutch connection” and later led to the regional *Dutch Dialogues* event in June of 2015.

Over the past year the city has advocated for and participated in the 11-member Hampton Roads Planning District Commission’s SLR Coordinating Committee, made up of local jurisdictions in the region. The 11 members include two Norfolk leaders. This intergovernmental Pilot Project grew out of the recommendations found in the Secure Commonwealth Panel report on SLR and recurrent flooding—to establish a committee that will compile, assess, prioritize and identify funding for coastal adaptation projects in the region. The goal is to bring Hampton Roads communities together for a more powerful and coordinated flood risk reduction effort throughout the region.

Finally, after Hurricane Irene the city’s Director of Emergency Response worked with local federal leaders to develop two critical community recovery groups: Team Norfolk and Operation Brother’s Keeper, a faith-based disaster preparedness and recovery organization. Team Norfolk arose from the region’s local emergency planning committees, and includes public, private, not-for-profit, higher

education, faith, community and military partners. These relationships support a true comprehensive, community-wide approach to preparedness. Team Norfolk's goal is a secure and resilient city with the capability to prevent, protect, mitigate, respond and recover from various threats and hazards. The second group, Operation Brother's Keeper, was initiated in 2015 to bring together people of faith for the purpose of educating local congregations about emergency preparedness, evacuation, sheltering and other disaster-related challenges that may impact their members. All of these initiatives add strength to Norfolk's resiliency in times of disaster.

Lessons Learned

The City of Norfolk's Phase 2 NDRC proposal was developed through coordination among city staff, departments and partners (e.g., the Norfolk Housing Redevelopment Authority (NHRA) and the Elizabeth River Project) to assure that all existing plans, initiatives, legislation, policies, and community input were considered as the projects were vetted. During the project development process, the city held weekly meetings to discuss project goals, objectives and conceptual design, which were attended by multiple departments, agencies, non-profit organizations, and local leaders. In addition, the city implemented an aggressive public engagement plan. As the projects took shape, city and partner staff were asked for specific input on the project elements most related to their work. The City Manager's office, key planners, the Director of Economic Development, public works storm water staff, the Director of Emergency Response, the environmental manager, and housing authority staff as well as Hampton Roads transit and local leaders were interviewed and provided specific data and information toward both project development and the BCA. After a number of community workshops, meetings and public hearings, feedback from the community and others was considered and incorporated into the final application.

Legislative Action

In 2014, the city worked with the state legislature to pass General Assembly Joint Resolution No. 16-03, which establishes an 11-member joint subcommittee to formulate recommendations for the

development of a comprehensive and coordinated planning effort to address recurrent flooding. The joint subcommittee is charged with recommending short- and long-term strategies for minimizing the impact of recurrent flooding. The joint subcommittee must submit its report to the Governor and the 2016 Regular Session of the General Assembly.

Raising Standards

The proposed Phase 2 NDRC project includes the demolition of old public housing units and subsequent construction of new affordable housing units, as well as improvements to storm water management in the target areas. The flood risk reduction accomplished by both storm water management improvements and the additional required freeboard will provide multiple lines of defense from flooding for residents and businesses. Additionally, property owners will experience a reduction in the cost of flood insurance premiums as a result of these measures.

After Hurricane Irene flooded the city in 2011, three feet of additional elevation for structures in the mapped floodplain was required by the city's flood damage prevention ordinance as a standard for new construction and any substantial renovations. An 18" freeboard is also required in the 500-year floodplain, and the city expects that when new FEMA flood maps reveal a coastal A zone, they will impose V zone regulations in that area to add further protection for property and resilience during and post-flood events.

Since Hurricane Irene, the city has worked to strengthen its National Flood Insurance Program Community Rating System practices and expects to see a rate change from the current 9 to an improved 6 or 7 in May 2016. These changes demonstrate higher overall standards of floodplain management that is recognized by FEMA and results in reduced flood insurance premiums for properties in the mapped floodplain.

