

Norfolk Virginia

December 14–19, 2014



Norfolk Virginia

Resilience in Fort Norfolk: Assessing Risk
and Protecting Value

December 14–19, 2014

About the Urban Land Institute

THE MISSION OF THE URBAN LAND INSTITUTE is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. ULI is committed to

- Bringing together leaders from across the fields of real estate and land use policy to exchange best practices and serve community needs;
- Fostering collaboration within and beyond ULI's membership through mentoring, dialogue, and problem solving;
- Exploring issues of urbanization, conservation, regeneration, land use, capital formation, and sustainable development;
- Advancing land use policies and design practices that respect the uniqueness of both the built and natural environments;
- Sharing knowledge through education, applied research, publishing, and electronic media; and

- Sustaining a diverse global network of local practice and advisory efforts that address current and future challenges.

Established in 1936, the Institute today has more than 34,000 members worldwide, representing the entire spectrum of the land use and development disciplines. Professionals represented include developers, builders, property owners, investors, architects, public officials, planners, real estate brokers, appraisers, attorneys, engineers, financiers, academics, students, and librarians.

ULI relies heavily on the experience of its members. It is through member involvement and information resources that ULI has been able to set standards of excellence in development practice. The Institute has long been recognized as one of the world's most respected and widely quoted sources of objective information on urban planning, growth, and development.

Cover: Wetlands Watch

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About ULI Advisory Services

THE GOAL OF THE ULI ADVISORY SERVICES program is to bring the finest expertise in the real estate field to bear on complex land use planning and development projects, programs, and policies. Since 1947, this program has assembled well over 400 ULI-member teams to help sponsors find creative, practical solutions for issues such as downtown redevelopment, land management strategies, evaluation of development potential, growth management, community revitalization, brownfield redevelopment, military base reuse, provision of low-cost and affordable housing, and asset management strategies, among other matters. A wide variety of public, private, and nonprofit organizations have contracted for ULI's advisory services.

Each panel team is composed of highly qualified professionals who volunteer their time to ULI. They are chosen for their knowledge of the panel topic and screened to ensure their objectivity. ULI's interdisciplinary panel teams provide a holistic look at development problems. A respected ULI member who has previous panel experience chairs each panel.

The agenda for a five-day panel assignment is intensive. It includes an in-depth briefing day composed of a tour of the site and meetings with sponsor representatives; a day of hour-long interviews of typically 50 to 75 key community representatives; and two days of formulating recommendations. Long nights of discussion precede the panel's conclusions. On the final day on site, the panel makes an oral presentation of its findings and conclusions to the sponsor. A written report is prepared and published.

Because the sponsoring entities are responsible for significant preparation before the panel's visit, including sending extensive briefing materials to each member and arranging for the panel to meet with key local community members and stakeholders in the project under consideration, participants in ULI's five-day panel assignments are able to make accurate assessments of a sponsor's issues and

to provide recommendations in a compressed amount of time.

A major strength of the program is ULI's unique ability to draw on the knowledge and expertise of its members, including land developers and owners, public officials, academics, representatives of financial institutions, and others. In fulfillment of the mission of the Urban Land Institute, this Advisory Services panel report is intended to provide objective advice that will promote the responsible use of land to enhance the environment.

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Urban Resilience Panels

WITH MUCH EXTREME AND DAMAGING weather occurring in recent memory, leaders in cities around the world are thinking about how to become more resilient in the face of those challenges. Resilience has taken on many meanings in many different contexts. The Urban Land Institute has joined a number of partner industries to create a shared definition of resilience: the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events. Implied in that definition is the ability not just to recover and bounce back but also to bounce forward and thrive.

The Kresge Foundation has provided generous funding support to ULI to undertake a series of Advisory Services

panels to assess how cities can better prepare for changes deriving from global climate change. Those changes range from rising sea levels and exacerbated drought and air temperatures to more extreme conditions, such as floods and wildfires.

The objective of such panels is to offer advice and guidance to communities that will assist their formulation of plans and policies and that will, in turn, create stronger responses to and recoveries from such events.

Acknowledgments

THE URBAN LAND INSTITUTE WISHES to thank the city of Norfolk for its support in sponsoring this panel, particularly Christine Morris, Ron Williams, George Homewood, Richard Broad, Lenny Newcomb, Peter Chapman, and Katerina Oskarsson, who ensured the panel's access to critical information and perspectives and facilitated an excellent seamless week of work. Thank you for inviting us into your community to share your challenges and to work toward solutions. ULI would also like to thank Ray Gindroz of Urban Design Associates and Thom White of Work Program Architects for their wealth of knowledge and their contributions to the success of the panel.

The Kresge Foundation also deserves sincere thanks for its generous support of ULI's Urban Resilience Program—support that has made these panels possible. The panel would also like to thank the more than 70 stakeholders from the Norfolk community who graciously provided their time and perspectives during the stakeholder interviews. This group of interviewees included elected officials, local business owners, community members, and municipal staff members. Throughout the week, the ULI panel was continually reminded of Norfolk's rich and diverse history and the commitment of its residents to protecting it.



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Background and the Panel's Assignment

THE HAMPTON ROADS REGION of southeastern Virginia has received national attention regarding sea-level rise (SLR). Regional land subsidence combined with coastal geography mean that the region faces the highest rate of SLR on the East Coast of the United States. Over the past 85 years, mean sea level has risen 14.5 inches in the region, compared with a global rise of eight inches over the past 140 years. The best available science suggests this rate is likely to accelerate in the future. Many parts of the region flood regularly at high tides. SLR will not only exacerbate regular high-tide flooding but also intensify flooding from regular storms, which are becoming more frequent and intense, because of the impact of SLR on the capacity of the existing storm sewer system.

Despite the challenges of climate and geography, the city of Norfolk is seeking to create a more vibrant and livable community for its residents. Using the Fort Norfolk neighborhood as a lens, the city wisely hopes to align its land use policies, economic development plans, and infrastructure investments in a way that protects existing cultural and economic assets, but will also create new opportunities for a resilient and thriving Norfolk.

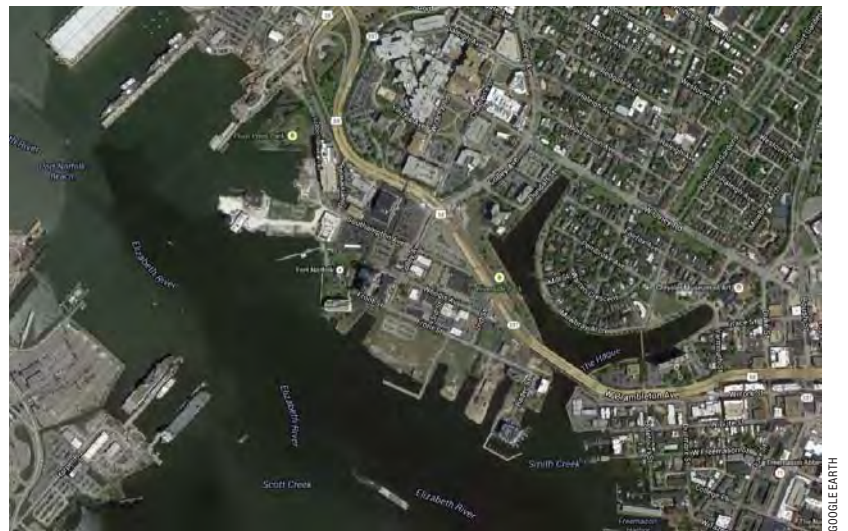
Study Area

Norfolk is known for the natural harbor located at the mouth of the Chesapeake Bay. Norfolk covers 66 square miles, with seven miles of Chesapeake Bay beachfront and 144 miles of shoreline. Norfolk, Portsmouth, Chesapeake, Virginia Beach, Hampton, Newport News, and Suffolk are the major cities in the 17-jurisdiction Hampton Roads metropolitan area (officially known as the Virginia Beach–Norfolk–Newport News, VA-NC Metropolitan Statistical Area). The region is home to 1.7 million people, and Norfolk is the second most populous city with more than 246,000 residents. The region is dominated by the presence of Naval

Station Norfolk, the largest naval base in the world. Federal spending, including Department of Defense spending, accounts for about 45 percent of the regional economy.

Norfolk boasts a long history as a strategic military and transportation hub and is home not only to Naval Station Norfolk but also to the only North Atlantic Treaty Organization (NATO) strategic command headquarters in North America. Norfolk is also home to a number of cultural amenities including the Virginia Opera, Chrysler Museum of Art, the maritime-themed science center and museum Nauticus, and the National Maritime Center and educa-

A satellite view of the study area.



tional institutions including Old Dominion University (ODU), Norfolk State University, Virginia Wesleyan College, and an expanding downtown campus of Tidewater Community College. Eastern Virginia Medical School (EVMS) and its four internationally recognized research institutes are located in Norfolk, as are Sentara Norfolk General Hospital; Bon Secours DePaul Medical Center; and Virginia's only freestanding, full-service pediatric hospital, Children's Hospital of the King's Daughters (CHKD).

The panel's study area was the neighborhood of Fort Norfolk, located on the banks of the Elizabeth River just northwest of downtown Norfolk. The neighborhood lies southwest of Brambleton Avenue, just west of the residential Ghent neighborhood. Toward the north end of the study area is the terminus of the Tide, a light-rail line that runs along Brambleton. The EVMS campus is across Brambleton to the north. The study area has a diverse mix of existing uses including a senior living facility; surface parking; and offices for the U.S. Army Corps of Engineers, the American Red Cross, People for the Ethical Treatment of Animals (PETA), and a television station. The site also has a substantial amount of vacant land along the waterfront.

Fort Norfolk, previously known as Atlantic City, was the subject of an earlier ULI panel in 2002. That panel recommended that the neighborhood be established as a mixed-use urban residential village, with extensive public access and open space along the waterfront.

The Panel's Assignment

The city of Norfolk asked ULI to convene an Advisory Services panel focusing on development opportunities in Fort Norfolk. The city sponsored this panel as a way to explore the best land use practices for urban coastal areas to ensure that Norfolk is prepared for increasing tidal and storm flooding in the future. The sponsor asked a series of strategic questions, which included the following:

- Given Fort Norfolk's waterfront location adjacent to an historic neighborhood, access to public transit, and proximity to downtown, what are the highest and best uses for the site considering rising sea levels and

increasing flood risk scenarios? What types of development would the current market support?

- How should future land use planning and development incorporate the impact of SLR on market potential, property values, and financing mechanisms?
- What are some recommended techniques for protecting development against flooding while also creating a walkable, active, human-scale environment?
- How can equity impacts be adequately addressed through resilient land use planning and infrastructure investment when some properties will benefit more than others and when some residents are disproportionately affected by risks from climate change?

What Is Resilience?

Resilience can take on different meanings and connotations depending on specific circumstances. Communities face different risks, face those risks in different degrees, and face risks with differing capacities to adapt. Generally, resilience is viewed as an ability to return to normal after a shock or stress, but ULI has looked to expand this perspective—to view shocks and stresses as an opportunity for a community to bounce forward.

