

EXHIBIT A: EXECUTIVE SUMMARY.

The Commonwealth of Virginia welcomes the opportunity to apply to the U.S. Housing and Urban Development's (HUD) National Disaster Resiliency Competition to meet unmet recovery needs in the most impacted and distressed areas of Hampton Roads that suffered damage from the qualifying disaster Hurricane Irene in 2011. The combined population of the Hampton Roads region and the Eastern Shore of Virginia is over 1.7 million and includes the cities of Norfolk, Virginia Beach, Chesapeake, Newport News, Hampton, Portsmouth, Suffolk, Poquoson, Williamsburg and the counties of Accomack and Northampton. During Hurricane Irene all of these areas were designated disaster areas by the Commonwealth and the Federal government.

The Commonwealth of Virginia and major stakeholders in Hampton Roads have created a regional public-private coalition, the Resiliency Partnership (RP), whose purpose is to re-invent the region around a shared understanding of how to live with water, in response to on-going environmental changes. The RP will surface, test and refine the best strategies for building water resilient communities across a range of environments by developing a model seaport region that derives its economic vitality from the water. To achieve its goal, the RP has produced a Regional Resilience Strategic Approach with five major goals, as presented in the figure below.

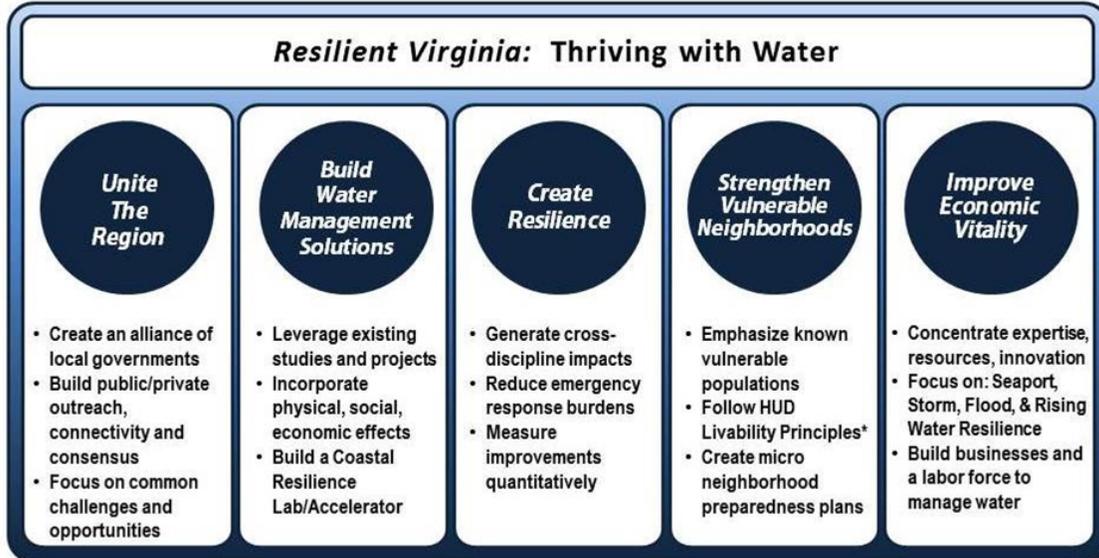


Figure 1. Virginia's Approach

Physically, the approach will manage water better and smarter during storms and floods. Socially, it will strengthen neighborhoods by creating people networks to mitigate risk for its most disadvantaged citizens. Economically, it will develop a regional business cluster centered on coastal land use and livability, built on good water management, innovation and entrepreneurship.

The individual capabilities of RP members are complementary, and together provide the capacity necessary to manage the transition to a regional, more resilient knowledge based economy, focusing on seaport operations, storm resilience, and rising waters. The coalition's size and economic strength underscore the region's commitment to achieving this goal. Major political, social, and economic influencers, including municipal, military, maritime, transportation, education, and private businesses, are coalition members, held together by a common desire to accept the opportunities, as well as the challenges, of managing water in a changing environment.

EXHIBIT B: THRESHOLD REQUIREMENTS.

The Commonwealth of Virginia presents the “Most Impacted and Distressed” threshold data for the Cities of Norfolk and Chesapeake as accepted by HUD’s 45-day threshold review letter and the corrected “Unmet Recovery Needs” threshold data with addressed deficiencies.

CITY OF NORFOLK - MOST IMPACTED AND DISTRESSED THRESHOLD. The target area identified as most impacted and distressed is **Norfolk, Virginia** as a result of **Hurricane Irene** that occurred in 2011. The area is a sub-county area within a county declared as a Qualified Disaster.

Specific Areas Affected. Norfolk, VA census tracts 11, 2.01, 2.02, 25, 26, 27, 29, 31, 34, 35.01, 4, 42, 44, 46, 5, 51, 55, 57.01, 57.02, 59.01, 59.03, 61, 64, 65.01, and 69.01.

Most Impacted Characteristics. As a result of Hurricane Irene in 2011, 345 homes sustained damage – 190 dwellings affected, 2 residential dwellings destroyed, 26 residential dwellings sustained major damage, and 127 residential dwellings sustained minor damage. Of these 335 homes, five (5) have been approved for FEMA Severe Repetitive Loss Grant funding to elevate the structures. To date one (1) structure has been elevated.

Most Distressed Characteristics. One hundred and forty-three (143) of the houses sustaining damage as a result of the qualified disaster, Hurricane Irene, are located in low- and moderate-income census tracts, defined as having more than 50 percent of the people in the target area at less than 80 percent of the median income. Of these 143 homes, two (2) have been approved for FEMA Severe Repetitive Loss Grant funding to

elevate the structure. To date one (1) structure has been elevated. Additionally two (2) houses have been elevated using private funds.

Unmet Recovery Needs Threshold. The City of Norfolk has Unmet Recovery Needs, meaning needs that have not been addressed by federal, state, or other sources, in the area(s) identified in this application as “Most Impacted and Distressed.”

The Commonwealth of Virginia has calculated the unmet needs under the Most Impacted Characteristics of Housing using the following NOFA definition found in Section III (b)(ii) of Appendix G of the NOFA: *A methodologically sound “windshield” survey of the target area conducted since January 2014. A list of 20 addresses needs to be provided to HUD of units identified with remaining damage. A survey of at least 9 of these addresses confirming (i.) the damage is due to the disaster and (ii.) they have inadequate resources from insurance/FEMA/SBA for completing their repairs.*

71 impacted Homes with unmet need – resilience repair

- Seventy-one (71) homes located in the Distressed area most Impacted by the Qualified Disaster, Hurricane Irene lie within FEMA designated flood zones. Nine (9) addresses were confirmed that (i.) the damage was due to the disaster and (ii.) they had inadequate resources from insurance/FEMA/SBA for completing their repairs.
- Five (5) of these seventy-one (71) homes sustained major damage and an additional one (1) home was destroyed.
- Thirty-four (34) of the seventy-one (71) houses have had multiple flood insurance claims according to historic flood claims data.
- Appendix G: Section III A(a) states that total repair costs can include the reasonable extra cost to buyout homes or repair homes resiliently, e.g., extra cost to elevate or

build a safe room. All 71 homes identified in the Distressed area Most Impacted by Hurricane Irene have a history of repetitive damage due to flooding (Appendix 4).

Based on their location in the FEMA defined flood zone, the repetitive loss that these homes experience and the city's commitment to ensuring that structures are elevated, resilient repair would include house elevation.

- Only three of these houses have been elevated to date because of insufficient resources available from private insurance, FEMA or SBA. Therefore, unmet needs include the cost of elevating sixty-eight (68) houses at a cost of between \$100,000 and \$150,000 per house.
- As noted above, the Unmet Need is the documented instances of homes to be elevated out of the repetitive flooding zones. The City has worked with residents on an individual basis where possible to undertake this action; however, there are insufficient resources to complete this much needed activity.