Resilience actions related to plan updates or alignment

The City of Norfolk developed and implemented a comprehensive four-pronged strategy to address coastal storm surge and flooding which: 1) commissioned studies and plans to understand flood risk; 2)

mobilized emergency preparedness and response education and training; 3) developed effective partnerships and obtained citizen input; and 4) strengthened infrastructure and implemented flood mitigation initiatives. City planners worked with communities to develop neighborhood plans incorporating flood risk reduction activities, such as the *St. Paul's Area Plan* in 2012. Norfolk also participated in the development of the “Coastal Resiliency: Adapting to Change in Hampton Roads” report published in 2013, which offers recommendations for local governments to incorporate sea level rise in local plans and activities.

Norfolk is developing shoreline buffer projects to provide the first line of defense against large storm surges and high tides. Additionally, living shorelines, in lieu of hardened structures such as bulkheads, add extra filtration of pollutants. These measures are included in the city's proposed Phase 2 NDRC project.

The city is partnering with the Army Corps of Engineers for technical guidance and funding to assist with Norfolk's master flood plan. The Corps recently completed a study for the Ocean View beaches, resulting in the city's first engineered beach. Related studies of Pretty Lake and The Hague are nearly complete. In 2015, the city completed a study for the conceptual design to elevate the city's downtown floodwall. Finally, Norfolk is presently reviewing all city codes to analyze deficiencies and identify areas for strengthening construction and zoning against flooding hazards. The city is rewriting the current zoning code ordinance, guided by a resilience framework for sea level rise adaptation, developed in partnership with 100 Resilient Cities, the American Planning Association, the Urban Land Institute and others.

Norfolk developed a flood awareness website, uses social media and tools such as email blasts, the “Nixle” phone storm alert app, local TV and radio, print media, presentations to business and civic groups, and interactive maps to connect residents to flood and risk reduction information.

In 2013 the city updated their comprehensive plan, *PlaNorfolk 2030*, and incorporated multiple goals and objectives related to resiliency, green storm water management infrastructure, sustainability, and flood risk reduction. Key resilience elements include:

- Develop necessary storm water infrastructure, utilizing green design wherever possible, while coordinating with citywide storm water initiatives.
- Support the development of “complete streets” that include provisions for bicycles and pedestrians, as well as cars and transit, in improvement projects along designated road segments.
- Encourage the use of Best Management Practices (BMPs) reflective of Norfolk’s urban character in order to reduce and filter storm water runoff.
- Incorporate bio-retention facilities, such as rain gardens, in municipal landscaping for passive treatment of storm water using native plant species.
- Increase the extent of natural areas along the waterfront, using shoreline restoration projects such as living shorelines, and consider incentives that could encourage their use.
- Encourage connections of open green spaces throughout the city through the development of pedestrian and bicycle corridors.

Resilience actions related to financing and economic issues

Norfolk is committed to resilience actions that will revitalize the economy, both in the target areas and throughout the city. Annually, the city spends approximately \$5 to \$7 million on storm water improvements and floodplain management and established a Recurrent Flooding Fund (2014) for the purpose of storm water project design, hydrologic and hydraulic studies, local grant match, and other costs related to flood risk reduction. This fund generates approx. \$1.4 million annually for these activities.

In the fall of 2015, the City of Norfolk will solicit qualifications for a master developer of city-owned property located in the Greater St. Paul’s Quadrant area. This effort includes support for the revitalization of the neighborhood coinciding with infrastructure improvements from completed resiliency projects. The

master developer will assist the city in maximizing real estate assets and economic development opportunities, creating non-competing land uses and a new tax base and emphasizing short and long term job creation. Additionally, the work will ultimately sustain an improved public education system to meet the educational needs of target area youth, the workforce, and all citizens of the city. The economic stimulus anticipated from the redevelopment projects will help to weave together currently disparate sections of the city and bring a unified central expansion to the downtown core, eliminating over time the poverty that exists in the target area, by including mixed-use, mixed income properties that can lift affected neighborhoods, making them safer, more socially connected and resilient post-disaster.

