



# Norfolk: Resilient Coastal Community of the Future

Kyle Spencer, Deputy Chief Resilience Officer

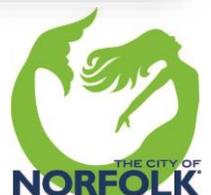
City Manager's Office of Resilience



## Norfolk's Resilience Strategy

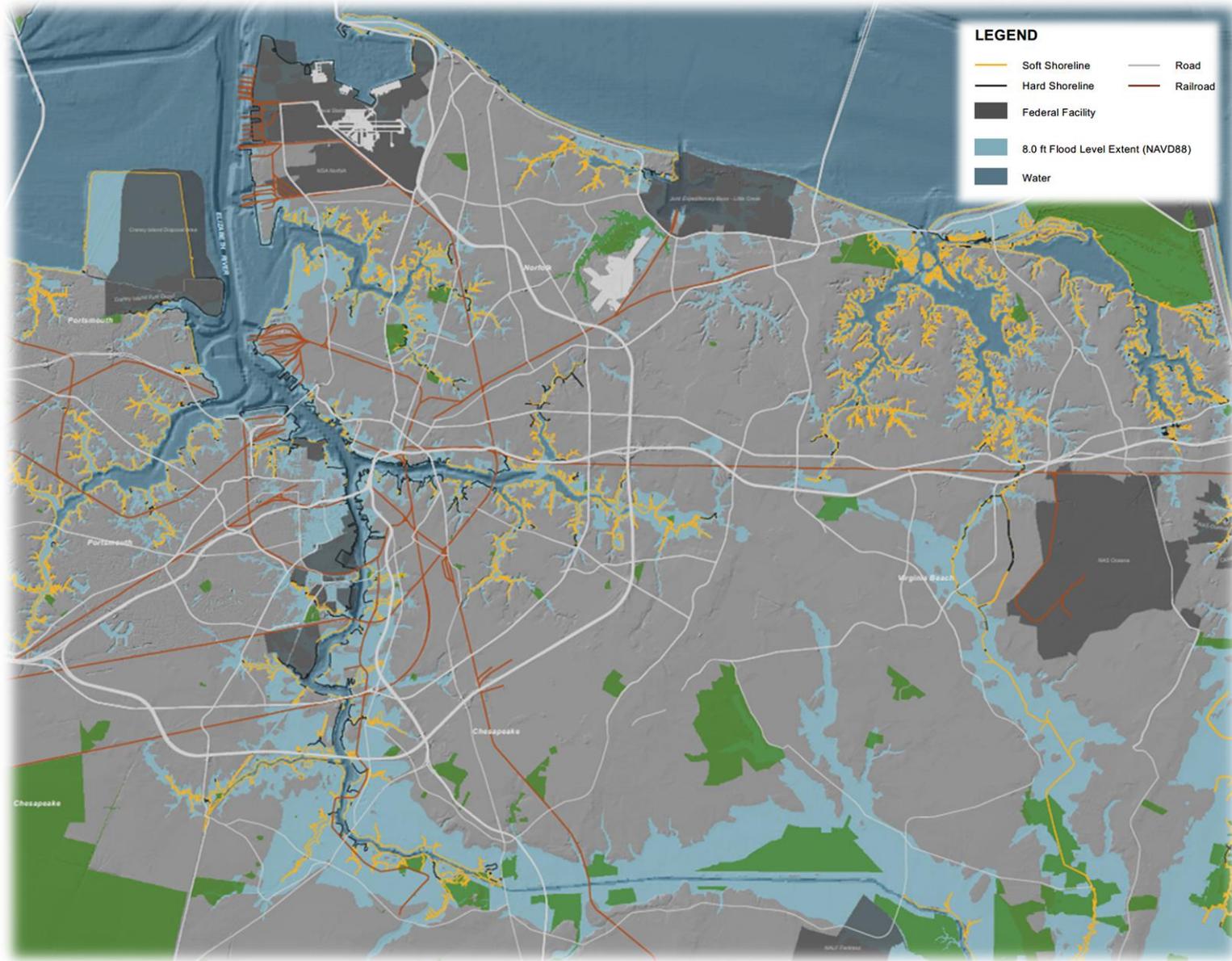
- Goal 1: Design the coastal community of the future
- Goal 2: Create economic opportunity by advancing efforts to grow existing and new industry sectors
- Goal 3: Advance initiatives to connect communities, deconcentrate poverty, and strengthen neighborhoods

