

CLIMATE ADAPTATION CHALLENGES AND SOLUTIONS



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Skip Stiles

2014 Virginia Coastal Partners Workshop



RAIN FLOODING – SEPTEMBER 8, 2014



 **City of Norfolk, VA Public Safety**

Monday September 8th, 2014 :: 05:54 p.m. EDT

Advisory

Coastal Flood Advisory from 9/8/2014 5:18 PM to 9/9/2014 12:00 AM EDT for City of Norfolk

Message Expired

Coastal Flood Advisory from 9/8/2014 5:18 PM to 9/9/2014 12:00 AM EDT for City of Norfolk

Address/Location

[City of Norfolk, VA Public Safety](#)
3661 East Virginia Beach Boulevard
Norfolk, VA 23502

Contact

Emergency: 9-1-1
Non-emergencies: 757-441-5600



FUND



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RAIN FLOODING - SEPTEMBER 8, 2014



Virginian Pilot

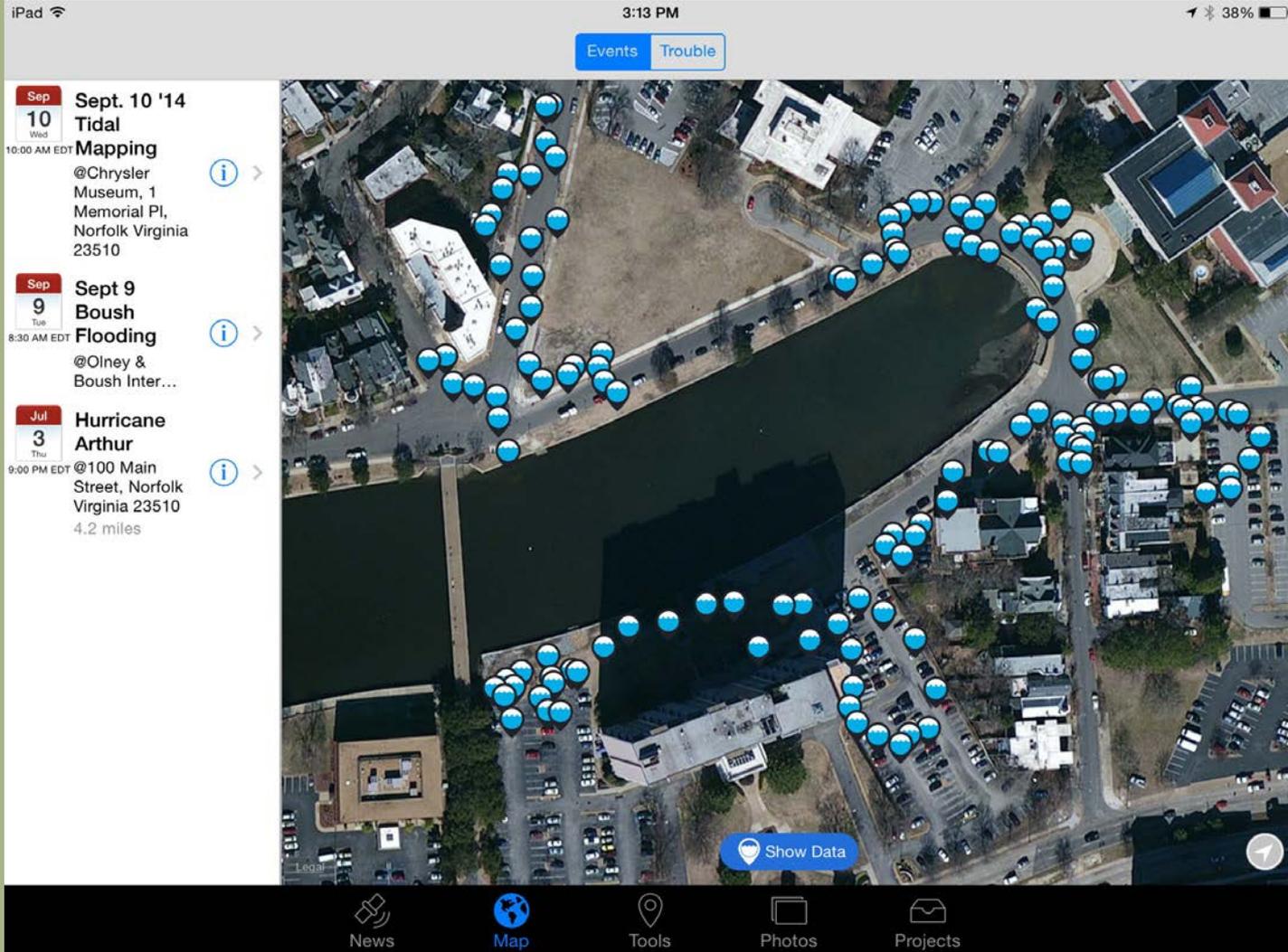


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SEA LEVEL RISE SMART PHONE APP



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SEA LEVEL RISE SMART PHONE APP

Next Steps?