City of Chesapeake

Chesapeake has been and remains supportive of enhanced zoning and building codes that protect our wetlands and open space, and we would be supportive of state legislation that mandated disclosure of flood zones and flood damages in real estate transactions. Currently, the city's freeboard is above the NFIP requirement. The freeboard was increased from 1 foot to 1.5 feet above the base flood elevation in 2013 and is enforced by the city's departments responsible for development and permits and inspections.

Chesapeake uses the Commonwealth of Virginia's building code as its development standard, but the city has enhanced building standards to reduce the impact of flooding. Chesapeake's zoning and code enforcement is carried out by city departments responsible for development, and permits and inspections. A minimum road grade at the two percent likelihood storm event (50 years) was established several years ago; BMPs must have emergency overflow or be designed for 100-year storms, an increase over the normal 50-year storm design; and Chesapeake adopted a new, enhanced Floodplain Management Ordinance (FMO) on Oct. 21, 2014. The ordinance requires all development within the floodplain district to have elevated and flood-proofed structures and prohibits the city from locating critical infrastructure within the special flood hazard area. The city completed the NFIP Community Rating System (CRS) in fall 2014 and received a rating of Class 8 with 1200 points from FEMA in June 2015.

In the South Hill Community, the City of Chesapeake is working closely with the Commonwealth of Virginia, seeking amended regulation of non-petroleum storage tanks, as well as emergency pedestrian egress on to I-64 to mitigate the risks of hazardous spills. However neither action will ensure the safety of the residents in this community: they are at risk for multiple threats, including riverine flooding, rail accidents, and industrial accidents; thus, only a buyout program can provide opportunities for real resilience. The city’s current building codes do not allow mixed zoning; future neighborhoods are thus protected from similar encroachment with the risk of industrial accidents.

Chesapeake’s land-use plan was updated in February 2014. The Hazard Mitigation Plan (HMP) was updated May 2014 after months of stakeholder review. The HMP is responsible to address all hazards and does address flooding issues from Hurricane Irene in 2011. The city’s Comprehensive Plan supports the HMP by stating: “The city will continue to devote available and applicable resources to implementing the City of Chesapeake All Hazards Mitigation Plan, 2008-2013 [now updated and adopted by City Council Resolution, May 2014] and its overarching goal to “develop and maintain a disaster resistant community that is less vulnerable to the economic and physical devastation associated with natural hazards event.”

The HMP planning committee reviews many relevant data, documents, plans and procedures as part of the planning process. Included in the review process are:

- Chesapeake’s Comprehensive Plan goal statements;
- *2013 Commonwealth of Virginia Hazard Mitigation Plan* goals and objectives;
- *Virginia Governor’s Commission on Climate Change Final Report*, December 2008; and,
- *2011 Southside Hampton Roads Hazard Mitigation Plan* Goals and Objectives
- the city’s floodplain management regulations, site plan review process, and permitting procedures

Based on the city’s intergovernmental and thorough stakeholders' input, hazard identification and analysis, vulnerability analysis, and vulnerability assessment were completed to produce an updated HMP, LUP, and Comprehensive Plan.

Proposed mitigation actions for local adoption are listed in the Mitigation Action Plan (MAP) within the 20145 HMP and will be implemented according to the plan maintenance procedures established for the City of Chesapeake Hazard Mitigation Plan (see Section 8: Plan Maintenance Procedures). The action items are designed to achieve the mitigation goals and priorities established by NEMAC.

Each proposed mitigation action has been identified as an effective measure to reduce hazard risk in Chesapeake and is described with background information such as the specific location of the project and general cost benefit information. Other information provided includes data on cost estimates and potential funding sources to implement the action should funding be required (not all proposed actions are contingent upon funding). Most importantly, implementation mechanisms are provided for each action, including the designation of a lead agency or department responsible for carrying the action out, as well as a timeframe for its completion. These implementation mechanisms ensure that the City of Chesapeake Hazard Mitigation Plan is a functional document that can be monitored for progress over time.

NEMAC and Emergency Management officials are responsible for determining additional implementation procedures beyond those listed within the Mitigation Action Plan. This includes integrating the Hazard Mitigation Plan into other local planning documents, such as comprehensive or capital improvement plans, when appropriate. NEMAC members remain charged with ensuring that the goals and strategies of new and updated local planning documents (such as Comprehensive Plans and Zoning Ordinances) are consistent with the goals and actions of the Hazard Mitigation Plan.