The primary risk the panel has been asked to address is flooding—from SLR and storm surge, but also from rain. To address this risk, the panel has looked primarily at design, planning, and economic strategies for resilience, but the panel has understood that resilience also has important implications for health, social equity, and sustainability.

Indeed, those various aspects of resilience are intimately and inextricably linked. The physical form of a community can protect its residents and assets from flooding risks while reducing transportation impacts, encouraging healthy behaviors, and improving quality of life. Better economic conditions mean that residents will have more resources and better capacity to deal with the costly disruption of school, work, and life that a disaster can bring. Thoughtful and inclusive land use planning can ensure that a community is less vulnerable, more desirable, and better connected for residents from all backgrounds.

ULI has joined with a number of industry partner organizations in a shared definition of resilience:

To prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.

Approach

The panel was asked to look at Fort Norfolk, but it quickly became obvious that resilience challenges were ubiquitous in the region. Furthermore, the flood risks that are exacerbated by climate change are compounded by economic stagnation, social equity issues, and an uncertain future. At first glance, the study area appeared to be an ideal site in which to explore investments in resilience: although faced with a challenging landscape of parcel ownership and uncertain market demand, Fort Norfolk also held the promise and opportunity of a relatively blank slate with an advantageous location near transit and the buzz of downtown.

However, after many hours of conversations with residents, business leaders, government officials, and other stakeholders, the panel was left questioning whether the Fort Norfolk neighborhood was the highest priority area for the city to address resilience issues. Other neighborhoods, for example, have many more residents at risk to immediate and severe flooding issues with little infrastructural and economic capacity to meet those challenges.

The city of Norfolk has a number of areas of opportunity and need for its limited public and private resources. A decision by the city to invest in the study area will require balancing the needs and opportunities presented by the study area against the needs and opportunities presented by sites elsewhere in the city. Because every city has limited resources with which to address resilience, choices must be made.

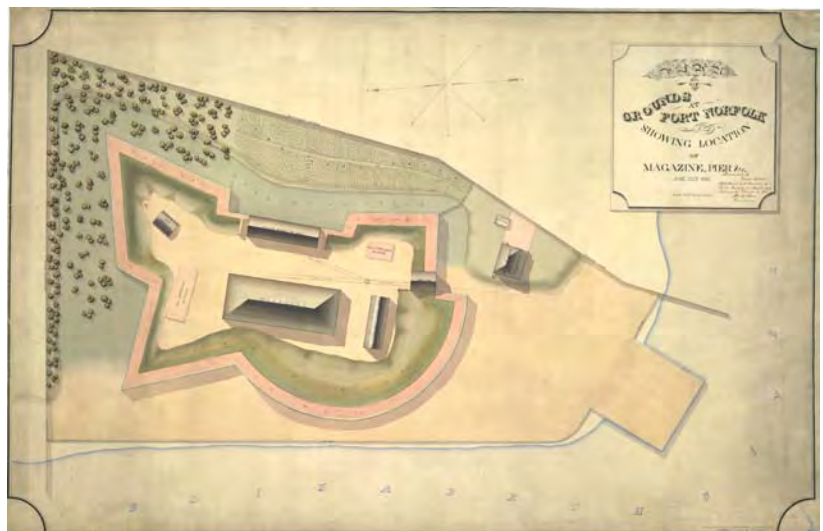
In making these difficult choices, the sponsor should identify those areas most essential to the city's long-term economic resilience and for the preservation of its social,

cultural, and historical heritage; the city should set priorities for such protection. This assessment should also seek to identify groups of residents that may be disproportionately exposed to risks from climate change or that may be disproportionately vulnerable to those risks. Furthermore, over time, the city may need to reduce its public investment in certain areas that are difficult to protect.

With a limited amount of time to prepare this assessment, the panel needed a narrow focus. Although this report will address resilience through the specific lens of the Fort Norfolk neighborhood, the panel intends that its recommendations and approaches are applied more generally to sites throughout the city. Although it was beyond the scope of this panel, a robust and detailed assessment of its cultural, historic, and human assets should be conducted by the city to determine which neighborhoods are most vulnerable to flood risk and how the approaches in this report can be applied to those areas to provide physical, economic, and social resilience.

Just as the historic Fort Norfolk, built on the high ground, has protected the city from military threats over the past two centuries, today the Fort Norfolk neighborhood can serve as a symbolic high ground—demonstrating how the city can protect itself from environmental threats for the next two centuries.

An 1860 plan for Fort Norfolk was designed to protect the city from naval threats.



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Summary of Recommendations

THE SPONSOR ASKED THE PANEL to consider strategic questions about resilience planning for the Fort Norfolk neighborhood. Those questions addressed market impacts from increased storm and flooding events, design strategies, equity impacts, and implementation strategies. Whereas the panel addressed these questions using Fort Norfolk as a lens, it strongly emphasized that now Fort Norfolk may not be the most critical neighborhood to address risks from climate change. Because of its comparatively underdeveloped nature, Fort Norfolk offers the chance for the city to think more creatively than might be feasible in other existing neighborhoods. However, the lessons from this exercise need to be applied to other Norfolk neighborhoods with the greatest resilience needs now.

The panel's recommendations are summarized as follows:

- **Transit-Oriented Development.** Locating housing and jobs near transit creates resilience through diversity of transit options. It also improves the economic opportunities for the region while reducing the total cost of ownership for residents, thereby allowing them to keep more value in the community.
- **Water's Edge.** Open space paired with temporary and low-intensity uses at the water's edge can fill the community's need for interaction with the waterfront while avoiding the cost and risk of permanent development. Well-designed green infrastructure can achieve this aim while also helping the sponsor achieve its sustainability goals.
- **Activate the Site.** Buildings and infrastructure are not enough. Programs and policies can create energy and momentum in the study area, which will help further establish a neighborhood identity while providing low-cost ways to jump-start economic development, provide

recreational opportunities, and reacquaint community members with their waterfront.

- **Opportunity for All.** Creating a diversity of opportunity for housing and jobs in the study area provides resilience against shocks that disrupt any one sector or group. Creating opportunities to build social cohesion provides a fabric of support throughout the community during adverse events.
- **Economic Strength for a Resilient Norfolk.** New economic clusters are needed to attract jobs and investment from outside the region and to provide resilience to economic shocks. These clusters should also develop an image of the region as one that is prepared for the challenges it faces.

Market

THE FORT NORFOLK STUDY AREA is best considered in two dimensions. The first dimension is time: What has the site been, what is it today, what might it be in the short run, and what kinds of outcomes are attractive in the medium to very long term? Time frames of interest include near-term momentum, intermediate-term financial returns, and long-term exposure to SLR, ground subsidence, and possible climate volatility.

The second dimension is the role and opportunity for the study area in the city of Norfolk with its portfolio of assets and interests and then further as a participant in the economic, demographic, and physical destiny of the Greater Hampton Roads region. The panel thinks that the fortunes of Fort Norfolk cannot be separated from the overall progress of its greater economic, human, and geographic setting.

To frame a discussion of the study area's market potential, the panel separates time frames and areas of geographic analysis and presents them in sequence. The panel's work is connected by multiple facets that include not only finance and market potential but also social equity, increased resilience and reduced vulnerability, the physical attributes of the study area, and the several different scenarios for phased growth and optimal use.

Trends

The Hampton Roads region is home to more than 1.7 million people and has a regional gross domestic product (GDP) of about \$88 billion. Naval Station Norfolk is the world's largest naval station, and direct and indirect impact of military spending accounts for about 45 percent of regional economic activity. While this military presence is a large portion of the current activity, it has been slowly but steadily declining for a number of years. Primary regional

private industry clusters in Norfolk are health care, retail, and accommodation and food services.

Data for the city of Norfolk show that population and GDP growth lag behind the rest of the country and that job growth is unexceptional. Through stakeholder interviews, the panel members heard that commercial real estate landlords perceive a musical-chairs scenario where tenants relocate but that little net new absorption of office space occurs. Similarly, new units of housing are absorbed each year, but the rate is slow to moderate. Taken together, these indicators forecast slow and uneventful economic growth. In the absence of any major disruptive sectoral shifts, the region's economy is likely to follow the sleepy pace of population growth.

The panel's initial research suggests that attracting new private investors to develop real estate projects in Norfolk may be difficult because of slow regional demographic

Norfolk GDP per Capita, 1998–2013
(2005 real dollars)



Norfolk Population Growth, 1998–2013



and economic growth, the existence of several capable incumbent developers, and the challenges of new development in a historic city. Commercial banks appear to be a source of commercial and multifamily finance in situations where the credit is strong and the projected cash flow is well understood, which currently excludes bank finance for condominium development.

Recent new multifamily development has included the use of historic tax credits as well as contributions of land as noncash equity. Programs with potential exist through the Virginia Housing Development Authority, and low-interest bonds are available. However, the panel's research indicates that the cost of debt is not a limiting factor; rather, the market rents for property in the study area do not justify the full cost of construction and fair market value of purchased land at any interest rate. This financial reality means that land must be contributed, development costs must be supported through mechanisms such as tax credits or grants, or revenue must be supported.

Key Drivers

These observations imply that commercial or residential development in the study area will not be driven by a broader trend of a rising tide of population or GDP per capita. Military spending cutbacks and a pending pivot toward Pacific-facing threats at best make the future uncertain. Businesses and residents will need to be attracted from other locations within the region. Whereas regional economic growth is tepid, a project in the study area could generate either new demand from outside the region or create an environment that is attractive enough to earn above-market rents.

Alternatively, the anchor institutions such as Sentara Norfolk General Hospital, CHKD, EVMS, or ODU could possibly work in concert with political leaders and entrepreneurs to create a magnet parcel that generates new jobs, new housing demand, and new value. When considering the context of resilience, the following sections explore three factors that have important potential impacts on the local economy: water, insurance, and brand risk.

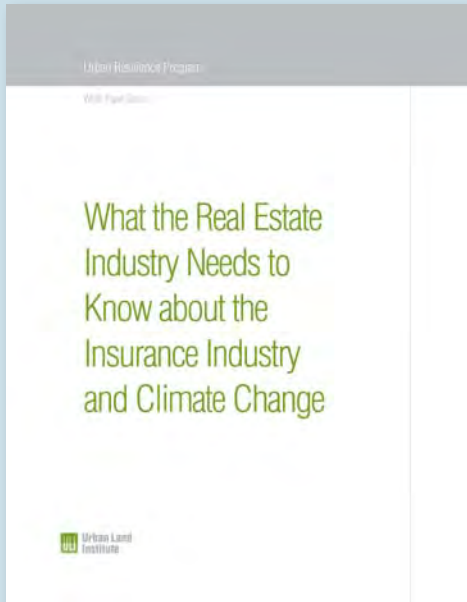
Water

The potential for SLR, changes in cyclonic storm patterns and strength, and variation in climate such as heavy rain are new considerations for planners and leaders in most coastal communities in the United States. Evidence at the Sewell's Point tidal gauge shows that mean sea level in the Norfolk area has risen by 14.5 inches since 1930. Projections indicate a range of further rise from 1.5 feet to 7.5 feet by 2100.