- Use “Citizen Science” to back cast/validate models (saving \$\$), allowing predictive models to be developed with greater precision
- Develop “push” messages in smart phone network – “The 600 block of Princess Anne Rd. will flood tomorrow at 6 pm.”
- Use auto insurance company funding to support the volunteer network.

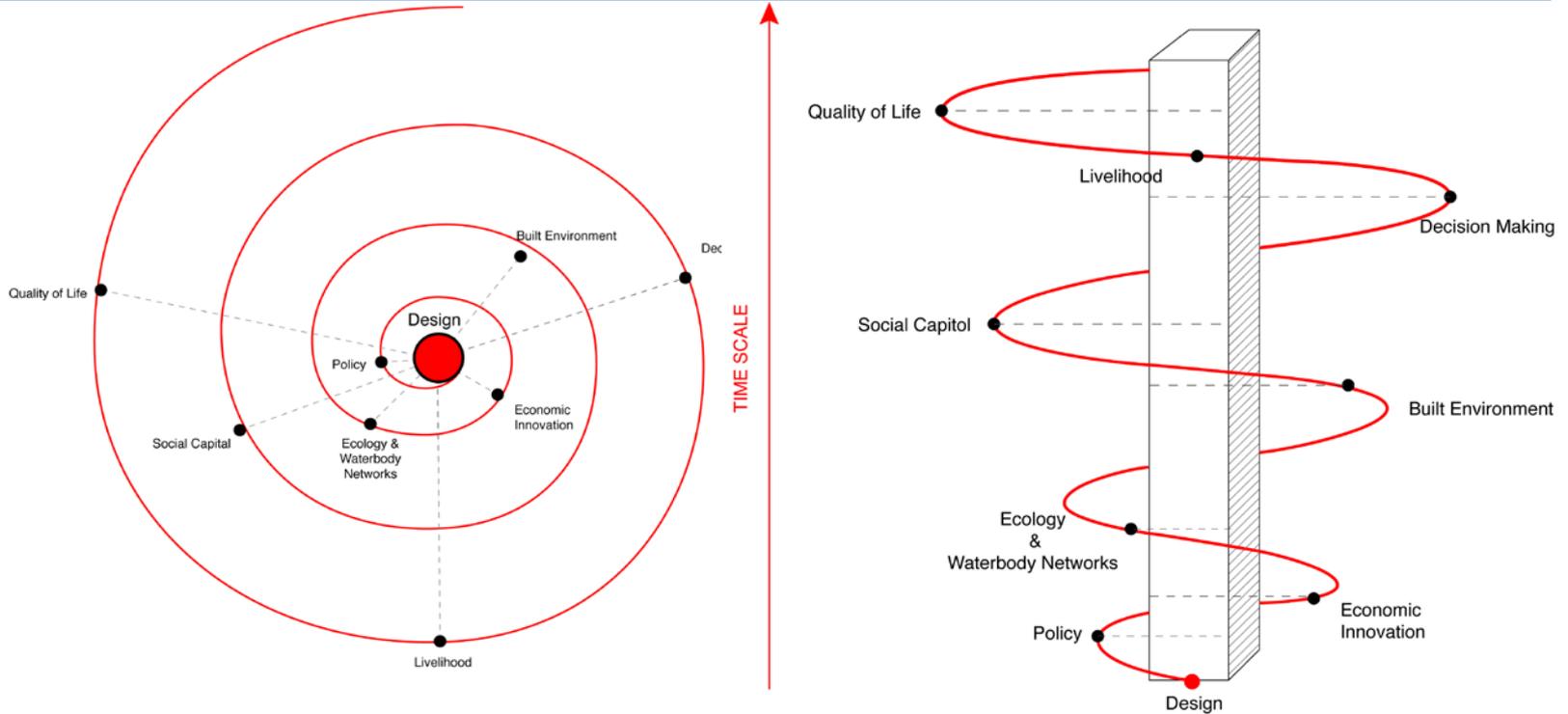


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TIDEWATER RISING RESILIENCY DESIGN CHALLENGE



Designs by Shelly Jules Plaag



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TIDEWATER RISING RESILIENCY DESIGN CHALLENGE

- VASG scoping meeting last winter – can we put adaptation design on the ground NOW, before the storm, in an urban neighborhood, maintain or expand ecosystem services.
- Chesterfield Heights in Norfolk –
Tidal Neighborhood, Historic Designation, Financially Stressed (avg income \$28,000), Vibrant/Intact, Just Starting to flood
- Using Hampton U Architecture, ODU Engineering, Hampton Roads Green Building Council, HRPDC, many private sector design, engineering, development professionals.
- Only adaptation design effort in an urban neighborhood, before the storm, in the US.