CITY OF CHESAPEAKE - MOST IMPACTED AND DISTRESSED THRESHOLD. The target area identified as most impacted and distressed is **Chesapeake, Virginia** as a result of **Hurricane Irene** that occurred in 2011. The area is a sub-county area within a county declared as a Qualified Disaster.

Specific Areas Affected. Chesapeake, Virginia census tracts 020100, 020200, 020300, 020400, 020700, 020809, 02904, 021005, 021403, 021501, 021602.

These areas exhibit Most Impacted Characteristics and Most Distressed Characteristics which affect the ability of the area to recover from Hurricane Irene.

Most Impacted Characteristics. Chesapeake, Virginia meets the Housing Most Impacted Characteristics as defined in Appendix G of the NOFA as follows: A

concentration of housing damage in a sub-county area due to the eligible disaster causing damage to either a minimum of 100 homes or serious damage to a minimum of 20 homes.

As a result of Hurricane Irene in 2011, 335 residential properties sustained damage – 148 residential dwellings affected, 2 residential dwellings destroyed, 39 residential dwellings sustained major damage, and 146 residential dwellings sustained minor damage.

Most Distressed Characteristics. Ninety (90) – out of 122 total properties – of the housing units sustaining damage as a result of the qualified disaster, Hurricane Irene, are located in low- and moderate-income census tracts, defined as having more than 50 percent of the people in the target area at less than 80 percent of the median income. Further, in those vulnerable, low-income areas, more than 20 homes recorded major damage.

Unmet Recovery Needs Threshold. The City of Chesapeake has Unmet Recovery Needs, meaning needs that have not been addressed by Federal, state, or other sources, in the area(s) identified in this letter as “most impacted and distressed.”

The Commonwealth of Virginia has calculated the unmet needs under the Most Impacted Characteristics of Housing using the NOFA definition found in Section III (b)(ii) of Appendix G of the NOFA noted above.

61 impacted Homes with unmet need – resilience repair

- Sixty-one (61) homes located in the Distressed area most Impacted by the Qualified Disaster, Hurricane Irene lie within FEMA designated flood zones. Nine (9) addresses confirmed that (i.) the damage was due to the disaster and (ii.) they had inadequate resources from insurance/FEMA/SBA for completing their repairs.

- Eleven (11) of these sixty-one (61) homes sustained major damage.
- Twenty-five (25) of the sixty-one (61) houses have had multiple flood insurance claims according to historic flood claims data.
- Only seven (7) of these houses have been elevated to date because of insufficient resources available from private insurance, FEMA or SBA.
- Appendix G: Section III A(a) states that total repair costs can include the reasonable extra cost to buyout homes or repair homes resiliently, e.g., extra cost to elevate or build a safe room. Based on their location in the FEMA defined flood zone, the repetitive loss that these homes experience and the city's commitment to ensuring that structures are elevated, resilient repair would include house elevation.
- Therefore, unmet needs include the cost of elevating sixty-one (61) houses at a cost of \$150,000 per house.

EXHIBIT C: CAPACITY

GENERAL MANAGEMENT CAPACITY. The Virginia Department of Housing and Community Development (DHCD) is the lead agency for this proposal from the Commonwealth of Virginia and will serve as the grant administrator and project implementation manager for US Housing and Urban Development (HUD) National Disaster Resiliency grant funds. As the primary point of contact for all programmatic and contractual obligations, DHCD will be responsible for program management, including strategic planning, project oversight, fiscal and budgetary controls, inter-community coordination, strategic communications and technical assistance.

DHCD currently manages a cadre of state and federally funded programs, including the HUD-funded Community Development Block Grant (CDBG), HOME, Emergency

Solutions Grant, and Housing Opportunities for Persons with HIV/AIDS, in areas such as resilience, storm disaster management, public works, affordable housing, environmental quality, economic revitalization, and has extensive knowledge of fair housing, civil rights, fair labor standards, environmental review process, and other program related requirements. The agency oversees the investment of more than \$100 million each year into housing and community development projects throughout the state and the majority of these are designed to help low-to-moderate income citizens.

Capacity to Launch and Manage Major Projects. DHCD implements comprehensive community revitalization strategies throughout Virginia, and administers important relevant resilience related programs for the Commonwealth, including federal and state CDBG programs, federal housing programs, and the Commonwealth's participation in the HUD CDBG Disaster Recovery Program. DHCD has extensive experience managing federal resources, including special allocations of HUD Disaster Recovery funds. It has substantial administrative and functional capacity, employing a well-established system of operational and financial oversight controls to monitor routinely the performance and budgetary activities of project sponsors, grantees, and sub-recipients.

DHCD's implementation of the HUD Neighborhood Stabilization Program (NSP) illustrates the agency's ability to effectively implement a highly leveraged and time-sensitive, priority program. DHCD formed partnerships with over 25 local governments and nonprofits to create a network that swiftly deployed resources to neighborhoods hardest hit by the foreclosure crisis. The Virginia NSP has not only acquired, rehabilitated, and resold over 300 homes, it has generated close to \$50 million in program income, ranking Virginia in the top four nationally.

Furthermore, DHCD has expanded its capacity when necessary to administer new resources, as 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 CDBG program. DHCD's response to managing programs and resources is scalable.

Experience with Collaboration and Coordination for Large Projects. As the Commonwealth's lead agency for various federal and state economic development, housing, disaster recovery, and public works programs, DHCD has extensive experience in coordinating outreach efforts that empower municipalities, formal and informal leaders, and other community stakeholders. DHCD routinely seeks collaboration and input from other state agencies, municipalities, special interest groups, nonprofits, foundations, the business community, and local outreach organizations.

As noted above, under the NSP program DHCD coordinated the efforts of 25 municipal governments and nonprofits which assisted homeowners in danger of foreclosure. DHCD directed and oversaw the use of federal funds to partner organizations and provided on-line and on-site training and workshops, policy briefs, technical assistance for outreach marketing and financial resources, including a frequently asked questions database, standardized forms, brochures, standardized sample transaction processes, and reporting mechanisms.

In addition, DHCD oversees the complex Continuum of Care initiative that has helped communities across the Commonwealth address problems of homelessness in a coordinated, comprehensive and strategic fashion. DHCD's collaborative work with partners has significantly impacted Virginia's homeless citizens: in 2014, homelessness in

decreased by 7.9%, family homelessness decreased by 10.8%, and homelessness among veterans decreased by 14%. DCHD's coordinated approach to this process transformed Virginia's homeless services system into a national model.

Collaboration with other state agencies is key to maximizing DHCD's impact. The Commonwealth's approach to disaster resilience also taps the capacity of the Virginia Department of Emergency Management (VDEM), whose Recovery and Mitigation Division has extensive experience in the delivery of disaster assistance programs in coordination with FEMA and eligible applicants. As of February 2015, there are over \$49 million dollars in hazard mitigation projects related to this program. Another significant DHCD collaborator specific to the Hampton Roads region is the Hampton Roads Planning District Commission (HRPDC), which provides regional focus and specialized planning studies on critical topics identified by local governments.

Application Development. This Phase I funding application was developed collaboratively and written by the Virginia DHCD with critical input provided by local government staff from the Cities of Norfolk and Chesapeake, and Hampton Roads-based private sector stakeholders; and the support of staff from the Old Dominion University (ODU) Office of Research and the Concurative Corporation.

CROSS DISCIPLINARY TECHNICAL CAPACITY. The complexity of Virginia's water management issues requires a comprehensive multidisciplinary team approach to mitigation and resiliency. The Commonwealth has developed a robust team comprised of state agencies, local governments, academia, private companies, and military and non-governmental organizations (NGO). Please see Attachment ___ for a list of partners.