Milan \* New York City \* Quito  
Melbourne \* Boston \* Bangalore  
Rotterdam \* Athens \* Paris  
Dakar \* Juarez \* Phnom Penh  
Thessaloniki \* Norfolk, Virginia  
Medellín \* Bangkok \* Rio de  
Janeiro \* Barcelona \* Los Angeles  
Rome \* Chicago \* Da Nang \* New  
Orleans \* Cali \* Kigali \* Huangshi  
Singapore \* Mexico City \* Lisbon  
Santiago de los Caballeros \* San  
Francisco \* Belgrade \* Ramallah  
Glasgow \* Montreal \* Mandalay  
Accra \* Jacksonville \* London  
Toyama \* Ashkelon \* El Paso  
Dallas \* Jacksonville \* Pittsburgh  
San Juan \* Durban \* Semarang  
Sydney \* Amman \* Vejle \* Enugu  
Porto Alegre \* Surat \* Santiago,  
Metropolitan Region \* Deyang  
Wellington City \* St. Louis \* Byblos  
Arusha \* Christchurch \* Tulsa  
Chennai \* Oakland \* Bristol  
Santa Fe \* Berkeley \* Boulder



# Guidelines

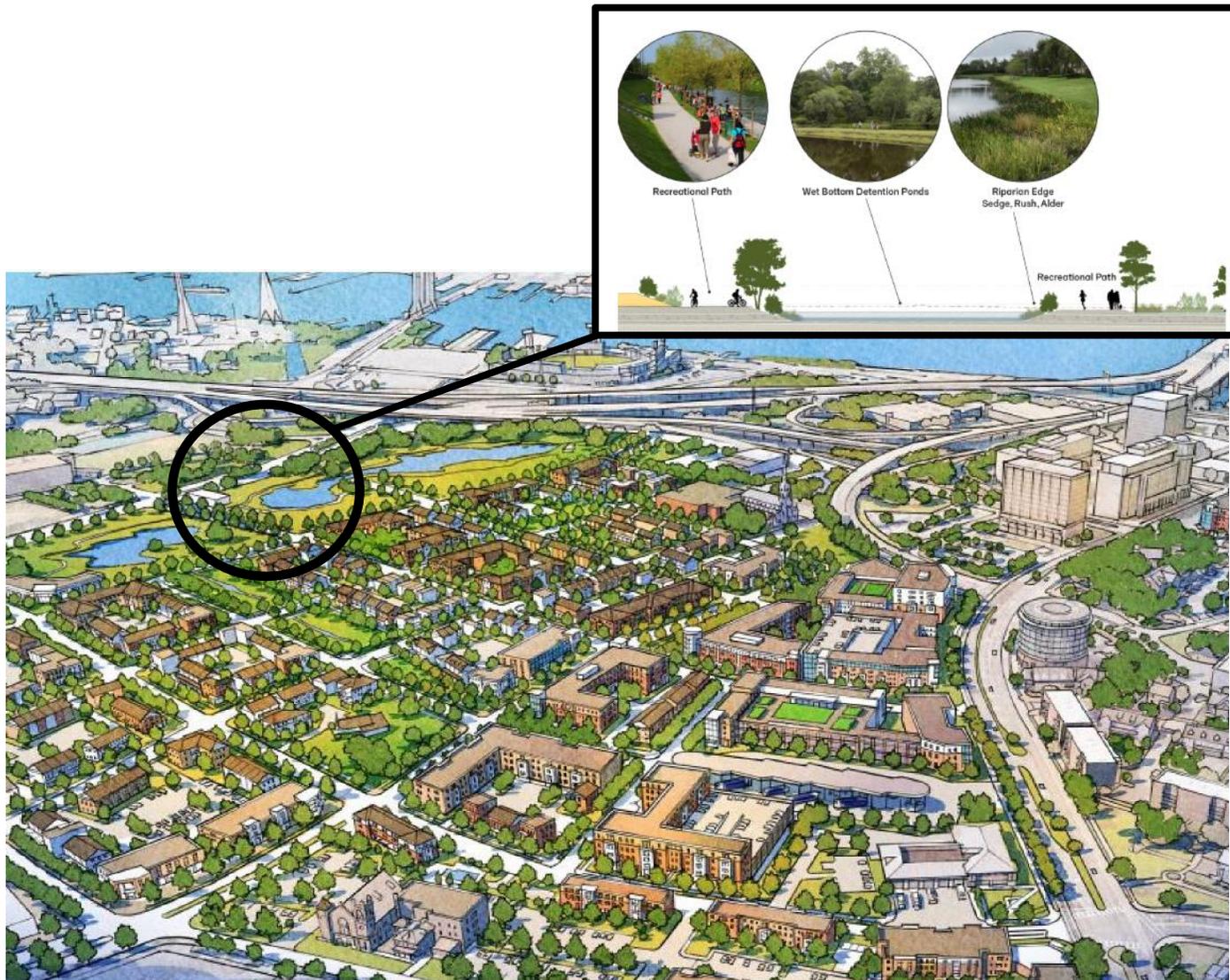
- Work with the system not against it
- Don't accept solutions that **only** work
  - Solution must work and add value
- Be careful with water
  - Retain, store, drain slow
- Create solutions based on our values
- Reinforce assets
- Layer public benefits
- Strengthen partnerships
- Use the best data
- Share knowledge and resource
  - HRPDC
  - JLUS