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TIDEWATER RISING RESILIENCY DESIGN CHALLENGE



Chesterfield Heights ~ 1880

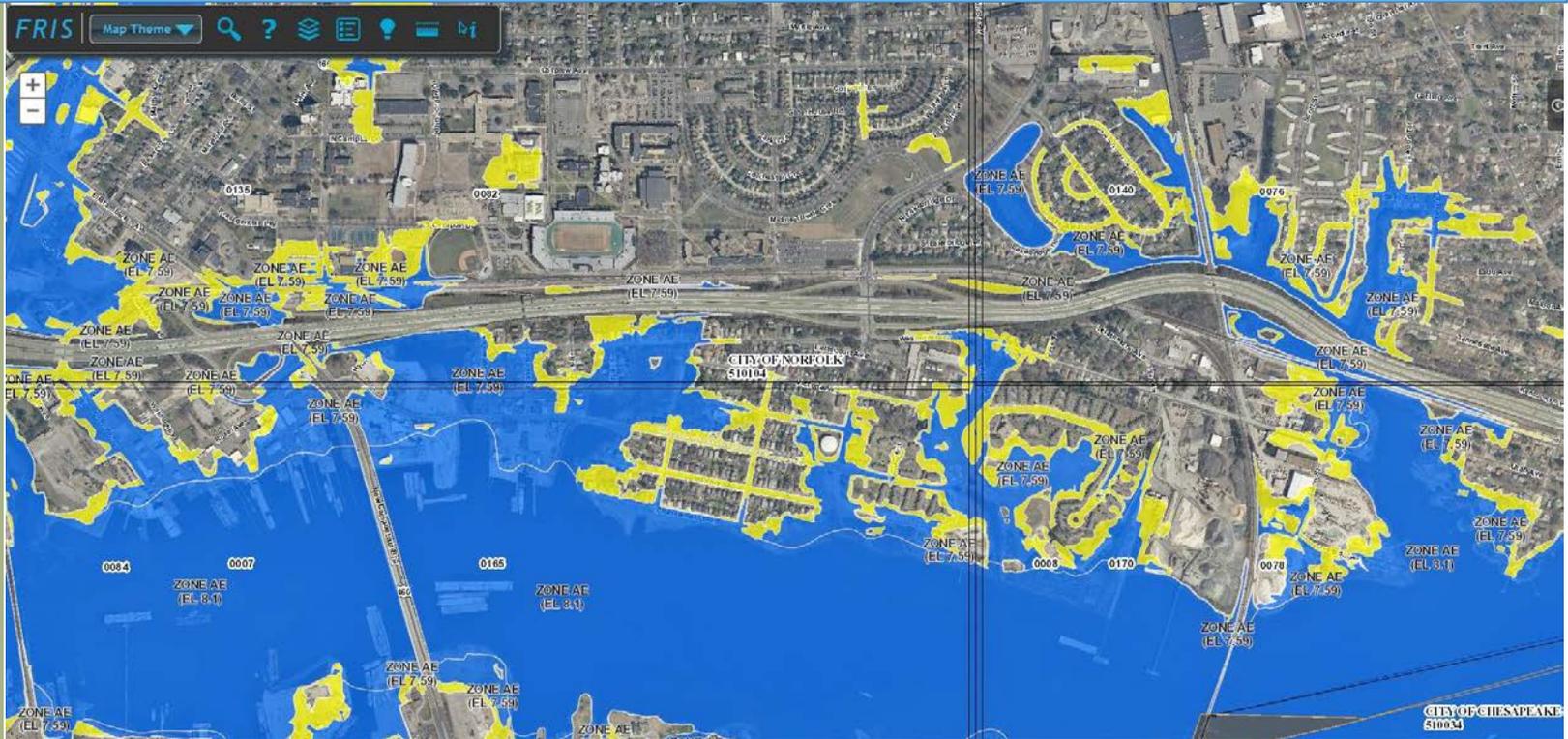


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TIDEWATER RISING RESILIENCY DESIGN CHALLENGE



Chesterfield Heights Flood Zones Today



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TIDEWATER RISING RESILIENCY DESIGN CHALLENGE



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TIDEWATER RISING RESILIENCY DESIGN CHALLENGE

SEA LEVEL RISE Chesterfield Heights

The sea level rising crisis is a worldwide problem that many are attempting to solve while the Hampton Roads area is second in the nation to suffer. Our focus is on an overlooked neighborhood known as Chesterfield Heights that is located north of the Elizabeth River. Environmental organizations and universities collaborated to resolve the issues the neighborhood faces. The community dealt with frequent flooding and shoreline erosion. Cost is a significant factor in the progression of resolving these issues; therefore the changes should be implemented in stages. Flooding can be reduced by creating underground cisterns to store rainwater. A living shoreline will be applied to the waterfront in order to minimize the erosion from the shipping channel. The final result is raising the entire home to save it from flooding. Mitigating with sea level rise rather than resisting its inevitable impact is preferred in the overall neighborhood design.



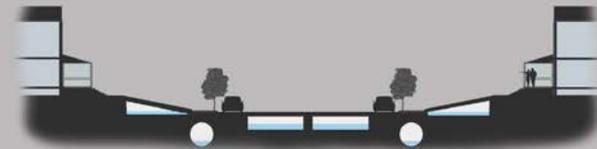
01 MITIGATION



02 LIVING SHORELINE



03 UNDER STREET CISTERN



04 RAISE THE HOUSE



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TEAM MEMBERS



HAMPTON UNIVERSITY
ARCHITECTURE

OLD DOMINION UNIVERSITY

SEA LEVEL RISE SMART PHONE APP

Next Steps?

- Develop concepts for urban areas that can form the basis for work in other urban, shoreline communities.
- Develop a community of practice in the private sector for this work – jobs and economic activity – NOLA + 2,000 jobs 2011-13; Dutch 4 of GDP from this work.
- Leverage private sector interest into support.



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FLOOD DAMAGE MITIGATION – NEED AND OPPORTUNITY



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November 2014