Partner Capacity. Government partners at the state and local levels provide strategic planning, program management, administrative and oversight capacity, as well as operational capacity with respect to water management, disaster response, public works, affordable housing, environmental quality, economic revitalization, and resilience. Non-government partners contribute essential capacity to strengthen individual citizen resilience during times of stress by creating, operating and maintaining social networks at the neighborhood level. Private sector partners provide unmatched knowledge of how to conduct seaport operations, encourage innovation, promote entrepreneurship, mentor new businesses, and foster successful economic development.

Cross Disciplinary Capacity. DHCD performs cross-disciplinary work routinely, while managing state CDBG funds, federal and state housing programs, disaster recovery assignments, and other major federal and state programs. Its community based projects require coordination of multiple public and private sector functions, including resilience, storm disaster management, public works, affordable housing, environmental quality, neighborhood enhancement, building and fire code regulation, and economic revitalization, all within a framework of federal and state standards regulating fair housing, civil rights, environmental review processes, labor standards, and other regulations.

Regional and municipal partners complement DHCD's coordination capabilities with significant capacity of their own. An example of DHCD's experience with 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.

Area-wide Comprehensive Planning and Implementation of Complex Projects.

Virginia's state, regional and local government agencies and nonprofit and private sector partners have significant experience with area-wide collaborative planning and complex project implementation. VDEM is currently involved in regional planning and execution of projects to repair or replace damaged facilities involving public infrastructure, roads and bridges, water control facilities, parks, and recreational facilities at eight open Commonwealth disaster sites. The HRPDC, which offers comprehensive planning services to its member localities throughout Hampton Roads, recently developed and implemented a watershed plan for the Northwest River in Chesapeake, Virginia.

Virginia NGOs and private companies are also coordinating comprehensive approaches to regional challenges. The Hampton Roads Community Foundation (HRCF), in cooperation with regional municipalities, is currently implementing a region-wide economic revitalization project, and a private sector partner, Timmons Group, has conducted area-wide wetland restoration projects and modeled citywide storm water watersheds in several localities across Virginia, including Hampton Roads. Virginia also harnesses the strengths of its universities: ODU has partnered with the Green Infrastructure Center and the City of Norfolk to carry out eight shoreline restoration and resiliency projects, including a green infrastructure job training and youth engagement component.

Relevant Expertise and Experience for Major Projects of this Nature. In addition to the specific expertise of Virginia's partners, described earlier in **Partner Capacity** (p. ___), the two Hampton Roads municipalities that will pilot Virginia's resilient water management projects have demonstrated experience in carrying out all aspects of major projects, from initial assessment to successful implementation.

Since 2007, the City of Norfolk has invested over \$2 million studying the effects of coastal flooding and the implications of relative sea level rise and developing plans for dealing with the challenges. This includes engineering analyses that assess possible benefits and outcomes of projects over their lifetime for different flooding risk scenarios for each watershed.

The City of Chesapeake's wetlands preservation mechanisms and requirements have been implemented for many years, are required citywide, and are enforced by city development and permit, zoning, and code enforcement personnel. Chesapeake's Comprehensive Plan and Land Use Plan, updated in February 2014, put forth actions to protect the wetlands. Chesapeake adopted the Northwest River Watershed Protection District in 2005 and partnered with the HRPDC in 2010 for an updated study of the watershed that resulted in enhanced goals for managing the watershed area, such as protection of wetlands habitats, providing a network of open space for recreation, and identifying opportunities for the creation of wetland to restore some of the Elizabeth River watershed's natural pollutant buffering and flood control capacity.

Chesapeake also established the Chesapeake Bay Preservation Area District Resource Protection Area, which includes tidal and non-tidal wetlands connected by surface flow

or water bodies with perennial flow, shorelines, and a 100' vegetated buffer around each such feature and water body.

Capacity to Assess Relevant Scientific Information on Climate Change and Resiliency. Multiple partners in the Resilience Partnership (RP), including the US Army Corps of Engineers (USACE), US Navy, VDEM, ODU, Virginia Institute of Marine Science (VIMS), Wetlands Watch, HRPDC, and the Timmons Group, have the capability to analyze climate change resilience data. In the last decade, RP partners have conducted over 40 relevant studies that have helped identify needs and mitigate the potential impacts of coastal flooding and sea level rise.

Experience with Civil Rights and Fair Housing Issues. DHCD adheres to Fair Housing requirements and Title VI of the Civil Rights Act of 1968. As part of contractual agreements with DHCD, all sub-grantees will be required to meet all requirements of the Act.

Capacity for Design Quality that Enhances Resiliency. The design quality of Virginia's NRDC projects will be guided by the DHCD and the Chief Resilience Officer for the Commonwealth, as well as by the 100 Resilient Cities Initiative currently underway in Norfolk. Additional capacity to ensure that design quality delivers long-term resilience exists at the municipal level and in the private sector. RP will further benefit from the direct involvement of Chief Resilience Officers at both the state and local level: Virginia was the first state to appoint a Chief Resilience Officer, and the City of Norfolk was the third city in the world to appoint a Chief Resilience Officer. As one of the Rockefeller Foundation's 100 Resilient Cities, Norfolk also brings a wealth of resources on resilient design to Virginia's approach.

Capacity and Contingency Plans. Virginia's approach to assuring capacity for its NDRC projects relies on a rich partner network that incorporates redundancy. By involving multiple partners who can be tapped for involvement at a variety of levels, the Commonwealth has created a resiliency resource system with primary, secondary and existing capacity in identified critical areas. Please see the **Partner Capacity** section (p. ___) for specific examples.

Capacity for Effective Cost-Benefit Analysis. Virginia's DHCD, its partner localities in Hampton Roads and its engineering partners all have extensive experience with cost-benefit analysis, including FEMA's Hazard Mitigation Cost Effectiveness process.

Assessing reasonable project cost involves ensuring work was awarded through an established competitive bid process, comparing costs of similar completed projects, performing a cost-benefit analysis, and consulting RS Means, an established industry reference resource that provides accurate cost data with regard to materials, labor and construction costs.

COMMUNITY ENGAGEMENT CAPACITY. The Commonwealth is committed to citizen engagement and active involvement in its approach to resiliency. The DHCD and its partners -- individual localities and Norfolk's and Chesapeake's Neighborhood Specialists (via civic leagues), Hampton Roads Center for Civic Engagement, ODU, VIMS, Wetlands Watch, HRCF, HRPDC, the UP Center, and Emergency Management staff -- all have long records of engaging stakeholders, including those most vulnerable to future threats associated with climate change (Please see Attachment D – Consultation Summary). RP has already employed this wide network of engagement capabilities to connect stakeholders to the NDRC planning and implementation process. The RP has

further expanded its capacity to collect and analyze citizen input through survey research, as demonstrated by the ODU survey of 7,000 regional households which identified and mapped recovery needs and community vulnerability in Hurricane Irene's aftermath.

Citizen outreach and education on the impacts of sea level rise has occurred in Hampton Roads on a quarterly basis since 2012 through the Hampton Roads Adaptation Forum. Organized by several RP partners -- the ODU Mitigation and Adaptation Research Institute, in cooperation with HRPDC and area municipalities -- this regional dialogue addresses concerns, and best practices and plans for dealing with sea level rise and climate change. RP will continue to use this quarterly meeting to gain input and keep residents informed of the Commonwealth's plans for building a more resilient Virginia.

In addition, the DHCD regularly uses participatory public meetings, held in neighborhood locations including churches, community organizations and libraries to provide information on opportunities for citizen involvement. DHCD will use these engagement strategies throughout the Phase II planning and implementation process as well as social media, printed flyers, and announcements in local papers.