While those projections are associated with probabilities and the top end of the range may not occur, a greater-than-zero probability of significant additional rise exists. As articulated by the Federal Emergency Management Agency (FEMA) flood maps, this puts substantial population and property value at risk. In addition to the property damage exposure, extreme weather exposes lives to danger if safe ground cannot be found or if large segments of population need to be temporarily relocated away from the path of an advancing storm. The panel proposes that these exposures be treated as real and serious threats to economic and human well-being for Fort Norfolk and for the city as a whole and that the sponsor contemplates how to incorporate these emerging techniques in its planning and investment decisions.

Insurance

Property owners and users from the public and private sectors rely on insurance coverage for general liability and property and casualty exposures. In recent years, the insurance industry has started to look carefully at flood and storm exposures. At the same time, FEMA continues to redraw flood risk maps to take new information into account and to more accurately portray risk characteristics, which often change dramatically on the new maps. The private insurance market has raised premiums in some areas and completely withdrawn from others, reflecting its business assessment of probability of loss. At a minimum, these changes are an annoyance for private and public property owners as they are forced to (a) pay higher premiums for the same coverage; (b) accept reduced coverage; (c) spend money on capital improvements to strengthen structures; or, in the extreme situations, (d) abandon parcels or sell



Insurance and Climate Change

The ULI report *What the Real Estate Industry Needs to Know about the Insurance Industry and Climate Change* (2014) examines the flood insurance industry's responses to climate change and why the real estate industry can be increasingly confident in the stability and resilience of the insurance industry as a whole.

them at reduced prices that reflect a new perception of value. At worst, the cost or unavailability of insurance can prevent development or redevelopment of properties.

Brand Risk

Finally, beyond initial damages to property and subsequent losses from business interruption, a tertiary risk exists to coastal communities affected by climate change. If a city develops a reputation as a place prone to disasters and is ill prepared to deal with them, it may be seen as a riskier place to invest. As the panel members heard throughout the interviews, this risk to Norfolk's image is already being felt, rightly or not. Investment may drop in the future because an image of perceived risk can have serious



WETLANDS WATCH

The Norfolk mermaid sculptures have adorned the city since 2000.

economic impacts—impacts that are all the more harmful for a place that is already weakened from a major storm. Instead, the panel encourages the sponsor to turn the risk to its image into an opportunity. Much as the Dutch have recently been exporting their knowledge as masters of keeping the ocean at bay worldwide, Norfolk can become known as a city that is prepared for climate change.

Valuation

THE SPONSOR ASKED THE PANEL to address specific questions about market potential and valuation because the study area has a substantial amount of undeveloped or underdeveloped waterfront property. Under a previous vision for the neighborhood developed by Urban Design Associates (UDA), this waterfront area was envisioned with mixed residential and retail development. However, recent attention given to increased flooding and effects from climate change has created concerns about appropriate waterfront development. Concerns have also arisen about the effect of storm and flooding risks on the potential value of the property and whether underdeveloped land would be more valuable as a buffer to coastal risks.

Fort Norfolk Housing Market

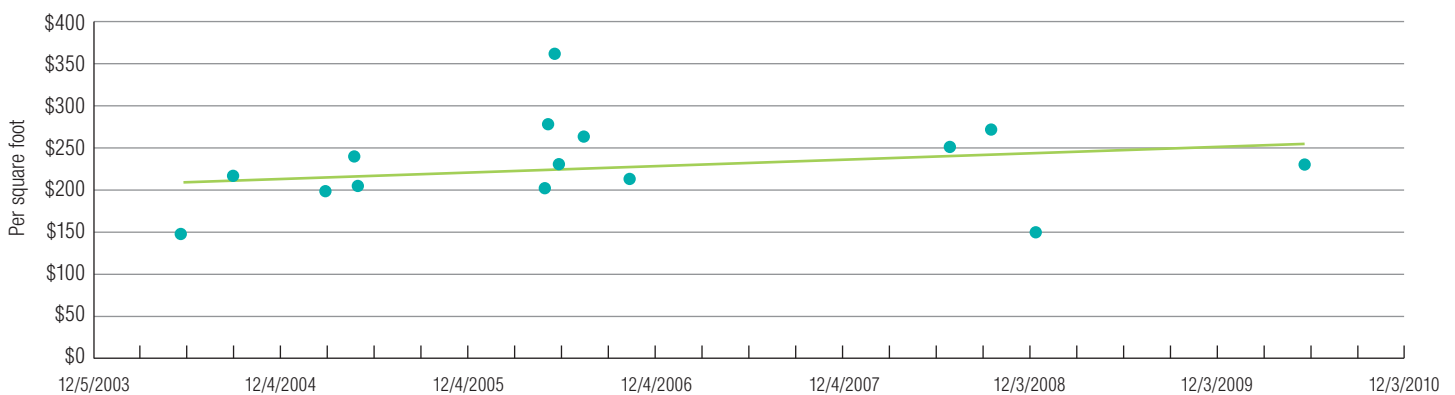
The panel examined the current residential housing market in the Fort Norfolk submarket. Three residential submarkets are represented in the study area: condominium, continuing care retirement community, and rental apartments. To understand potential housing trends, the panel conducted a paired sales analysis for the one condominium building in the study area, the Pier Condominium at 40 Rader Street. Located on the southeastern corner of the study area and constructed in 1918, it is the only

condominium in the Fort Norfolk submarket. Residents are allotted one off-street parking space and have access to a private dock. A mid-sized building with an elevator, it is located directly on the Elizabeth River. The building has direct river views to the west and south, partial river views to the north and city views to the east. Periodic flooding from the combination of heavy rains and tidal patterns can prevent car and pedestrian access to the building.

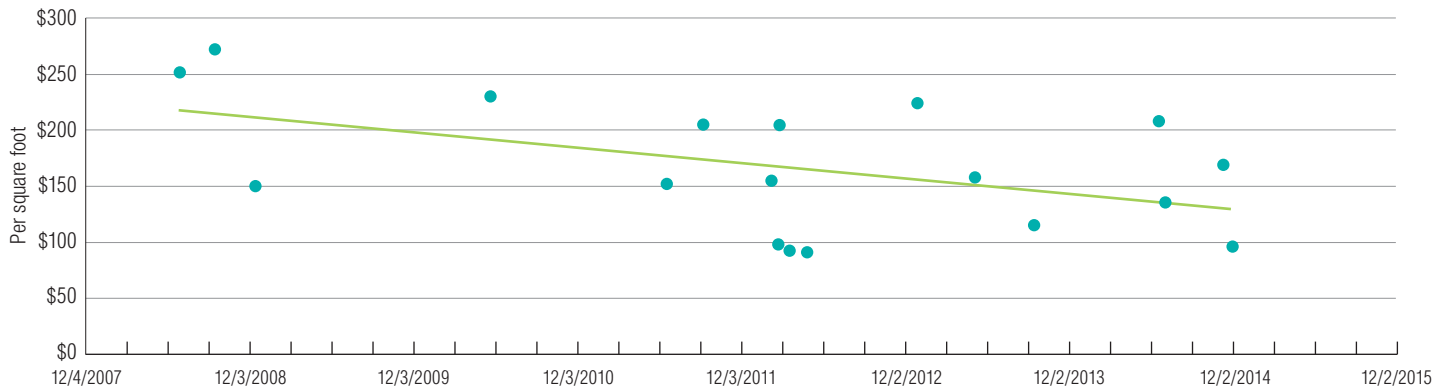
Using available closed sales data over the past decade, the panel looked at price trends for the 40 Rader Street property to illustrate the change in the market. The general trend in the building shows a modest price increase in the years leading up to the 2008–2009 financial crisis and a modest decrease in prices that continues today, five years later. The panel then conducted a paired sales analysis, which looks at trends over time for specific units or very similar units within the building.

This analysis reveals a much weaker market for condo sales, with an average price decrease of 31.9 percent for units that were sold before the financial crisis and then sold again after the financial crisis. The S&P/Case-Shiller Home Price Index shows an average decline of 15.9 percent across the United States and of 16.5 percent in the

40 Rader Street Sales Price Trend, 2004 (Pre-Financial Crisis) to 2010



40 Rader Street Sales Price Trend, 2008 (Circa Financial Crisis) through 2014



Washington, D.C., metro region during that time. The Fort Norfolk decline appears by this analysis to be about twice as bad as the national average.

Analysis for All Property Types

Although a detailed market analysis was beyond the scope of this study, the panel strongly recommends that the sponsor undertake such an analysis to better understand

the potential market for rental and condo units. Whereas the panel is confident of the implications of this brief snapshot, the sponsor should conduct a detailed market analysis of all property types to get a complete picture of the study area. This understanding will inform general planning as well as any planning for resilience infrastructure that might require assembling land parcels or collaborating among multiple owners.

Paired Sales Analysis, 40 Rader Street

Pre-financial crisis

Apt	Closing date	Price	Beds	Baths	Square feet	Price per sf	% change
305	8/31/04	\$278,000	1	2	1,280	\$217	
302	6/21/11	\$200,000	1	2	1,314	\$152	-29.9%

Post-financial crisis

Apt	Closing date	Price	Beds	Baths	Square feet	Price per sf	% change
107	5/25/10	\$205,000	1	1	891	\$230	
207	9/16/13	\$103,000	1	1	891	\$116	-49.8%
401	3/20/12	\$161,000	2	2	1,734	\$93	
301	4/27/12	\$158,000	2	2	1,734	\$91	-1.9%

Straddling pre-/post-financial crisis

Apt	Closing date	Price	Beds	Baths	Square feet	Price per sf	% change
202	10/16/06	\$280,000	2	2	1,314	\$213	
302	6/21/11	\$200,000	1	2	1,314	\$152	-28.6%
402	5/2/05	\$269,500	1	2	1,314	\$205	
302	6/21/11	\$200,000	1	2	1,314	\$152	-25.8%
510	5/10/06	\$414,000	2	2	1,490	\$278	
510	6/18/14	\$310,000	2	2	1,490	\$208	-25.1%
106	9/18/08	\$380,000	2	2	1,397	\$272	
206	12/27/12	\$320,500	2	2	1,430	\$224	-17.6%
512	4/25/05	\$364,500	2	2	1,519	\$240	
312	12/1/14	\$144,000	2	2	1,497	\$96	-59.9%
610	5/23/06	\$595,000	2	2	1,648	\$361	
310	3/2/12	\$315,000	2	2	1,540	\$205	-43.3%
511	5/2/06	\$325,000	2	2	1,610	\$202	
611	5/7/13	\$279,000	2	2	1,768	\$158	-21.8%
						Average	-31.7%

Planning and Design

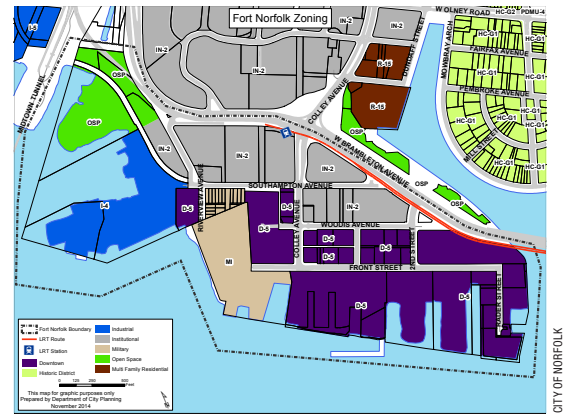
THE PREVIOUS PLAN FOR THE STUDY AREA was completed in 2004 by UDA and provides an overall master plan and design guidelines for the development of the study area. (That year, SLR was a local issue, but it did not receive the same caliber of attention as it does currently.) The UDA report calls for a mix of residential, waterfront retail and restaurant uses, office and research facilities, and public open space along the waterfront.