THE CHALLENGE OF MITIGATING VIRGINIA'S FLOODING AND SEA LEVEL RISE IMPACTS



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FLOOD DAMAGE MITIGATION – NEED AND OPPORTUNITY

TABLE 2 - REPETITIVE LOSS DATA BY LOCALITY

LOCALITY	# OF REPETITIVE LOSS PROPERTIES	AVERAGE COST OF MITIGATION	TOTAL COST OF MITIGATION	AVERAGE ANNUAL FEMA FUNDING	# OF YEARS TO MITIGATE W/ FEMA FUNDING ALONE
Chesapeake	409	\$250,000	\$102,250,000	\$787,500	130 years
Hampton	863	\$75,000*	\$64,725,000	\$833,333	78 years
Norfolk	900	\$162,500	\$146,250,000	\$778,000	188 years
Portsmouth	186	\$75,000*	\$13,950,000	NA	NA
Virginia Beach	561	\$185,000	\$103,785,000	\$725,000	143 years
TOTAL	2,919	NA	\$430,960,000	NA	NA

*No average mitigation costs were available, so the statewide average of \$75,000 was used.

FEMA Funding Levels:

- Hampton has received \$2,500,000 since 2011
- Chesapeake has received \$6,300,000 since 2006
- Norfolk has received \$3,890,000 since 2009
- Virginia Beach has received \$2,900,000 since 2010

Note: The most recent data available for Chesapeake, Norfolk, and Virginia Beach is September 2014; for Hampton, data is from 2013.



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FLOOD DAMAGE MITIGATION – NEED AND OPPORTUNITY

- Examples of funding mechanisms exist for revolving funds under Virginia Resource Agency – Sen. Lynwood Lewis has indicated he will introduce legislation to establish a flood mitigation fund.
- Connecticut has established a \$25 million resilience fund
- Existing 201 k redevelopment loans can be used - “The mitigation of flood risk to an existing home either through relocation or elevation of the existing structure is permitted by the 203k program.”
- Models exist in energy efficiency mortgages – “flood mitigation” mortgages reduce flood insurance rates = higher household available income.
- Finding the \$431 million = 9,200 jobs!



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FLOOD DAMAGE MITIGATION – NEED AND OPPORTUNITY



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Larry Atkinson – 9/8/2014



QUESTIONS?



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CITIZEN'S LAND USE ACADEMY



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Sea Level Rise