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.

Norfolk's 100 Resilient Cities initiative has likewise brought stakeholders together in workshops and committee meetings to seek input on regional threats and potential strategies for becoming more resilient. All Hampton Roads municipalities have existing boards, commissions, and committees created to foster involvement and obtain citizen input on critical matters. Partner cities will use these advisory bodies to advance stakeholder engagement in the planning and implementation of the grant-funded projects.

Empowering Formal and Informal Community Leaders. DHCD works to empower formal and informal leaders to create communities that are safe, affordable and prosperous by taking advantage of the unique capabilities of municipalities to build local leadership. An example of municipal leadership building includes Norfolk's Mission Possible program, which encourages and recognizes city employees for improved service delivery and reduced costs. Mission Possible has recruited over 150 "agents" who recommend changes in the city's business practices. In the City of Chesapeake, an annual Neighborhood Leadership program provides residents with opportunities to learn first-hand about establishing effective civic leagues and creating positive partnerships with City government, non-profits, and private groups.

Regionally, the HRPDC's Residential Retrofit Project uses neighborhood-level leadership to drive conservation improvement outcomes in low-income areas. Local NGOs and faith-based groups assist with participant screening, staging and installation of conservation retrofits. This cooperative effort has resulted in greater participation and improved outcomes, including higher levels of water conservation.

Harmonizing Contributions of Diverse Stakeholders. The project team has worked with a wide variety of stakeholders to create and vet the direction of the NDRC proposal. The project team meets weekly to organize and integrate both quantitative and qualitative data and the opinions and aspirations of diverse stakeholders. This approach to planning produces goals and strategies that are unified, with measurable goals that are responsive to community input. Updated plans are shared with stakeholders to ensure the project direction remains congruent with stakeholder needs.

REGIONAL AND MULTI-GOVERNMENT CAPACITY.

Experience Effectively Addressing Regional Problems. The Hampton Roads region recognizes that important issues require coordinated efforts, and does so through organizations that collectively address regional challenges, such as transportation (Hampton Roads Transportation Planning Organization), water quality (Hampton Roads Sanitation District), community engagement (Hampton Roads Center for Community Engagement), social service planning (The Planning Council), and sea level rise (the HRPDC's Hampton Roads Special Committee on Recurrent Flooding and Sea Level Rise, and the ODU Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Planning Pilot Project). This level of experience with regional planning and coordination provides Virginia with a solid foundation where it can pilot a truly regional approach to resiliency.

Working Regionally on Resilience: For the residents of Hampton Roads, the threat is water: rising tides, flooding, and storms that are increasingly intense and more frequent. Because the impact of sea level rise is already a reality in this region of Virginia, its localities are working to address these threats through the HRPDC's Hampton Roads

Special Committee on Recurrent Flooding and Sea Level Rise, ODU's Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Planning Pilot Project and the State's Joint Subcommittee on Recurrent Flooding. The HRPDC has a breadth and depth of experience that is especially valuable in bringing together diverse stakeholder groups on a variety of topics such as housing, water supply, pollution prevention, environmental education, emergency management and various planning efforts.

Recognizing the importance of Hampton Roads and the significant contributions of its maritime economy, the Commonwealth of Virginia is committed to supporting the region's move towards resilient solutions to its water management challenges. The RP builds on Norfolk's involvement with the 100 Resilient Cities Initiative to extend the concepts of this important initiative across the Hampton Roads region. Together, the partners in this effort will define resilience best practices that are cost effective, impact the most vulnerable populations, create economic development, and improve the region's capacity to move forward in the face of threats.

Advantages of a Regional Approach. A regional approach to Hampton Roads issues of sea level rise affords Virginia the opportunity to build on the region's existing capacity and multi-government experiences with problem solving. RP has gathered many regional and government partners for the coalition, as evidenced by the partners' depth of experience with climate change issues. For instance, in response to the growing local concerns about sea level rise and recurrent flooding, the 2012 General Assembly directed the Virginia Institute of Marine Science (VIMS) to prepare a study on recurrent flooding and preventative strategies in Tidewater Virginia. The study was developed in collaboration with local governments, state agencies, NGOs, as well as regional planning

district commissions and universities. The study findings led to the creation of the Recurrent Flooding Sub-Panel of the Virginia General Assembly Secure Commonwealth Panel, a collective effort by government officials, scientists, business leaders and NGOs to develop recommendations for addressing sea level rise and recurrent flooding in coastal Virginia.

In accordance with VIMS and the Sub-Panel's recommendations, the Virginia General Assembly established a Joint Subcommittee in July 2014 to formulate recommendations for the development of a comprehensive and coordinated planning effort to address recurrent flooding. The Joint Sub-committee is coordinating with federal agencies such as the Army Corps of Engineers, local governments and universities. In particular, it is working with the Secure Commonwealth Panel, Flooding Subpanel to examine the technical aspects of recurrent flooding.

Furthermore, in December 2014, Virginia named its first Chief Resilience Officer, who will help coordinate various ongoing sea level rise initiatives. Earlier, in March 2014, HRPDC approved creation of a Special Regional Committee on Recurrent Flooding and Sea Level Rise focused on addressing resilience problems in the region.

In 2013 ODU launched the Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Planning Pilot Project and the State's Joint Subcommittee on Recurrent Flooding.

Addressing Disparities through Regional Efforts. The goal of Virginia's regional approach is to build safer communities, more vibrant economies and more socially cohesive neighborhoods. Rising water means that in the near future, citizens of Hampton Roads will need to live differently. This NDRC grant funding offers the Commonwealth

a tremendous opportunity to demonstrate how communities can engage citizens in developing effective strategies for resiliency and pilot innovative solutions that can be adopted across the Commonwealth and the US, and around the world.

Leveraging Multi-Entity Organization Strengths for Project Implementation.

Virginia will leverage existing efforts and integrate new partners using existing organizations and structures to plan and carry out the work of the grant as appropriate to achieve its plan's strategic goals.

EXHIBIT D: NEED

Unmet Recovery Needs. Damage from Hurricane Irene was evaluated by an assessment team using FEMA's structural damage levels for homes in the region. Based on an analysis of data collected, the Hampton Roads cities of Norfolk and Chesapeake meet CDBG-NDRC thresholds for *Most Impacted* and *Distressed* areas (see Exhibit B). Windshield surveys of these areas, conducted in January and February 2015, reveal water-related *Unmet Recovery Needs* remain for nearly half the damaged homes. Repairs made to these homes did not incorporate resilient measures to mitigate similar future damage. Surveyed homeowners reported they did not undertake resilient repairs such as elevating the structure because of inadequate funding. In addition to the windshield surveys, the City of Norfolk modeled inundation caused by Irene using geospatial information science (GIS), topographic elevations, and the best available tidal data, including National Oceanic and Atmospheric Administration (NOAA) data collected at NOAA's Sewells Point station in Norfolk, as well as the latest light imaging detection and ranging (LIDAR) data. This analysis produced a much more accurate

model of how Irene impacted the city. It shows that a total of 1,747 residential housing units located in low- and moderate-income census tracts were potentially impacted by the Qualifying Disaster. The most impacted sections of the city include the additional low- and moderate-income census tracts (33, 50, 43, 47, 9.02, 32, 17, and 48). Nearly 50 percent, or 38, of all census tracts in Norfolk are designated as low- and moderate-income tracts. Twenty-six (26) of these 38 tracts were impacted by Hurricane Irene. As Map 1 demonstrates, the *Most Impacted* and *Distressed* target areas are distributed across the entire City.