The UDA plan was completed before the SLR became an urgent local issue and before Phase 1 of the Tide light-rail system was finished. While the plan made sense when it was created, these factors along with the changes in the market conditions over the past decade challenge the original plan's feasibility.

Norfolk's comprehensive plan and its zoning ordinance provide a current policy framework for the study area. The city's future land use plan illustrates a concept for higher-density development along the southern half of the study area as well as on the peninsula that extends west. The property along the blocks closest to the Tide station is shown as institutional. No open space is shown along the waterfront in this plan. The zoning for the study area includes high density areas along the waterfront, industrial



The 2004 planning vision for the study area.



Current zoning puts density in parts of the study area that are vulnerable to flooding.

uses on the peninsula to the west, and institutional uses on the parcels adjacent to the Eastern Virginia Medical Center (EVMC) Tide station.

The current study area includes a wide range of under-used properties, low-density single-story structures, vacant parcels, surface parking, and a few significant existing buildings. These buildings include the Harbor's Edge Retirement Community, the U.S. Army Corps of Engineering (USACE) building, the Riverview Lofts, Fort Norfolk Plaza medical building, the EVMS facilities, the Pier Condominium, PETA headquarters, National Oceanic and Atmospheric Administration (NOAA), WVEC TV, and the American Red Cross. Historic Fort Norfolk is located on the site but largely hidden behind the USACE and Harbor's Edge buildings. The study area has a number of existing streets—including Colley Avenue, Southampton Avenue, Woodis Avenue, Rader Street, Second Street, and Front Street—that provide access to most of the property and provide two access points onto Brambleton Avenue—at Colley Avenue and at Second Street.

A key element of the study area is the Flood Insurance Rate Map proposed by FEMA, which is under review by the city and anticipated to be adopted by early 2016. This map shows a substantial portion of the study area to be within the 1 percent annual flood probability (i.e., the 100-year floodplain) with additional exposure to damage from wave action. These areas in the floodplain have a 26 percent chance of experiencing a flood over a 30-year mortgage period, and these risks may increase as the sea-level rises. Establishment of these zones by FEMA will either limit development or require that portions of the site be raised to a height of about 11 feet above mean sea level to help protect those areas from flooding.



Top: The existing Flood Insurance Rate Map shows much of the study area exposed to a 1 percent annual chance of flood. Bottom: the proposed new Flood Insurance Rate Map shows even more land in the study exposed to flood risk.

Opportunities and Constraints

Based on the existing conditions of the study area and the adjacent areas, the panel recognized a number of opportunities and constraints that will affect future development.

Opportunities

- Proximity of the Tide station: The majority of the Fort Norfolk site is within a five- to ten-minute walking distance of the Tide station.
- Adjacency to the EVMS: This facility and major employer provides a medical amenity for residents of Fort Norfolk and an opportunity to attract additional medical businesses to the area as well as housing for the employees.
- Connection through Colley Avenue and Ghent: These areas provide stable neighborhoods as well as commercial uses that can help support growth in the study area.
- Downtown Norfolk: The Tide station and continuation of the Elizabeth River Trail to downtown offer strong connections to the city's commercial center.

Constraints

- Ownership is fractured in the study area.
- The proposed FEMA map affects a large portion of the study area.

Design for Resilience

Design plays an important role in creating resilient communities. For coastal urban communities such as the study area, water management is a critical element of being prepared. Impermeable surfaces already contribute high volumes of storm runoff to nuisance flooding throughout the region, as SLR reduces the outflow capacity of the existing storm sewers. While the study area is relatively underdeveloped with many vacant parcels, it already has the beginnings of stormwater problems, with several surface parking lots that the panel observed to be empty in the middle of a workday. As the site develops, the sponsor should consider comprehensive strategy to manage parking. Below-grade structured parking coordinated with



The study area includes many underused parking lots.

a regional transportation system could improve stormwater flooding while also preserving higher-value uses of property at levels above grade.

Beyond addressing permeability concerns under existing conditions, many design strategies should be incorporated into the study area, many of which overlap with general sustainability best practices. Since the particular risk relevant to the study area is flooding from rainfall and storm surge, both exacerbated by climate change, the design strategies implemented in the area should focus on this risk. Many studies have been done on the value of green infrastructure for this purpose. Particularly, the two publications *Value of Green Infrastructure* (Center for Neighborhood Technology, 2010) and *Economic Benefits of Green Infrastructure in the Chesapeake Bay Region* (EcoNorthwest, 2011) and the Systems Approach to Geomorphic Engineering at the Virginia Institute of Marine Science would be valuable resources. A summary of some common design strategies follows.

Green Roofs

Vegetated roof systems help mitigate stormwater flooding by reducing the amount of stormwater entering the system and by delaying the peak rate of discharge. These systems can also reduce building energy use and urban heat island effect while providing habitat for birds, butterflies, and other wildlife.

Cisterns

Stormwater that falls on roof surfaces can be collected in cisterns or rain barrels, reducing the stress on the storm sewer. This water can often be reused for landscaping in drier months, thereby reducing potable water consumption.

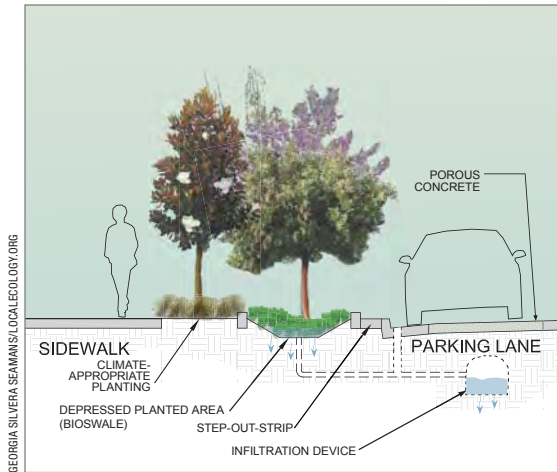
Permeable Pavement

Permeable pavement can provide enough structural stability for vehicle traffic while allowing stormwater to percolate through the material instead of running off to the storm sewer. A common configuration for such pavement involves reducing the amount of fine material in a standard mix, thus leaving gaps between the aggregate material. Many products are on the market, ranging from concrete to asphalt and even modular products such as pavers. If deployed strategically for local topography, a relatively small amount of permeable pavement can reduce large quantities of runoff.

The city of Santa Monica modified a section of Bicknell Avenue with bioswales and permeable pavement to collect urban runoff before it entered the storm drain system.



GEORGIA SILVERA, SEAMANS/LOCALECOLOGY.ORG



The city of Santa Monica modified a section of Bicknell Avenue with bioswales and permeable pavement to collect urban runoff before it entered the storm drain system.

Bioretention

Plant material and bacteria in soil naturally treat runoff, which in turn reduces the quantity of runoff that enters the watershed and also improves the quality of the water through treatment. In urban areas, this natural treatment is typically achieved by directing stormwater flows to mini-swales or retention basins designed for this purpose.

Underground Reservoirs

A large-scale version of cisterns, underground reservoirs can store large amounts of water. If combined with treatment, this water can reduce potable water needs. Because reservoirs are typically larger infrastructure projects, combining this project with other excavation work for buildings or utilities makes sense.

Living Shoreline

Living shorelines use natural features to protect against erosion and to reduce wave energy along the shoreline. Using natural features instead of traditional bulkheads and seawalls has multiple ecosystem benefits and can be less expensive and more effective than traditional engineering strategies. The sponsor should consider a living shoreline along the Hague Park area. Potential future development of open space and parks along the waterfront in the study area may also present an opportunity for a living shoreline, but this would have to be assessed for feasibility with the

existing seawall infrastructure. It would be ideal to have a comprehensive plan for green infrastructure that connects and coordinates with areas adjacent to the study area, such as Hague Park, Plum Point Park, and others.

Raise Front Street

The southeastern portion of Front Street lies in a vulnerable area on the proposed FEMA flood map revisions. If the sponsor considers future open space uses for waterfront property in the study area, the sponsor should also consider raising the elevation of Front Street at its vulnerable areas to minimize flood damages and to provide protection. A raised elevation can be well integrated with parks and open space to protect land parcels that are further inland as well as to ensure continuous access in the study area during a flood.

Renewables and Storage for Buildings and Critical Infrastructure

Although the main risk to the study area is from flooding, the sponsor should consider a strong push for renewable energy with backup storage. The pump station in the study area is a critical facility, and Harbor's Edge Retirement Community and EVMS would benefit from a more robust assurance of power. Although those facilities have backup generators, the panel noted that access to the study area may be limited during a major flood. As New York and New Jersey residents learned during Superstorm Sandy, generators were not much use without fuel. The large amount of open space and surface parking in the study area could present an opportunity for large-scale solar generation. Such an investment would also be consistent with the sponsor's sustainability goals and would likely be cost-effective at a neighborhood or district scale.

Planning for the Future

Whereas specific design strategies can be deployed to improve resilience, incorporating resilience thinking into longer-term and larger-scale land use policy and planning is important. Because the timeline for these processes can be long, careful consideration must be applied to anticipate impacts far into the future but also to build the



The Tide Light Rail Line, highlighted in blue, runs adjacent to the study area.

political and financial support for the strategies now. The following sections outline some planning recommendations that may be applicable specifically for the study area. But more broadly, the panel hopes that the general method of applying resilience thinking can be useful throughout the Hampton Roads region.

Transit-Oriented Development

One of the panel's primary recommendations is to revise the previous plan for Fort Norfolk, which focused on development at the waterfront. With the addition of the Tide light rail, the focus on resilient development, and the anchor of the EVMS, the panel recommends the sponsor focuses on phased development, with initial mixed-income and workforce housing building out from the Tide station. This initial phase would help support more mixed-use development in the future.

The study area is served by both auto and transit transportation systems, as well as the Elizabeth River Trail for

bicyclists and recreational users. Encouraging transit-oriented development along the northern edge of the site near the Tide station would provide residents, workers, and visitors to Fort Norfolk a range of transportation options. During storm emergencies, residents and workers at the site would have multiple options for gaining access to and from this location. Whereas residential net absorption in central Norfolk is limited, the sites at the Tide's EVMC/Fort Norfolk station could draw tenants from anywhere on the Tide line as well as from the adjacent medical center. Several sites are available in the immediate vicinity of the Fort Norfolk stop.