Opportunities to integrate the requirements of this Plan into other local planning mechanisms will continue to be identified through future NEMAC meetings and through the five-year review process.

Periodic revisions and updates to the Plan are required to ensure that the goals of the plan remain current, taking into account potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the plan is in full compliance with applicable federal, state and local regulations.

The changes that will most directly impact the most impacted and distressed target area (Mains Creek) are the MAP actions that will increase awareness of sea level rise and flooding, require NEMAC and city staff action to mitigate flooding issues, and build a more resilient city, but have a targeted impact on the areas of the city that have repetitive flood loss.

City of Newport News

Raising Standards

The City of Newport News has adopted floodplain development regulations (November, 2014) that will measurably increase resilience now and will continue to do so into the foreseeable future. The new regulations require at least two (2) feet of freeboard on all new residential construction or substantially improved residential structures. Non-residential structures must observe the two (2) feet freeboard on all new construction and substantially improved structures or the construction must be entirely flood proofed. These regulations are included as a special overlay district in the zoning ordinance.

Resilience actions related to plan updates or alignment

The city is in the process of updating its comprehensive plan. As required by Virginia Code, the comprehensive plan update will address coastal resource management and sea level rise, providing goals, strategies and actions necessary to ensure Newport News has the capacity to maintain or regain functionality following natural, climate-induced, or man-made disturbances. Planning staff is working closely with the Division of Emergency Management to identify potential hazards and land use to ensure the city is proactive in responding and adapting to changing conditions. As part of this effort, the comprehensive plan will support the hazard mitigation plan by identifying the most impacted and distressed areas and providing recommendations to mitigate issues related to land use and transportation policies. The comprehensive plan will be ready for adoption in 2016 and will align with regional resilience actions facilitated through the Metropolitan Planning Organization.

The Peninsula Hazard Mitigation Plan, approved in 2011, was a joint effort by the Cities of Hampton, Williamsburg, and Newport News and the counties of York and James City. This plan conforms to all requirements of the Disaster Mitigation Act of 2000 and was reviewed and approved by both the Virginia Department of Emergency Management (VDEM) and the Federal Emergency Management Agency (FEMA). Since the affected target area in Newport News is also one of the most flood-prone areas of the city, many of the actions adopted in the mitigation plan are directly tied to the target areas.

The hazard mitigation plan is due for update in 2016. This plan will take into consideration the effects of climate change with a detailed analysis of the potential effects of sea level rise. The updated plan will also emphasize floodplain management through ordinance administration. Flood ordinance changes in 2014 include freeboard for new and substantially improved structures. In addition, the following improvements have been documented since the 2011 plan adoption:

- Certified Floodplain Managers increased in number across at least 2 departments and they participate in hazard mitigation planning on a regular basis.
- The City Watch program was expanded to include post-disaster messages as a result of a careful capability analysis.
- The city formed a Generator Committee to address needs in the city identified during hazard mitigation capability review.
- The hazard mitigation plan recommended developing a natural hazards school curriculum. Existing Fire Department programs were expanded to address this need.
- The HIRA in the previous HMP identified City Line apartments, located in the Newmarket Creek Watershed, as high hazard and some retrofits were made to the complex's HVAC system. Additional flood protection measures for this and an adjacent housing complex are being pursued in conjunction with the City of Hampton, HUD and other State and Federal agency partners.

Resilience actions related to financing and economic issues

Newport News is planning to develop a rental inspection program, which includes rehabilitation assistance, in the next fiscal year. In addition, the city has several revolving loan programs already in place that businesses can utilize and one of the requirements is job creation.

The city has worked over the last 10-15 years with our housing and redevelopment authority to redevelop the Southeast Neighborhood area. Over 100 new homes have been constructed and over 200 rehabilitated in that timeframe. These efforts have helped improve the ownership rate in the Southeast Neighborhood target area.