The extent of the inundation makes clear that unmet need is not for resources to repair the water damage to homes in areas designated *Most Impacted* and *Distressed*, but rather for resources to develop a comprehensive approach to resilience that will enable Hampton Roads, as the gateway to the Chesapeake Bay, the Commonwealth of Virginia and other seacoast communities, to protect the homes of all residents by anticipating, preparing for and adapting to the changing environment. The Strategic Resilience Plan for Hampton Roads envisions a series of infrastructure, social networking and economic development projects that are designed to showcase innovative opportunities for solutions for managing water and building resilience to storms and flooding in seacoast communities in the midst of climate change.

Most Impacted and Distressed: The City of Chesapeake. Established in 1963,

Chesapeake is a relatively young mix of suburban and rural communities.

Geographically, the tidal Elizabeth River flows through its center, and the Great Dismal Swamp borders it to the west. Early on, the city took measures to check building in its flood plain and wetlands through building ordinances. Chesapeake's repetitive flooding

primarily occurs in Mains Creek, a lower-to-middle income neighborhood with 121 homes located in the 100-year floodplain. Constructed in the 1960s before Chesapeake developed its local NFIP and minimum standards for construction elevations, its lowest roads are 3-4 feet above sea level and lowest homes are 4-5 feet above sea level. Roads constructed today must be 7 feet above sea level. Ninety-one homes in Mains Creek experience repetitive flooding.

Many residents are elderly, with few financial or social resources. This community's need for a comprehensive, resilient approach to repeated flooding is unmet because of inadequate funding. Resilient solutions currently being explored include: elevating or acquiring houses (which will then be demolished and the land restored to green space for perpetuity); improving infrastructure for better water management; increasing road elevation in the target area to eliminate flooding of streets and yards; and installing tidal flood gates to control the increased surge waters from the Elizabeth River into Mains Creek.

The City of Norfolk. Founded in 1682, the City of Norfolk is Virginia's second-largest city and home to the world's largest naval base, Naval Station Norfolk. Tidal waters surround it on three sides. Its position on the Chesapeake Bay, combined with low drainage gradients due to near sea-level topography, puts a significant portion of the city at risk for flooding from heavy rains, high tides, and storm events. The areas most prone to flooding are built on the sites of former creeks and inlets that were filled in decades ago. Exhibit B (Threshold) demonstrates the extent of damage recorded by a city assessment team who conducted windshield surveys in the aftermath of Virginia's qualifying event, Hurricane Irene.

As described earlier, damage from Irene was more extensive than the snapshot provided by city assessments. All 1,747 housing units were identified as potentially impacted using scientific modeling techniques are located in the 100-year floodplain. Map 2 shows the likely impact of a Hurricane Irene-type event with sea levels of 1.5 feet, the mid-century predicted sea level rise. Projections show that such a storm could potentially impact approximately 2,827 homes in low- and moderate-income neighborhoods in the city. With additional sea level rise projected by 2100 of 3 feet, such a storm could potentially impact 5,249 homes. While discussions of existential threats to the city may seem dramatic, it is worth noting that when Hurricane Irene made landfall along the North Carolina coast, it was a Category 1 hurricane. In light of the projected rise in sea levels, the amount of future damage to be expected from more intense storms, for instance Category 4 or 5 hurricanes, creates the potential for a Hurricane Katrina-like scenario. This forward-looking risk analysis drives regional thinking to more comprehensive approaches to building regional resilience.

RISKS AND VULNERABILITIES. This proposal focuses on threats and vulnerabilities associated with managing water; specifically recurrent flooding and sea level rise. In its 2013 Hazard Mitigation Plan, Virginia identified flooding as the top hazard with regards to probability and impact to all jurisdictions in the Commonwealth.

In the last decade more than 40 separate studies focusing on current and future water-related risks, vulnerabilities, and solutions were completed by Hampton Roads localities, universities, businesses, NGOs, military facilities and the Port of Virginia. This proposal leverages findings of these analyses, including the recent US Army Corps of Engineers' *North Atlantic Coast Comprehensive Study*, along with output from peer-reviewed tools

such as the Rockefeller Foundation-supported Climate Central's Surging Seas Risk Finder and NOAA's Digital Coast, among others.

The region is experiencing [the highest rate](#) of relative sea level rise on the East Coast due to the exacerbating effects of land subsidence. Global sea levels have risen 5-8 inches over the last century, but in Hampton Roads, sea level has risen over 14 inches since 1930. As a result, Hampton Roads is second only to New Orleans as the largest population center at risk from rising water and ranks 10th in the world in the value of assets exposed to flooding. The fact that seven of the ten most significant regional storms since 1933 occurred in the last 13 years clearly demonstrates the risk is accelerating. With local sea level rise projected between [1.5-7.5' by 2100](#), and conservative estimates projecting a 3-foot rise by 2100, the risk will only continue to increase.

Under NOAA's intermediate low scenario, there is "[a better than even chance](#)" of floods exceeding 5 feet above the high tide line by 2030-40 along the whole Virginia coast. Based on Climate Central's [Surging Seas risk finder estimates](#), more than 107,000 Virginians live in homes below 5'. Close to 77,000 of Virginia residents are in the high or medium Social Vulnerability Index class with 17,000 in Norfolk alone. Furthermore, according to US Census data, 9% of Hampton Roads residents report they do not have access to a vehicle. This indicator of vulnerability would impact resident evacuation and use of public shelters, as the region's public transportation system also is at risk of flooding.

A study by Sandia National Laboratories notes failure to mitigate the effects of climate change could cost Virginia \$45.4 billion in GDP and over 314,000 jobs between 2010 and 2050. In Hampton Roads, economic wellbeing depends on the same

surrounding bodies of water that place it at risk; thus, sea level rise will impact nearly every sector of the regional economy. The region is home to the largest concentration of US defense facilities in the world and the third largest commercial port on the east coast. It is also a major hub for shipbuilding and has a strong tourism-related economy. Sea level rise and flooding puts these critical assets to the regional and national economy as well as global security at increasing risk.

Economic Impact. According to a recent [study](#) by the Hampton Roads Planning District Committee (HRPDC) the large number of businesses and employees working in Category 1 (flood) zones indicates that “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.” Another HRPDC [study](#) estimates that by the end of the 21st century sea level rise could result in direct economic costs at between \$12 and \$87 billion, with up to 877 miles of roads in the region permanently or regularly flooded by 2100.

Military Presence and Flood Risk. 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 percent of US naval shipbuilding and repair capacity is housed in the region. Other area Department of Defense facilities include NATO’s Allied Command Transformation, Homeland Security facilities, Jefferson National Accelerator Facility, and NASA Langley Research Center. In 2013, defense-related activities and spending accounted for 41 percent of the region’s \$87 billion economy.

At an average elevation of 8-1' above mean sea level, Naval Station Norfolk and many of the 29 other military bases, shipyards and installations in the region already experience storm-related flooding. Furthermore, military readiness depends on regional infrastructure such as roads, bridges, tunnels and utilities located off base. [Studies](#) show that the 1.5' sea-level rise projected by 2032- 2062, combined with a mild 3' storm surge, could impede roadway access to nine of the region's military facilities, including Langley Air Force Base, Naval Station Norfolk, Norfolk Naval Shipyard and Naval Air Station Oceana.

Flood Risk to the Port of Virginia. The Port of Virginia in Norfolk is the 3rd largest on the East Coast and is currently the only East Coast port with shipping channels that can accommodate the massive Post Panamax-size ships. In 2013, 81 million tons of cargo valued at \$53 billion moved through Port facilities, and according to an economic impact report by the College of William and Mary, the Port's total economic impact for the Commonwealth of Virginia was \$60 billion. Related economic activity employs more than 343,000 Virginians and an additional 10% of gross regional product (35,000 jobs) was generated by Port of Virginia activities.