Shifting Tide

Since ULI's last panel study of this area in 2002, perhaps the greatest change is that the study area is now traversed by the Tide, Norfolk's light-rail system: the station for Fort Norfolk lies to the west of the site, which is also the westernmost terminus of the line. Given that the medical center is immediately north and west of the EVMC/Fort Norfolk

Lessons from Estes Park

In 2013, northern Colorado experienced a 1,000-year rainstorm that caused devastating flooding throughout the region. Estes Park is a small mountain community at the gateway to Rocky Mountain National Park. Along with its bucolic charm and frontier appeal, the community is also known for expensive real estate and vacation homes. Many of the emergency and service workers who help keep the town running cannot afford to live there and commute from other towns. When the storm washed out the only road into Estes Park from those towns, those workers were not able to get there. Through heroic efforts, the community airlifted medical workers and patients in and out of the town, but at great financial cost. This event has highlighted how communities may need to consider workforce housing as part of its resilience infrastructure.



When a main road to town washed out in a flood, lack of affordable housing became a resilience issue in northern Colorado.

station, the station is particularly convenient for commuting medical center employees as well as patients. Although current ridership is relatively modest, the presence of the Tide station opens up entirely new opportunities for transit-oriented development in Fort Norfolk.

Plans for expanding the Tide line are progressing and have the potential to dramatically increase ridership. Higher ridership would increase Fort Norfolk's exposure to users from the metropolitan area and could become a major economic driver for Fort Norfolk.

The route that is ultimately selected for expansion will affect future visibility of Fort Norfolk and the traffic to Fort Norfolk. The proposed eastern alignment runs along a highway right-of-way that is a straighter line to the naval base, which makes the segment running through Fort Norfolk a stranded spur—not ideal for development. The proposed western alignment passes Fort Norfolk and ODU on the way to the naval base. Connecting the university population and the naval base workers to the downtown core of Norfolk with a route that passes through Fort Norfolk would be ideal for the development of the neighborhood, especially if the route aligned with the transit stop and not the waterfront as previously envisioned. This development, along with increased transit ridership, would create density

and help increase economic activity. Creating housing for medical workers would improve the resilience of the region in the event of a crisis. Workers who live near their jobs are more readily able to return to work in the aftermath of a crisis. For a critical medical facility, these workers are essential for the safety and recovery of the entire region.

While the different routes proposed for expansion in Norfolk would have different effects on the Fort Norfolk study area, the panel noted that any expansion of the Tide line would likely have positive benefits for Fort Norfolk through increased ridership and better regional accessibility. By the same reasoning, an expansion of the Tide to connect with Virginia Beach would benefit Fort Norfolk by increased ridership on the line and, especially, an increase in regional users.

Waterfront Access and Recreation

Panelists heard a consistent theme from stakeholders: public access to the waterfront is crucial to the success of Fort Norfolk. Many commented that despite Norfolk's abundance of water, the city offered no place to have a waterside dinner; others commented on the city's lack of marina space. To appeal to all residents and to maximize energy, momentum, and community support for progress at the study area, the sponsor should collaborate with

“Public access to the waterfront is crucial to the success of Fort Norfolk.”

—from stakeholder interview

private property owners to provide creative public access to waterfront spaces. A food truck festival, engagement with the local arts community, or other events could be low-cost ways to increase access and connection to the waterfront in the study area.

This study area also provides an opportunity for more community-oriented waterfront access and affordable recreation options. Town Point Park is an urban, formal park on the Elizabeth River that is used for major events and programs. The waterfront park can provide a more informal, community-oriented passive and active recreation space, possibly with water sports such as canoeing and kayaking. The public space should be available to be used by all city residents, further reinforcing opportunities for connecting socially and building community. Links to the Elizabeth River Trail and better access to Fort Norfolk will also increase the use and social connectivity of the site's public spaces.

Open Space and Trails

Many stakeholders mentioned a desire to see more open space throughout the city. Because public access to the water is somewhat limited, the study area offers an opportunity to create both active and passive open spaces. The panel suggests that the sponsor creates parks and open spaces in Fort Norfolk as part of a citywide strategy for increasing open space, recreation opportunities, and access to the water, such as through extending the Elizabeth River Trail.

The Elizabeth River Trail provides an existing example of the benefits of recreation and public space, but also an example of how this space can be used to enhance community connectivity. The trail currently runs through the middle of the Fort Norfolk neighborhood. To maximize the aesthetic appeal of the trail and its ability to connect users

with the waterfront, the alignment of the trail may need to be changed so that it is directly on the coastline. If parks and open space were included in the vision for the Fort Norfolk waterfront, this alignment could be coordinated with site planning to help improve grading, stormwater management, and storm-surge protection as part of a larger resilience strategy. At the same time, improving this trail and increasing visitor traffic on it could help strengthen connections between the study area and adjacent neighborhoods, thereby improving the sense of access and interchange in multiple areas.

Historical Fort Norfolk

Finally, although the study area is called Fort Norfolk, the actual fort is hemmed in by the U.S. Army Corps of Engineers building and Harbor's Edge Retirement Community and has limited visibility and access. Rich with history, Fort Norfolk is the last surviving fort of the chain of coastal forts that George Washington commissioned to protect the early United States from foreign attack. During the Civil War, it was occupied by Confederate troops first and then by Union troops. But the landmark is not widely known even to residents of the region. Fort Norfolk could become a rallying point for its namesake community. Increased access through the Army Corps property and improved wayfinding signs for the fort would create a stronger sense of place and a grounding in the history of the region while also attracting more interest in the neighborhood.

Although the U.S. Army Corps of Engineers generously administers Fort Norfolk and the Norfolk Historical Society generously cares for portions of it, the resources of both the Army Corps and the Historical Society are very limited for a demanding task. That Fort Norfolk is of national significance suggests a national solution is needed, such as association with the major Civil War organizations, action by the National Trust for Historic Preservation, or creation of a separate Fort Norfolk Foundation.

Governance

One of the most challenging planning issues at Fort Norfolk is translating community priorities and interests

into an actionable consensus. Many owners are concerned about property, the city is concerned about how to create a vibrant neighborhood in the face of rising seas, and the larger community is concerned about equitable impacts from development. Once a stronger community consensus is achieved, procedural questions arise about how best to address issues of land use. In this section, the panel has recommended some ways that the sponsor can approach community engagement and land use strategies.

Making It Official

The panel heard from several community stakeholders that Fort Norfolk should create a community development authority (CDA). It may be necessary for the city of Norfolk to create such an authority on its own initiative. Under Virginia law, 51 percent of the landowners in the jurisdiction of the CDA must agree to its creation, so the CDA must take the interests of the landowners into account.

The main advantage of a CDA is that it constitutes a vehicle for the reception of revenue. Such an authority could create a tax increment financing overlay district, which could apply sales and employment taxes from the area to support bond payments. In addition to addressing conventional redevelopment costs, a Fort Norfolk CDA could also address long-term resilience infrastructure costs. Precedents exist for CDAs in the Hampton Roads region as well as elsewhere throughout Virginia.

While a CDA would enable the sponsor to address long-term capital financing for the study area, a business improvement district (BID) would be useful to address other concerns. Although there may not be enough business activity in the study area at present to support its own BID, the sponsor could consider collaborating with neighboring BIDs such as the Downtown Improvement District to help with programs and site activation in the study area. Having a nearby champion to house these efforts would strengthen and help publicize the identity of the study area to the rest of the region. If the sponsor is successful in attracting new activity to the study area over the long term, the sponsor should consider establishing a stand-alone BID for the study area.

Finally, the sponsor should consider creating a more formal way for the residents and stakeholders of the study area to participate in shaping its future. Many active community organizations already exist in Norfolk that might serve as models. Having a good process for community involvement will help to create interest and a sense of ownership in the future success of the study area. Even though the study area currently has few residents, the panel noted that many current and former civic leaders live at the Harbor's Edge Retirement Community. This population presents a rich resource of knowledge and history that can inform any development in the study area. A robust shared interest could arise from a structured dialogue with the Fort Norfolk community and input from the many commuters who have now gained exposure to the study area by riding the Tide.

As the study area grows and develops, a formal community organization would be able to establish a liaison with neighboring community organizations to share knowledge and find common interests in this area of Norfolk. These community connections would create knowledge, trust, and social capital that would be instrumental in addressing both resilience for catastrophes and long-term resilience planning.

Land Use Transaction and Control Strategies

Redeveloping Fort Norfolk from a transitional industrial area to a thriving mixed-use community will likely require a wide range of land use transaction and control strategies. Those strategies may also be needed to address issues of landowner equity. If waterfront properties are needed to provide flood protection or resilience for the larger community, then a method for compensating those property owners would be justified. Similarly, if investment in public infrastructure is made to improve the resilience of a neighborhood, the neighborhood should have a way to contribute ideas to that project.

Ultimately, if development is phased to build outward from the relative high ground near the Tide station, these issues may not pose serious challenges, as both climate and market forces may act to diminish the potential for develop-

ment in riskier areas. Following are suggestions for land use control strategies that may play a role in the resilient development and protection of the study area.

Land Swaps. Given the relatively fragmented ownership of the Fort Norfolk area, land swaps, perhaps in the form of tax-free 1031 exchanges, may be needed to consolidate smaller parcels into sites that can be developed or to transfer value in an equitable manner. For example, a swap of land north of Front Street for some of the waterfront property may help to free up the waterfront property for public use.

Enhanced Use Leasing. Where specific congressional authority has been granted to an agency, unneeded federal property can be ground leased to a developer to make improvements while the federal entity retains ownership of the property.

Transfer of Development Rights. It may be possible to compensate owners of vulnerable, undeveloped waterfront property by establishing transferable development rights. Either through direct sale or through banking, these development rights help steer development away from threatened areas and toward more desirable locations.

Implementation

ALTHOUGH THE BUILT ENVIRONMENT has received much of the attention in resilience planning, economic and social factors are equally important in creating community capacity to withstand shocks and stresses. Areas that are stronger economically have more resources to support rebuilding and recovery efforts. Individuals and families with a financial cushion are better able to put their lives back in order after a storm. Furthermore, regional economies that are diversified and thriving are more resistant to collapse from shocks than economies that rest solely on one or two pillars.

Social connections in communities also help mitigate the impacts of severe weather and natural disasters. People who have deeper networks, developed through relationships of trust and transparency, are more likely and able to help each other in times of crisis. The broader the spectrum of people and families in a specific neighborhood or community who are connected with each other, the broader the beneficial aspects of this social resilience will be experienced.

A microcosm of the social capital effect occurs in Harbor's Edge Retirement Community during storms: employees of the complex bring their families into the facility during storms and emergencies, resulting in the creation of a community of mutual support during periods of severe weather.



Economic and social factors are in many ways distinct from the buildings and infrastructure that defend and accommodate climate-related risk. However, it is important to understand that strategies and policies for the physical community can have positive or negative effects on a community's economic and social well-being; all the factors are intimately related. Communities must be designed intentionally and with purpose to be sustainable, diverse, inclusionary, and resilient.

Innovation for Economic Resilience

The naval base has been a consistent driver of the regional economy. However, the heavy reliance on defense spending and port activities are themselves resilience risks to Norfolk and, by extension, Fort Norfolk. Exposure to this risk may be exacerbated if the U.S. Navy shifts to a Pacific-focused alignment as expected. Norfolk needs to plan for a future that is, if not completely without a Navy presence, at least a future with a diversified and expanded set of economic drivers.

To increase economic resilience, Norfolk should continue to consider economic development approaches such as cluster development and support for entrepreneurialism and arts and culture. To this end, the panel recommends that the sponsor should put in place an updated, local-scale economic development strategy to guide strategic decision making and cultivate local and global business. In many ways, Fort Norfolk offers an opportunity to test economic development approaches and pilot projects that can form part of a cohesive economic development strategy grounded in the needs of the local business community and can leverage local assets.

The local economic development community, including the Greater Norfolk Corporation, is examining cluster develop-

Building on Innovation: Key Principles

After seeing the success of innovation districts such as Silicon Valley and Research Triangle, many cities have been eager to create their own. In ULI's *Building on Innovation* (2011) report, Tom Murphy, a ULI senior resident fellow and former mayor of Pittsburgh, explores the innovation economy, the role of anchor institutions in it, and how to create the conditions for success.

- **Don't believe your press release.** It is important to take an honest look at your community's existing assets, to build on your strengths, and to improve on your weaknesses. In the innovation economy, regions need to be competitive globally, not just locally. Who are your anchor institutions, and what are their core strengths? What areas can you compete in globally?
- **Show me the money.** To generate new economic engines, it is important to demonstrate that research and ideas can be effectively commercialized. Having high levels of government or institutional funding by itself is not enough. How much venture capital exists in your community? How will you attract those investors to your community to support the creation of new businesses?
- **Have a culture of entrepreneurship.** As evidenced in the San Francisco Bay area, leading entrepreneurial communities have a culture that is embedded in the community. Is your local culture driven by innovation and problem solving, or is it driven by existing practices and procedures?

ment approaches as well as programs that could stimulate entrepreneurialism and innovation. That community recognizes the opportunity afforded by anchor institutions such as EVMS and Sentara Norfolk General Hospital, and plans are underway to create an Innovation Crescent that would span from the arts hub north of downtown and reach ODU through the medical campus in Fort Norfolk. The panel noted that the empty research and development (R&D) space in the Sentara building indicates that a partner needs to be identified to offer incubation and acceleration programming for this site and to make good on the vision of the Innovation Crescent.

Experts in the implementation of innovation districts emphasize that underlying conditions that support economic, physical, and networking assets such as healthy access to venture capital, presence of R&D funding, and—critically—a spirit of entrepreneurialism will dictate the success or failure of innovation district initiatives. Furthermore, Norfolk needs to remediate these conditions to unlock the potential of the Innovation Crescent. Support for the local ecosystem is essential, as stakeholders expressed that the spirit of entrepreneurialism is dampened by the culture of pursuing defense-related contracts and the accompanying lethargy of bureaucratic processes.

One stakeholder described Norfolk's paucity of New York-style hustle that is needed to spur startup activity.

As noted previously, Norfolk needs a cohesive economic development strategy. However, the panel has identified a number of initiatives that offer quick actions and that test more strategic approaches while directing energy and momentum to the study area. By recognizing potential, leveraging existing assets, and bringing together the right community partners, the study area can be an economic innovation laboratory for the region.

Community Access and Site Activation

The Fort Norfolk district is a mental gap for many Norfolk residents. A cohesive neighborhood identity is lacking, exacerbated by poor wayfinding and physical access. Many stakeholders described the area as underused, unknown, and cut off from the rest of the city, despite being located close to many neighborhoods such as Ghent, Chelsea, St. Paul's Quadrant, and downtown. Residents in those neighborhoods describe a desire for connectivity to the waterfront, whereas the nature of Fort Norfolk also lends itself to interim experimental uses and unusual boutique concepts.

Employers and residents of the neighborhood report a lack of amenities (only one place to eat lunch and nowhere to mail a letter) and a run-down feeling. While the panel has recommended a phased development building out from the Tide station, in the interim an opportunity exists to create energized spaces for residents of the neighboring communities to congregate, create, and recreate.

The strategies outlined next can provide short-term and interim uses that will activate the site, create market awareness of the location, and build economic resilience through entrepreneurial development and training. These strategies can be focused on the themes of coastal resilience and water-related uses, or they may simply entail providing inexpensive real estate and facilities for artists, artisans and makers, and grass-roots entrepreneurs. They will also complement more formal economic development provided by the city, EVMS, and other anchor institutions. As interim or temporary uses of these sites, these strategies provide an accommodation response to storm mitigation until longer-term measures can be put into place.

Embrace the Arts

Arts, culture, and design offer economies in transition a fast-growth and dynamic cluster that appeals to young people, help mature industries become more competitive, and provide the critical ingredients to create innovative spaces. Artists can help facilitate community engagement and increase property values. They are able to do so in transitional economies because of access to affordable housing and work areas, diversity of space types, and proximity to existing cultural and artistic assets.

For the study area, the arts community could be engaged to address the lack of a cohesive neighborhood identity and poor wayfinding, characterized by numerous “Do Not Trespass” signs and barbed-wire fences. Active local arts outfits such as Alchemy NFK could work with design students to generate authentic wayfinding signs with emphasis on accessibility and walking tours as well as information on how to evacuate in a flood or storm surge. A similar engagement could collect stories about businesses in the Fort Norfolk district for websites, walking

“Industrial land is where the most interesting things happen—where ideas, innovation, and experimentation happen. It is also where culture is produced and attracted to.”

—Bruce Katz, vice president and founding director, Metropolitan Policy Program, Brookings Institution

maps, and posters. Fort Norfolk has many assets to build on, and illuminating the stories of its businesses may spark opportunities and supplier relationships.

One or more of the existing industrial buildings on the site are great opportunities to provide low-cost space for artists, artisans, and small entrepreneurs. The Foundry in Buffalo, New York, is an example of a low-tech community space that provides the following:

- Workshops and offices for artists, artisans, and small businesses;
- Multifunction community space to support arts performances, education, and public gatherings; and
- Neighborhood anchor institution for artistic expression, creative exchange, and the encouragement of new ideas and productive action.



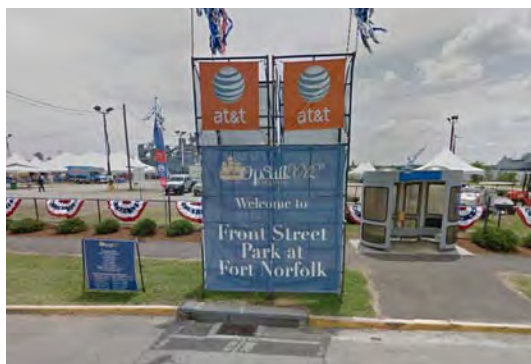
Food truck festivals are a low-impact way to activate a site. Seen here is the Street Food Festival in Cincinnati.

Alternatively, shipping containers could also be used for these and similar activities temporarily on vacant or underused sites. Proxy in San Francisco, Boxpark Shoreditch in East London, and Night Market Philadelphia in Philadelphia are examples of the use of shipping containers and other temporary facilities for short-term retail and artisans' facilities. Norfolk already has experience with creating temporary use sites with the Better Block Project and can use the existing pop-up shop program to easily provide permits and licenses for such sites. A simple food truck festival would not even need physical infrastructure.

Those are low-cost strategies for bringing activity to the site without major investments that would be severely affected during storms and until more permanent uses with better storm- and flood-mitigation measures can be constructed.

Activities and Events

A relatively common approach to activating undeveloped waterfront sites is to program events and festivals such as flea markets, art shows, makers' fairs, and food truck roundups. The goal would be to identify activities and events that would not compete with other events in the city, but would bring people to the city to create greater awareness of the location and provide opportunities for entrepreneurs and small vendors to market and sell products and services.



Temporary uses such as OpSail can help activate a site without the need for permanent development or infrastructure.

In the past, OpSail, a nonprofit organization dedicated to sail training and promoting goodwill among nations, has used some of the vacant land at this site for activities. This use is a great example of a site activation program that requires no long-term permanent infrastructure or development at the study area. In several of the interviews, the panel heard a desire for more frequent and accessible local farmers markets or fish markets. These types of events have successfully been used in many communities for building community while supporting the local agricultural and small business economy.

Waterside Recreation and Business

Stakeholders expressed the desire for waterfront recreation opportunities. This demand can drive recreational services and concession businesses, while also encouraging use of and connection to the water. Providing waterfront access to the entire community can generate economic development and promote social connections, both of which improve resilience. Access and recreation opportunities can be inexpensive to create but affordable to enjoy, which opens them up to a much broader segment of the community. Such opportunities could be provided through a short-term lease with one of the waterfront property owners as part of a larger public acquisition for key waterfront properties. Or, an Enhanced Use Lease with the U.S. Army Corps of Engineers for the slip next to the Corps's offices could create more access to and use of the historic Fort Norfolk.

Further Analysis

The recommendations in this section offer a healthy start for the sponsor to begin developing economic improvements and social connections to build community resilience. The panel emphasizes that the sponsor should focus on leveraging real opportunities as they arise and on supporting champions that step forward. Building on existing competitive advantages should be a priority, as well as reaching out to and creating partnerships with leading regional institutions for programs and operations. The Enterprise and Empowerment Foundation at Norfolk State University, the Downtown Norfolk Council, and the Greater

Norfolk Corporation, among others, may offer excellent assets for the sponsor to use.

Without going into extensive detail, the panel recommends that the sponsor investigates key areas to support the efforts described in this section:

- **Map the study area's existing assets.** Developing maps to understand economic relationships in the region helps inform an economic development strategy. Where does connectivity exist now, and where can it be improved?
- **Conduct detailed interviews with businesses.** Understanding location choice factors, growth drivers, constraints, and opportunities for both local and regional businesses and clusters helps determine where to focus attraction efforts.
- **Complete analysis of availability of space.** Understanding the location of available commercial and industrial helps identify gaps and options for interim solutions in the study area, but also begins to create a comprehensive inventory of available and needed space for the city and the region as a whole.

Catalytic Concepts

MANY POSSIBILITIES EXIST for the study area. They depend on a confluence of factors including (a) other competing priorities for civic attention, (b) interest and ability of landowners to coordinate efforts and collaborate, and (c) plausibility of some of the more ambitious visions. The panel considered several scenarios guided by a desired outcome of net creation of jobs, net creation of new mixed-income housing, and creation of a compelling place—all through building a more resilient Fort Norfolk.

Each of these scenarios described in detail subsequently could be further enhanced with (a) careful phasing of buildout, (b) thoughtful temporary uses as the site evolves, (c) attention to the whole community at every phase of development, and (d) taking care that current investments in physical assets are either storm-resilient buildings in themselves or urban design features that contribute to climate resilience of the study area and of the city, if possible.