Sea level rise and flooding place this critical economic engine at risk. The Port of Virginia Master Plan 2040 [estimates](#) its facilities can withstand 1 foot of sea level rise. But, like the military, the Port depends on transportation infrastructure. Conservative estimates [project a 1.5' sea level rise](#) between 2032 and 2062, with risk to the Port.

Risk to Other Economic Drivers. 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.

Sustaining these important regional and global assets will require adaptation to sea level rise and proactive management of flooding risk.

Known Unknowns. The long range, end-of-the-century forecasts show significant uncertainty, with regional projections for sea level rise estimated between 1.5-7.5'. These projections are based on the US National Climate Assessment, which generated four scenarios of global sea level for its 2013 report to Congress. However, given current projections, a study by the Virginia Institute of Marine Science recommends that the regional cities plan for the 1.5' rise expected in the next 20-50 years under a very moderate scenario. This time frame takes into consideration potential sea level rise impact relevant to home mortgages and most public infrastructure systems.

Flood Risk and Insurance Coverage. A CoreLogic [study](#) demonstrates a large number of Hampton Roads residents are potentially uninsured for storm-surge flooding. Out of approximately 90 seaside communities, Hampton Roads has the highest percentage of homes (86% or about 340,000 homes) that are at risk of storm-surge flooding but are located outside a FEMA zone where flood insurance is required.

While we have limited regional data explaining flood insurance purchasing decision drivers, a RAND Corporation [study](#) finds that only approximately 20% of homeowners living in the most flood-prone areas buy federal flood insurance when not required to do so. Additionally, reduction in the number of insurers in the region ([55 percent](#) of insurers active in the Mid-Atlantic market will not sell policies for businesses and primary residences in the coastal region) has had an adverse impact on pricing likely causing

many consumers to opt-out of program participation. Additionally, according to an [ODU survey](#), 43 percent of survey respondents mistakenly believe that active homeowner insurance policies cover damage from flooding.

The challenge of water in Hampton Roads is made more difficult by the state of several cities' economic health. For instance, Norfolk is the 13th most fiscally stressed municipality in Virginia, and rated "High Stress" by the state's Commission on Local Government. Nearly 15 percent of Norfolk families live below the poverty level, nearly 50 percent of its census tracts are designated LMI neighborhoods, and almost 40 percent of them are designated as medically underserved areas.

Virginia is the first state to name a Chief Resilience Officer and is working collaboratively with the region to identify solutions to repetitive flooding issues. The City of Norfolk was named one of the nation's 20 Leading Resilient Cities Responding to Climate Change & Extreme Weather by the ICLEI (Local Governments for Sustainability, founded as the "International Council for Local Environmental Initiatives) - the world's leading network of over 1,000 cities, and one of the Rockefeller Foundation100 Resilient Cities. Although the region has worked diligently to mitigate against climate change risk, it lacks the resources to implement a comprehensive resilience plan.

EXHIBIT E: SOUNDNESS OF APPROACH

CONSULTATION. Stakeholder outreach and consultation have been primary drivers throughout the proposal development process. This proposal reflects the input of a wide range of stakeholders including multiple levels of government, human service providers

and other NGOs, private businesses, neighborhood organizations, philanthropic organizations, and concerned individuals. Input mechanisms included 100 Resilient City workshops, work groups and committee meetings, academia-led interactive community discussions, neighborhood-based community meetings, surveys, and one-on-one conversations.

Led by the Office of the Governor of Virginia, Virginia's Chief Resilience Officer and Virginia's Secretary of Commerce and Trade the strategic development process has been coordinated by Old Dominion University and the Hampton Roads Planning District Commission (HRPDC), in consultation with DHCD and vetted by all of the organizations identified as part of the Resilience Partnership (RP).

The Commonwealth's threats, vulnerabilities and hazards have been identified by engaging stakeholders around research-based information via individual and group consultations, as well as in working group sessions and regional hazard mitigation planning processes. Input also has been garnered through regional planning, education, and outreach events such as: a FEMA National Exercise Division tabletop exercise with over 200 participants; regular Hampton Roads *Sea Level Rise and Flooding Adaptation Forums* organized by ODU and HRPDC; an Urban Land Institute *Resilience Panel*, which conducted interviews with nearly 100 stakeholders; a *100 Resilient Cities* workshop with over 100 stakeholders; the HRCF's *Reinvent Hampton Roads* initiative; and, a new regional conference, "*TechSurge - Technical Support for Coastal Resiliency*," with over 250 planners from all levels of government and industry; and many additional community outreach and education activities (see Appendix I-Consultation Summary). As we move to Phase II, RP will use its wide network of engagement capacity to bring

together work groups and to distribute information to ensure that all stakeholders, most importantly vulnerable populations, are represented and informed about the process.

The binding issue for Hampton Roads is how to thrive as a model seaport community among rising seas, while facing uncertainty about the future of our main economic driver, and combating the effects of concentrations of poverty. These challenges may seem unrelated, but stakeholders, especially vulnerable stakeholders, agree they are interconnected and have a cumulative negative impact on our communities. Therefore, viable solutions must include strategies to mitigate all three simultaneously.

IDEAS AND CONCEPTS. With stakeholder input, Hampton Roads has designed a comprehensive approach that builds on strengths and converts risks and vulnerabilities into opportunities: *Hampton Roads will thrive with water by developing a model seaport region that derives its economic vitality from its position on the water.* Specifically, our strategy is to create long-lasting resilience at all scales by uniting the region around shared water challenges, improving economic vitality, and strengthening vulnerable neighborhoods by building social cohesion around water management solutions.

This proposal is a key to jump-starting the regional transformation to a model seaport equipped to handle rising waters. In turn, the Commonwealth of Virginia will use the region's experiences to surface, test and refine the best strategies for building resilient communities across a range of environments including communities with riverine flooding, periodic drought impacting agricultural production, concentrations of poverty and communities with low social cohesion. While we have a strong vision for the strategy, the RP will continually look for opportunities to strengthen our approach.

Hampton Roads communities understand how to live with water. As one of the first coastal regions to experience daily impacts of rising water, Hampton Roads has a head start on planning for mitigation and adaptation. In the last decade, more than 40 separate studies were completed by localities, universities, businesses, NGOs, military facilities and the Port of Virginia – all focused on innovative solutions to address new water-related challenges. The region's strategy leverages key knowledge, aligning it to a resilience framework to inform planning, investment and implementation strategies for thriving with water. Guided by the National Preparedness System, RP's approach features five lines of effort, each designed to achieve a major critical objective, address an unmet need, and provide replicable and scalable solutions to identified vulnerabilities (please see *Figure 1*).