Coastal Urban Resilience Venture Enterprise

The Hampton Roads region has the highest rate of SLR on the East Coast, an increasingly well-known fact. This public knowledge creates a risk to the region's image and its attractiveness for future investment. The sponsor should seek to flip this vulnerability and, instead, to cultivate the image that the region is the most prepared for the risks that it faces. At the same time, economic factors suggest that the sponsor should look to diversify its economy from an uncertain military future and toward development of new clusters that can attract new growth to the region.

Using the study area as a way to address brand risk, economic development, and site activation, the panel recommends that the sponsor seek to create a coastal urban resilience venture enterprise (CURVE). CURVE would

build on the excellent work underway at ODU and other institutions and organizations, but would have a focus on implementation, commercialization, and demonstration.

The study area offers several advantages to the creation of CURVE. First, the proximity to other relevant organizations will be important. The Mitigation and Adaptation Institute at ODU is an obvious partner, but the U.S. Army Corps of Engineers, NOAA, the American Red Cross, EVMS, and the U.S. Navy are all potential collaborators. Second, the study area has portions of higher, safer ground alongside lower, more vulnerable areas. This variety would allow for a secure location for CURVE while providing access to potential testing grounds for strategies and technologies developed there. Last, the study area is relatively underdeveloped, and future development in the area can serve as a laboratory for resilience strategies created through CURVE.

Because surplus office space exists in the Norfolk market, value has to be created by leveraging proximity to researchers and entrepreneurs located close enough to share equipment and to exchange ideas and by creating opportunities for partnerships and collaborations. In addition to CURVE, opportunities exist to develop other spaces such as offices, training areas, research labs, and community space.

Some examples of the range of activities that CURVE could support are as follows:

- Firms could provide high-level design and engineering consulting similar to that provided to Norfolk by the Dutch engineering company Fugro NV. Although one-quarter of the Netherlands is below sea level, the Dutch have earned a reputation for managing this risk through a variety of strategies. Dutch companies export this

knowledge and expertise around the world as communities face higher seas, sinking land, and fiercer storms.

- Financial services companies could build on work being done by Wetlands Watch Inc. in Norfolk and others to make the region a leader in risk transfer. Flood insurance premiums and coverage will have a major effect on property prices and economic investment in the region. By working with state regulators, insurance companies, and academics, the Hampton Roads region could lead the nation in innovative ways to address insurance challenges.
- CURVE could provide a test bed and incubation grounds for the local cottage industry that already includes floodproofing and other resilience-related businesses. Short-term and long-term opportunities exist to create jobs through programs and activities proposed for the site. Unlike many tech-based sectors that create highly specialized jobs, workforce development and job training programs that focus on the installation and construction trades related to storm and flood mitigation could create job opportunities more aligned with the workforce in the Hampton Roads region.

Examples of Creative Municipal Procurement Events

Many innovative models have been used successfully by cities to attract ideas, talent, and capital. Ideas such as SwitchPitch and Citymart turn a typical procurement on its head by having large companies or governments pitch their problems to startups and small businesses. Then the small companies can decide how to solve those problems, rather than responding to a formal request for proposals seeking a specific solution. Larger-scale efforts such as the World to NYC program create international competitions around certain challenges. Initiatives that generate citizen engagement such as the Innobucks campaign in Manor, Texas, can harness social tools and gamification, or game thinking, techniques to spur creative responses to local challenges.

Fort Norfolk is already home to several critical organizations responsible for emergency response: the American Red Cross, the U.S. Army Corps of Engineers, and EVMS. Given the proximity of these emergency responders and the existing vacant and underused sites in the study area, CURVE could partner with these institutions and with the city's Office of Emergency Preparedness to specialize in emergency preparedness and response training.

CURVE should ensure adequate programming to support the growth of a local resilience-based cluster. One specific way the sponsor could help support the enterprise would be to engage businesses in the municipal procurement process. Frequently, small businesses drive job growth and provide resilience in the presence of international shocks. However, small businesses can be underrepresented in city procurement and can often miss opportunities to solve local problems because they lack capacity to respond to process-heavy municipal projects.

To ensure that local businesses are engaged in resilience issues well ahead of formal procurement processes, the sponsor could consider holding a "reverse trade show" to outline the city's objectives for resilience. This reverse trade show would give local small businesses an opportunity to focus their efforts and align R&D to meet the city's needs. For example, the city may want to engage a contractor to offer programs for businesses in emergency preparedness and business continuity. The city may also want to partner with software developers to deliver maps enabled with geographic information systems showing flooded roads in and around Norfolk in real time.

Ultimately, CURVE should focus on commercialization and generation of business opportunity. This focus is partly to avoid duplicating research efforts already happening at ODU and other institutions. But that dual focus is important because resilience strategies need to provide multiple benefits. If the sponsor is going to invest time and energy in creating something to address resilience, the effort should also help benefit the community economically.

Medical Cluster: Building on Strength

The 2002 ULI panel report titled *Atlantic City, Norfolk, Virginia* concluded that “the continued expansion of the regional medical center complex to the southeast of Brambleton Avenue would be detrimental to the proposed development’s urban waterfront village character.” However, development has been minimal in Fort Norfolk since that time. Because the Tide line has changed the transit infrastructure, the panel has instead concluded that thoughtful mixed-use development near the Tide light-rail stop that includes workforce housing could benefit the study area (see next section). In contrast, the CURVE concept focused on leveraging resilience itself for niche economic cluster development. A mixed-use development near the EVMC/ Fort Norfolk station could conceivably leverage the medical sector as an anchor institution for medical and medical-technology business cluster development.

The EVMS is one of the key economic and social assets of Norfolk and the larger Hampton Roads region. It is one of the largest employers in Norfolk. As the largest medical center within about 100 miles, it has a large patient service area in southeastern Virginia and northeastern North Carolina. The panel heard from several stakeholders that the medical center does not contemplate major expansion in the next decade. However, because the medical center is relatively landlocked to the north and west, it may need at least some of the available land in Fort Norfolk in the future.

Norfolk has the advantage of several strong existing medical anchor institutions, including Sentara Norfolk General, CHKD, and EVMS. The anchor institutions have some research focus, but are fundamentally high-quality organizations that deliver patient service. The knowledge they produce would be relevant for a focus on bioinformatics and health care performance. Trauma is already an expertise of EMVS and of Sentara Norfolk General. The sponsor could consider cultivating a medical center focused on bioinformatics, trauma, neonatal care, or another discipline that builds on areas of national expertise in all three institutions. This center could generate research

to export from the region and create net new jobs. The health care industry, while very large, basically grows only following regional population growth and growth in GDP per capita. Because both indicators are relatively flat in the region, new economic activity would need to be created by new intellectual property.

While planners would want to take care with promoting a city because of its trauma expertise, this expertise is relevant to resilience and disaster preparedness. If handled correctly, trauma expertise could contribute to an image of Norfolk as a prepared city. This area of potential investment and growth would complement CURVE and would benefit the mission and interest of the existing institutions. Similar to CURVE, there would have to be true synergies from proximity. In both the medical center and resilience institute scenarios, an entrepreneurial ecosystem that includes venture finance and professional services such as law and accounting would be beneficial. Such a major endeavor needs to be coordinated not only with the anchor institutions, but also with other existing innovation initiatives in Norfolk.

Dynamic Mixed-Use Development

Many of the interviewees noted a desire for a mix of housing, retail, and office in the study area. One plan for such a mix of uses was described in the previous ULI panel report in 2002 and further developed by UDA in 2004. Whereas that proposed vision is aesthetically appealing, it is not clear that there is any material demand beyond small or home office, nor is there a demand for waterfront residential.

As a design principle, a dynamic mixed-use and mixed-income plan is appealing. If the mixed-use configuration can be bolstered with true new office, research, light manufacturing, and information-technology space and combined with new residential demand based on expanded medical sector or resilience jobs, this configuration could create a powerful mutually supportive situation that could be strong and attractive, could engage all economic strata from the

city of Norfolk, and could brand the city along with its Navy, port, and downtown areas.

The panel members think that the most effective development strategy for the study area is to pull permanent development back from the shoreline toward Brambleton Avenue while immediately implementing interim short-term recreation and activating site opportunities on the waterfront. The study area development should proceed outward and seaward from the medical center and the light-rail stop located in the upland area of the site because the medical center and light-rail stop are the main economic drivers for the site.

While the potential for waterfront development has understandable appeal, current densities in the study area and the current draw of the site from the surrounding area are too low to sustain permanent large-scale mixed-use waterfront activity, notwithstanding the increasing risk from SLR and storm surge. The more pressing land use connection with the medical center is to fill housing needs for medical center workers. The medical center personnel, such as doctors, nurses, and a variety of staff members, lend themselves particularly to mixed-income housing. Providing housing options in the study area would ensure that critical employees of the medical center could live close to work during emergencies and when travel in the region may be restricted.

The panel's experience and current market information indicate that achieving the full potential of the study area may take an extended period of ten years or more. Carefully phasing redevelopment centered at the rail stop while increasing demand and exposure through site activation and community connection to the waterfront holds the promise of producing a successful result. Construction in the study area can take advantage of the latest in flood-resistant materials and of sustainable, healthy, and resilient design strategies that could be provided by local businesses being supported through CURVE. Development projects can be a living laboratory for green infrastruc-

ture and stormwater management practices to be tested for use throughout the region. By using this gradual and limited development approach, the study area can serve as a model for developing resilience techniques over a long time frame and facilitating a planned and intentional retreat from vulnerable areas.

Conclusion

THE HAMPTON ROADS REGION faces serious challenges from rising seas, increasing storms, and subsiding land. At the same time, the region faces some economic stagnation and an uncertain future. Fortunately, the region has a wealth of expertise, resources, and commitment with which to face those challenges. Perhaps the most important tool at the sponsor's disposal is the willingness to plan and to act before the storm strikes, a quality that is sadly rare among communities facing similar challenges.

While general themes run through this report, the panel thought it important to call attention to the following recommended actions for the sponsor:

- Conduct a thorough real estate market analysis of the study area.
- Conduct a citywide vulnerability assessment.

The study area was used as a lens with which to consider resilience in land use planning and economic development. Pending a more robust vulnerability assessment to determine where these general themes should apply, the vision of resilience should begin to coalesce. The panel identified the need to do the following:

- Create a network of open space, recreation opportunities, and community access for all residents along the waterfront.
- Use sustainable design and infrastructure to provide flood protection and to mitigate stormwater runoff in concert with the network of open space.
- Provide temporary and low-intensity uses and activities to create community engagement, social connections, and economic opportunities for all residents while avoiding risky permanent development for vulnerable sites.

- Develop mixed-use density with workforce housing near transit.
- Leverage existing strengths and anchor institutions to create economic opportunity out of existing perceived risks and challenges.

When considering the key themes among the recommendations, the panel suggested three catalytic concepts that brought these themes together. The panel hopes that the sponsor may find these concepts useful in developing resilience strategies:

- Create a coastal urban resilience venture enterprise.
- Develop new medical cluster businesses.
- Build a dynamic mixed-use project near transit.