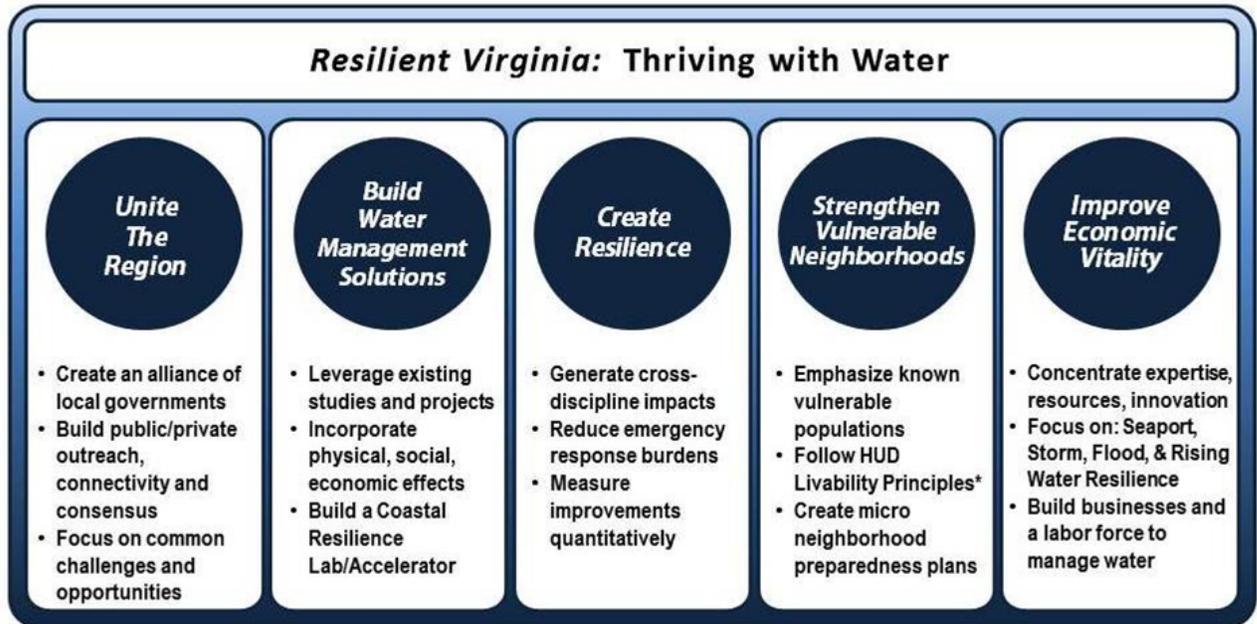


Figure 1. Hampton Roads' strategic, five-pronged approach to thriving with water.

Unite the Region: This approach helps unite efforts among the region's cities, businesses and residents, bound by a shared deep-water harbor, and common environmental

challenges and economic opportunities. RP members are already working to unite the region around economic development and entrepreneurship opportunities. This grant will help focus these efforts on water-based opportunities. Multiple cities struggle with managing water. This grant will pilot innovative strategies that can be used across multiple jurisdictions. Each city in the region has neighborhoods where vulnerable people live in harm's way. This grant will pilot social cohesion building practices in multiple cities to reduce their risks.

Create Coastal Resilience: RP will leverage shovel-ready water management projects to create a water resilience model and a methodology and planning tool to help coastal communities increase their physical, social, and economic resilience. This model, guided by the National Preparedness System, will focus on HUD's livability principles, and be driven by a resilience framework that ensures investments produce outcomes-benefits that increase the region's ability to survive, adapt and thrive in the face of hazards. These co-benefits, more fully explained in the Exhibit G: Outcomes section and include quality of life, environmental, business and workforce development benefits.

Build Water Management Solutions: RP will imagine, create, and build water management solutions that address current gaps in the region's capabilities, showcasing innovative multi-scale solutions, systems, and technologies useful to other seacoast communities. Due to our recognized threats, the region already serves as a natural lab for state-of-the-art water management practices. The Rockefeller Foundation-supported Structures of Coastal Resilience (SCR) design project and RE.invest Initiative grant, the USACE's North Atlantic Coast Comprehensive study, the Urban Land Institute's

Resilience Technical Panel and the Dutch Dialogue process all have selected Hampton Roads as testing grounds for new strategies for living with water.

The region's cities, Naval Station Norfolk and the Port of Virginia all have shovel-ready innovative projects to manage water. These projects are tailored to solve specific types of water-management issues and range from parcel-based solutions to large-scale infrastructure improvements. They incorporate innovative combinations of structural, non-structural, and nature-based measures deployed at different scales. Using this grant RP will align and showcase these innovations.

Improve Economic Vitality: In the coming decades, the region will invest heavily in water management and water mitigation systems. Using this grant we will develop local businesses that can do this work, capturing the economic benefit of our own spending. Hampton Roads will leverage the impact of the grant to accelerate the pace of building a regional business cluster, focused on water resilience innovation and entrepreneurship.

In collaboration with area universities and the private sector, a coastal resilience lab accelerator will be established to drive innovation and new businesses to bring these innovations quickly to market. By accelerating innovation, small business creation and workforce readiness, the grant will help ensure the seaport infrastructure is resilient to storms, reducing regional risk to these hazards. These efforts will give special attention to risks impacting our major economic drivers to ensure that they can carry out their missions over the long-term even within a rising water environment.

Strengthen Vulnerable Neighborhoods: In Hampton Roads, the increased frequency and intensity of storms, along with flooding, increases risk to vulnerable populations. A large number of individuals in Hampton Roads live independently but rely on daily support

services. This vulnerable population's survival is at risk when extreme events disrupt transportation, energy and other basic service networks.

Research done in the aftermath of Hurricane Sandy reveals that cohesive communities bounce back from disruptive events more quickly. Thus, project RP's approach will foster neighborhood cohesion to act as a mitigating force. The region has begun to pilot hyper-local networks to increase the probability that vulnerable residents can survive in place for short periods when essential support services are disrupted. Planning small networks of neighbors, by using technology that provides hyper-local information on conditions, transportation routes, shelter, food, water, and power availability, will coordinate needed care for populations at risk for survival during disruptive events.

Research suggests that financially vulnerable residents are more likely to choose to stay in the face of oncoming storms because they lack the financial resources to leave their homes for overnight stays. Using neighborhood networks to identify those residents who are at risk for survival due to disruptions but financially unable to relocate, RP will create a fund that can provide short-term assistance to enable residents to leave.

To further strengthen neighborhood resilience, RP will build on the existing efforts underway to and work collaboratively to educate residents and business owners about current threats and adaptive strategies to reduce risks. Regional efforts are already underway to find innovative approaches to distributing critical information in ways that drive behavior adaptation. A committee of business, government, and resident representatives is creating messaging around reducing resident and business vulnerabilities to flooding. Recommendations include color-coding frequent flooding areas, finding new ways to calculate the benefits of flood insurance, and integrating flood

risk reduction strategies into K-12 education as a way of informing parents about the importance of taking action.

EXHIBIT F: LEVERAGE AND OUTCOMES.

OUTCOMES. A major goal of our proposed approach is to transform how Virginians live with water. Our focus is a model redesign of a coastal community, concentrating on our most vulnerable citizens and neighborhoods where we can integrate new water management principles and mixed-use and mixed-income development practices that include accelerating the creation of businesses to enhance our ability to manage water and improve water quality.

Our strategy is multi-phased. In the near term, the strategy will focus on incorporating resilient water management strategies into ongoing projects, revisiting redevelopment plans and applying a resilience lens to them, selecting demonstration projects, conducting community outreach, educational initiatives, and advocacy for recommended policies and funding. This will also include replication and scaling of a neighbor-to-neighbor community-building pilot around disaster preparedness that is currently underway. In the mid-term, RP will implement pilot/demonstration projects, while continuing all of the above. In the long term, RP will scale and replicate these projects across Virginia in the context of new policies such as a resilient zoning code.

A main criterion for implementing RP's approach and selecting projects are the project's potential to deliver co-benefits. As demonstrated in Exhibit E, our infrastructure solutions include green and nature-based infrastructure that will provide not only recreational amenities, environmental benefits and storm water management but also social cohesion building and economic development co-benefits. Specifically, by

expanding the region's natural infrastructure (wetlands, shorelines, tree canopy, tidal streams and other landscape features) and building on restoration projects currently underway, a line of defense against storms will be provided, while also providing habitat and water quality improvements.

By increasing community resilience at the neighborhood level through social cohesion and network development for emergency planning, communities may over time reap additional resilience dividends. The neighbor-to-neighbor approach around shared water vulnerabilities may serve as an initial step for advancing resident-led vision setting for and revitalization of neighborhoods (re-norming and spill-over). Research shows that increased social cohesion translates into less crime and economic revitalization. Norfolk has successfully piloted such an asset-building model of redevelopment in the Park Place neighborhood.

Environmentally and Financially Sustainable Implementation. The region has been at the forefront of water quality improvements through the restoration of oyster reefs, wetlands and underwater grasses. RP will incorporate this type of innovation into its projects. The group is already experimenting with improving the quality of water in storage systems using natural filtration. The Rockefeller Foundation's RE.invest Initiative program provided water management strategies that have the potential of improving water quality including holding water in tree trenches, bio swales, rain gardens and other landscaping techniques. The RE.invest Initiative also recommended that the region become a lab for water management demonstration projects to attract water management business to the region.

The proposed approach will integrate locally and regionally appropriate new urbanism and smart growth development principles, while generating new businesses innovating in a model seacoast community.

Indicators of Success and Evaluation.

Uniting the Region examples of success will include: an increased number of projects completed collectively by regional partners; an increased number of projects funded by multiple regional municipalities; increased collaboration between the private sector and public sectors to create solutions; and a unified, regional vision for resilience.

Water Management success will include: increased capacity to manage water; increased integration of green, grey and hard infrastructure in water management solutions; reduction in days of flooding and decreased levels of flooding in project areas; and increased property values in project areas.

Neighborhood success will include: de-concentration of poverty in the project area; increased social cohesion as measured by the number of networks in place in the project area; increased housing values in project area; and reduced number of service calls from emergency management in the project area.

Economic Vitality success will include: increased number of small and medium-sized businesses; increased employment in water management; increased employment for entry level positions; and increased number of training certifications for retrofitting property.

Resilience success will include: integration of systems to manage water, number of cross-disciplinary impacts/co-benefits, increased ability of individuals to meet their basic needs through improved employment opportunities; and creation of more cohesive communities.

RESOURCES AND COMMITTED LEVERAGE. Innovative projects addressing water management are already underway across the region. Resilience Partnership (RP) members are working together to increase water quality, reduce the risk of water inundation and improve systems that handle precipitation that cause much of the region's flooding. Examples of these projects include a dune restoration effort funded by the US Army Corps of Engineers (USACE) and the City of Norfolk and EPA-funded wetlands restoration in the Mason Creek area of Norfolk.

The Virginia Port Authority and the USACE's Norfolk District are in the process of implementing a 10-year, \$70 million, 411-acre environmental mitigation plan which allows wetland creation and oyster restoration along the Lafayette and Elizabeth Rivers. In addition, Concursive Corporation is working with multiple cities and partners to develop a strategy for increasing the number of neighborhood networks that improve vulnerable residents' ability to survive service disruptions. RP member Hampton Roads Community Foundation is implementing a strategy to increase the number of business start-ups in the region. All of these efforts will enhance the implementation and maintenance of the grant strategies.

RP members assisted by the 100 Resilient Cities staff are in conversations with insurance and reinsurance representatives around the risks associated with increased flooding and its effects on insurance premiums. Swiss-Re, one of the leading reinsurers and 100 Resilient Cities' Platform Partners, is helping to develop methods to monetize potential insurance savings to fund mitigation efforts that reduce risk. RP will implement strategies to monetize savings developed through this process to fund projects and related maintenance.

Co-benefits of implementing the strategy will potentially deliver the significant cost savings and generate profit that will contribute toward its financing since a main objective is to manage water for long-term economic growth. RP will use the grant's economic impact to accelerate the pace of building a regional business cluster focused on water resilience innovation and entrepreneurship and developing workforce readiness with our educational partners.

The approach will also deliver significant cost savings by reducing the financial burden of flood insurance through the changes of the FEMA flood maps and localities' Community Rating System's (CRS) class. Other cost savings will accrue through averted losses to state and individual localities, businesses and residents. According to the Multi-hazard Mitigation Council, each dollar spent on mitigation saves society an average of four dollars in disaster response and recovery costs. The water management approach will translate into considerable savings. Illustratively, some \$17.4 billion in property value sits on the area less than 5 feet above the high tide line in Virginia. According to low range projections, this area has "a more than even chance" of floods exceeding today's historic records within the next 20 to 30 years, according to the Central Coastal vulnerability assessment for Virginia.

Committed Resources. A \$100,000 Kresge Foundation grant to the Urban Land Institute in December 2014 was matched with \$25,000 from the City of Norfolk to conduct a Fort Norfolk Resilience Panel that will inform project design. Old Dominion University has committed \$50,000 to be used as leverage.

EXHIBIT G: LONG-TERM COMMITMENT

The Commonwealth of Virginia, the Hampton Roads region and its individual localities have already taken major steps to improve permanent resilience far beyond its most impacted and distressed target areas. These include resilient legislative actions, raising standards, plan updates and alignments, and resilient actions related to financing.

Legislative and Administrative Action. In July 2014 Governor Terry McAuliffe signed Executive Order 19, convening a Climate Change and Resilience Update Commission “to prepare Virginia’s coastal communities to deal with the growing threat of climate change.” The Commission builds on the Virginia Governor’s Climate Change Commission, which laid out a detailed adaptation plan for the state already in 2008. Examples of implemented action includes the passage of the Coastal Resource Management Law of 2011 by the Virginia legislature which requires localities to include coastal management strategies – including sea level rise projections and scientific evidence – in their long range land use plans starting in 2013.

In response to recommendations by Virginia’s Subcommittee on Recurrent Flooding, Governor McAuliffe created the position of State Chief Resilience Officer to coordinate actions to build resilience in the Commonwealth.

Higher Standards at the Local Level. As a result of regulatory changes that give a preference to wetland restoration, to mitigate coastal erosion and federal water quality requirement that improved the cost effectiveness of the wetland restoration strategy, wetland restoration activities have increased dramatically in the region. In Norfolk alone, wetland areas increased from 3,124 square feet to 60,846 square feet between FY2008 and FY2011. Following Hurricane Irene, wetlands more than tripled to 217,070 square

feet by FY2014 as a result of dedicated restoration efforts. On the local level, many Hampton Roads cities have significantly raised standards in their floodplain ordinances in response to the increasing threat. Effective January 2014, Norfolk mandated 3 feet of freeboard for structures in the 100-year floodplain and 1.5 foot freeboard for structures in the 500-year flood zone.

Resilience Actions Related to Plan Updates or Alignment. As part of its long-term commitment to enhancing resilience, the Commonwealth of Virginia commissioned three formal reviews of climate change and its impacts. The three plans build on each other and include the 2008 Climate Action Plan, the 2013 VIMS study on Recurrent Flooding in Tidewater (Hampton Roads) Virginia and the September 2014 action plan by the Recurrent Flooding Sub-Panel of the Virginia General Assembly Secure Commonwealth Panel.

Several Hampton Roads cities are in the process or have already developed watershed management plans. For example, beginning in 2007 the City of Norfolk conducted a series of watershed specific coastal and precipitation flooding studies to better understand where and why flooding was increasing in the city. The studies resulted in the development in 2014 of a Comprehensive Flooding Strategy and a Combined Coastal & Precipitation Flooding Master Plan for the City. Since 2014, as part of the City's participation in the 100 Resilient Cities network, Norfolk has been developing a comprehensive resilience strategy for the city, including a long-term recovery plan which integrates lessons learned from previous events including Hurricane Irene and Hurricane Sandy as well as best practices from around the world. Norfolk is presently rewriting the zoning code ordinance which will be guided by a resilience framework being developed

in cooperation with 100 Resilient Cities, the American Planning Association, the Urban Land Institute and others.

Resilient Actions Related to Financing. The Commonwealth has begun actively exploring potential funding sources that could address the implementation and maintenance aspects of projects that will emerge from our overall approach.

The Hampton Roads localities have also begun developing new financing mechanisms dedicated to addressing the identified risk and vulnerabilities. For example, in 2012 Norfolk increased its Storm Water Fund by \$1 per month per customer account. This increase raises approximately \$1.3 million annually.