About the Panel

John McIlwain

Panel Chair

New York, New York

McIlwain is a senior adviser to the Jonathan Rose Companies and a consultant on housing and urban resilience. Previously, he was the senior resident fellow and J. Ronald Terwilliger Chair for Housing at ULI from 2001 to October 2014. An author, speaker, and former lawyer, McIlwain brings more than 40 years of experience in the fields of housing, housing investment, and the development of sustainable urban environments.

As the senior resident fellow, McIlwain was responsible for leading ULI's research to seek and promote affordable housing solutions in the United States and other nations, including development and housing patterns designed to create sustainable future environments for urban areas. He is the author of *Housing in America: The Next Decade* (2010) and *Housing in America: The Boomers Turn 65* (2012), both published by ULI.

McIlwain serves as a senior adviser to the Garrison Institute on climate change and served as the director of the Garrison Institute Climate Mind and Behavior Program until October 2014. He is cochair of the ULI New York Housing Council.

Before joining the ULI staff, McIlwain founded and served as senior managing director of the American Communities Fund, a venture fund for Fannie Mae that was dedicated to investing in hard-to-finance affordable housing. In this capacity, he was responsible for structuring, underwriting, and closing equity investments in more than \$700 million of residential and neighborhood retail developments in

lower-income communities around the country. McIlwain also structured, negotiated, and closed more than \$100 million in historic tax credit and inner-city equity investment funds with Lend Lease, AEW Capital Management, and the Community Development Trust. Before taking that position, he was president and chief executive officer of the Fannie Mae Foundation.

Before joining Fannie Mae, McIlwain was the managing partner of the Washington, D.C., law offices of Powell, Goldstein, Frazer, and Murphy, where he represented a broad range of clients in the single-family and multifamily housing areas. McIlwain also served as executive assistant to the assistant secretary for housing and the federal housing commissioner at the U.S. Department of Housing and Urban Development. He began his career in housing as assistant director for finance and administration and deputy director of the Maine State Housing Authority.

McIlwain is a member of the board as well as the immediate past chairman of the Center for Housing Policy and a past president of its affiliate, the National Housing Conference, an umbrella organization for low-income and affordable housing issues. He is a member of the board of the Greenline Community Development Fund and the editorial board of "The TOD Line: The NY & CT Transit-Oriented Development Newsletter." He is a past president of the National Housing and Rehabilitation Association.

McIlwain received a law degree from New York University, where he was on the editorial staff of the *NYU Law Review* and was a John Norton Pomeroy Scholar. He received a bachelor of arts degree, cum laude, from Princeton University.

John Macomber

Cambridge, Massachusetts

Macomber is a senior lecturer in the finance unit at Harvard Business School. His professional background includes leadership of real estate, construction, and information technology businesses. At Harvard, Macomber is engaged in the Business and Environment Initiative and Social Enterprise Initiative. He is the former chairman and CEO of the George B. H. Macomber Company, a large regional general contractor, and remains a principal in several real estate partnerships. Macomber serves or has served on the boards of Young Presidents' Organization International, Boston Private Bank & Trust Company, and Mount Auburn Hospital.

Courses he teaches include Innovation in Business, Energy, and Environment; Real Estate Development, Design, and Construction; and Building Cities: Infrastructure, and Sustainability. He is chair or cochair of executive education programs including Real Estate Management, Real Estate Executive Seminar, and Develop India: Real Estate Strategies for Growth. Before teaching at Harvard, Macomber was a lecturer at Massachusetts Institute of Technology in civil engineering and real estate. Macomber is a graduate of Dartmouth College (mathematics in the social sciences) and Harvard Business School.

Jonathan Miller

New York, New York

Miller is president and CEO of Miller Samuel Inc., a real estate appraisal and consulting firm he cofounded in 1986. He is a state-certified real estate appraiser in New York and Connecticut, performing court testimony as an expert witness in various local, state, and federal courts. He holds the Counselors of Real Estate (CRE) and Certified Relocation Professional (CRP) designations. He is an Appraiser "A" Member of the Real Estate Board of New York and a member of Relocation Appraisers and Consultants Inc.

Miller Samuel provides appraisal services on roughly \$5 billion worth of property a year in the New York City metropolitan area. He is also cofounder of Miller Cicero LLC, a commercial real estate valuation firm. He is the author of a series of market reports considered the report of record covering the New York City metropolitan area and south Florida that are relied on by the media, financial institutions, and government agencies including the Federal Reserve, Internal Revenue Service, U.S. Department of Housing and Urban Development, the New York City Office of Management and Budget, the New York State Budget Division Economic Advisory Board, and others. He co-authored a research paper for New York University (NYU) School of Law and the NYU Wagner Graduate School of Public Service's Furman Center for Real Estate and Urban Policy titled "The Condominium v. Cooperative Puzzle: An Empirical Analysis of Housing in New York City," published in 2007 by the *Journal of Legal Studies* at the University of Chicago.

Miller serves on the New York City Mayor's Economic Advisory Panel representing the residential real estate sector and has participated in studies on valuation issues with academic institutions including NYU, Princeton University, Columbia University, and Baruch College. He is a well-regarded real estate commentator addressing U.S. and regional housing issues in the media including the *New York Times*, the *Wall Street Journal*, Bloomberg News, Reuters, the Associated Press, CNBC, CNN, ABC, and others. Miller is a New York State real estate instructor for qualifying and continuing education courses as well as a New York State real estate appraiser instructor for qualifying certified general and continuing education courses. He interviews a wide variety of housing and economic experts for his podcast, "The Housing Helix."

Paul Moyer

Vienna, Virginia

Moyer is director of planning for Vanasse Hangen Brustlin (VHB) in Vienna, Virginia. VHB is a multidisciplinary plan-

ning, design, engineering, and consulting firm providing services throughout the Mid-Atlantic area.

Moyer is an urban planner and land use professional with more than 25 years of experience. He began his career with EDAW Inc. in 1987 shortly after graduating from college and advanced to become managing principal of the Alexandria, Virginia, office; regional director; and vice president of the firm that merged with AECOM Technology Corporation.

A certified planner with background in architecture, land use planning, and environmental impact analysis, Moyer has applied his talents to community-based projects for both public and private sector clients, from the military to developers.

The plans he has worked on—Schuylkill River master plan; Laurel Hill master plan; Mount Vernon Avenue business strategy; and Norfolk Southside, to name a few—serve as models for the way he conducts the planning process and interacts with those involved. In Moyer's mind, planning is all about communicating facts, thoughts, and ideas in an open forum to achieve consensus.

Moyer is a member of the American Planning Association and active in ULI Washington, D.C., having served on several panels and participated in the Urban Plan program. He has a bachelor's degree in urban planning from the University of Cincinnati.

Chuck Schilke

Baltimore, Maryland

Schilke is a senior real estate development, finance, and legal professional, as well as a real estate educator. He currently serves as senior lecturer in the Edward St. John Real Estate Program at the Johns Hopkins Carey Business School, teaching at the Washington, D.C., and Baltimore campuses.

He teaches real estate development, real estate finance, transactional real estate law, environmental and land use real estate law, business law, financial institutions, micro-

economics, macroeconomics, and financial crisis and contagion.

Before joining the Carey Business School, Schilke served as associate dean and faculty member at Georgetown University, where he created the real estate master's program and grew it to 300 students. Before founding the Georgetown real estate program, he created commercial mortgage-backed securities (CMBS) for a leading Wall Street law firm during both the CMBS boom and crash. He also served as real estate senior counsel and assistant corporate secretary at the American Red Cross national headquarters in Washington, D.C., where he served on the deal teams that built the Red Cross's national headquarters building and launched a billion-dollar project to rebuild all of the Red Cross's blood processing facilities nationwide. Schilke also was counsel at Exxon Mobil Corporation headquarters in Fairfax, Virginia, where he performed the real estate legal due diligence for the Exxon-Mobil merger and served as a Superfund environmental attorney.

Schilke is a member of the Counselors of Real Estate and a Fellow of the Royal Institute of Chartered Surveyors. He is currently completing his doctorate at Harvard University, where he is writing his dissertation on the development of CMBS. He also holds a law degree from Cornell Law School and a bachelor of arts from the University of Chicago.

David Stebbins

Buffalo, New York

Stebbins is vice president of Buffalo Urban Development Corporation (BUDC), a local, nonprofit development entity that specializes in urban redevelopment. BUDC is currently developing the Buffalo Lakeside Commerce Park, a 275-acre reclamation of the former Hanna Furnace Steel Mill and Union Ship Canal. Stebbins and BUDC are also in the process of redeveloping the 260-acre former Republic Steel site in South Buffalo along the Buffalo River now known as RiverBend. His role has recently been expanded to include coordination and assistance of redevelopment and infrastructure projects in downtown Buffalo in

conjunction with the city of Buffalo and other downtown stakeholders.

Before his tenure with BUDC, Stebbins worked for several public and not-for-profit organizations in the Buffalo area with responsibilities for waterfront planning, economic development, small business assistance, and real estate development, including multitenant industrial buildings, downtown mixed-use development, urban infrastructure, brownfield redevelopment, and business park projects.

Stebbins has 35 years of diversified experience in urban planning and development, with a bachelor's degree in environmental design from the University at Buffalo and a master's degree in city and regional planning from the University of North Carolina—Chapel Hill. He qualified as a member of the American Institute of Certified Planners in May 1986. Stebbins is a full member of ULI and a member of ULI's Urban Revitalization Council. He has served on five ULI Advisory Service panels.

Juvarya Veltkamp

Vancouver, British Columbia

Veltkamp is a green economic development practitioner with experience in real estate development, green buildings, and place-based economic development. In her role as manager of Green Economy Initiatives with the Vancouver Economic Commission (VEC), she is responsible for Vancouver's green economic plan, which forms part of Vancouver's vision to become the greenest city in the world by 2020.

Veltkamp helped design, develop, and deliver Vancouver's ten-year strategic plan to grow the green economy, a key pillar of Vancouver's vision to become the greenest city in the world by 2020. She helped reach the more than 35,000 residents and 100 organizations that were consulted for the plan, and she now helps to implement and roll out actions to double the number of green jobs by 2020. Actions range from initiatives to support green entrepreneurs and grow green clusters to programs that

support businesses in their efforts to unlock the benefits of more sustainable practices.

A major project Veltkamp manages at VEC is a program to create a Green Enterprise Zone in the False Creek Flats industrial area of Vancouver. Through supporting existing businesses, community capacity building, and developing a narrative, the story of "the greenest place to work in the world" is emerging. This project brings together local businesses, grass-roots organizations, nonprofits, city planners, and the economic development agency to align land use, transportation, infrastructure, buildings, arts and culture, and place-based economic development. This work is done in a novel and innovative approach to neighborhood development and district scale sustainability in an area spanning more than 100 acres and housing more than 500 businesses.

Veltkamp holds an undergraduate honors degree in economics and sustainable development from the School of Oriental and African Studies at the University of London. She also holds a postgraduate certificate in international business from Capilano University, North Vancouver, British Columbia, and a master of business administration from the University of British Columbia. Veltkamp teaches sustainability at Kwantlen Polytechnic University and operates a niche local food business, Holey Crumpets.

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