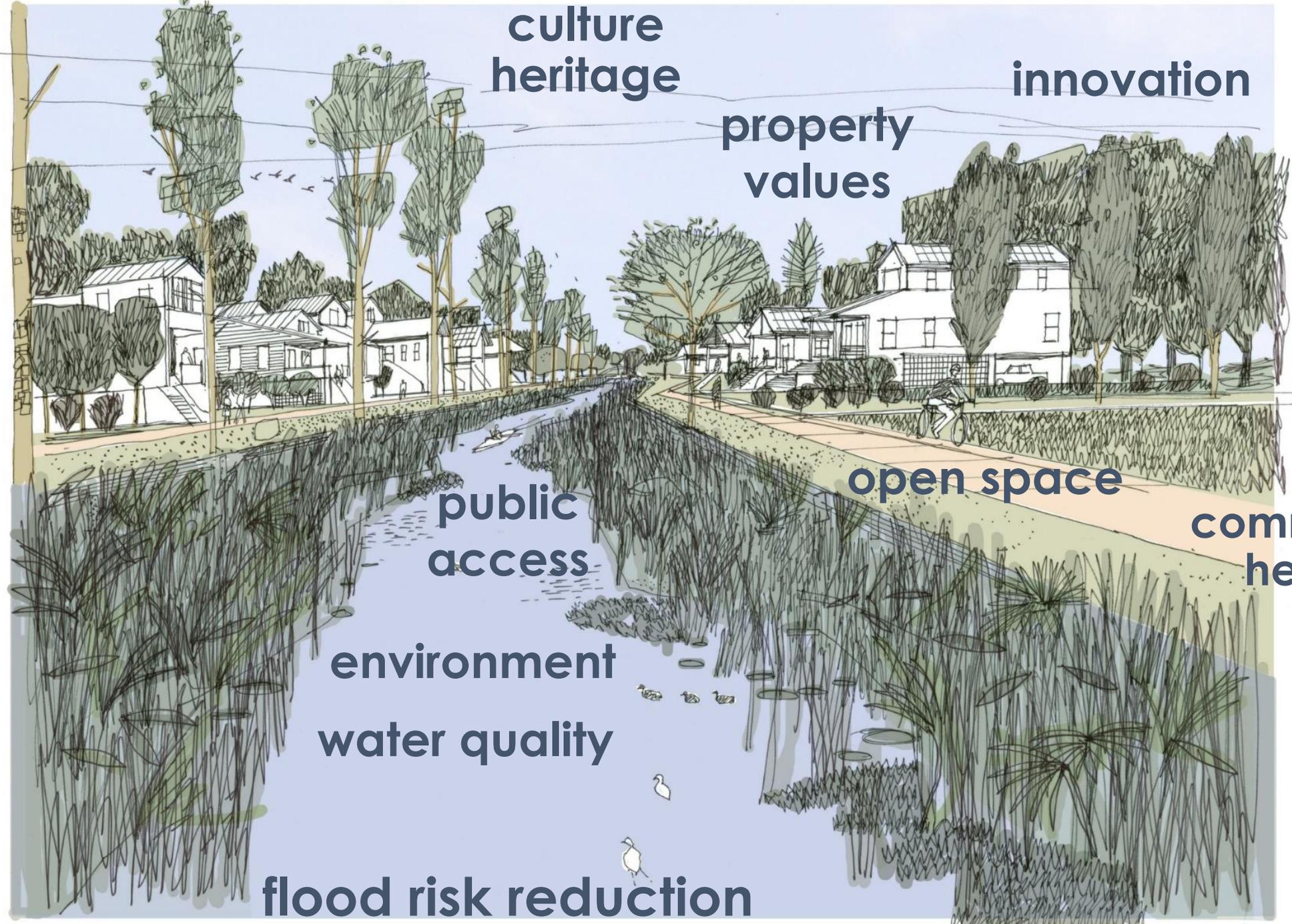


# Value-Based

## Solutions should be grounded in:

- **Safe** – reducing risk
- **Equitable** – distribution of benefits
- **Natural** – protect ecosystems
- **Heritage** – history and culture
- **Integrated** – connect systems
- **Sufficient** – leverage investments
- **Nimble** – be able to adapt
- **Innovative** – be forward thinking





**culture  
heritage**

**innovation**

**property  
values**

**public  
access**

**open space**

**community  
health**

**environment  
water quality**

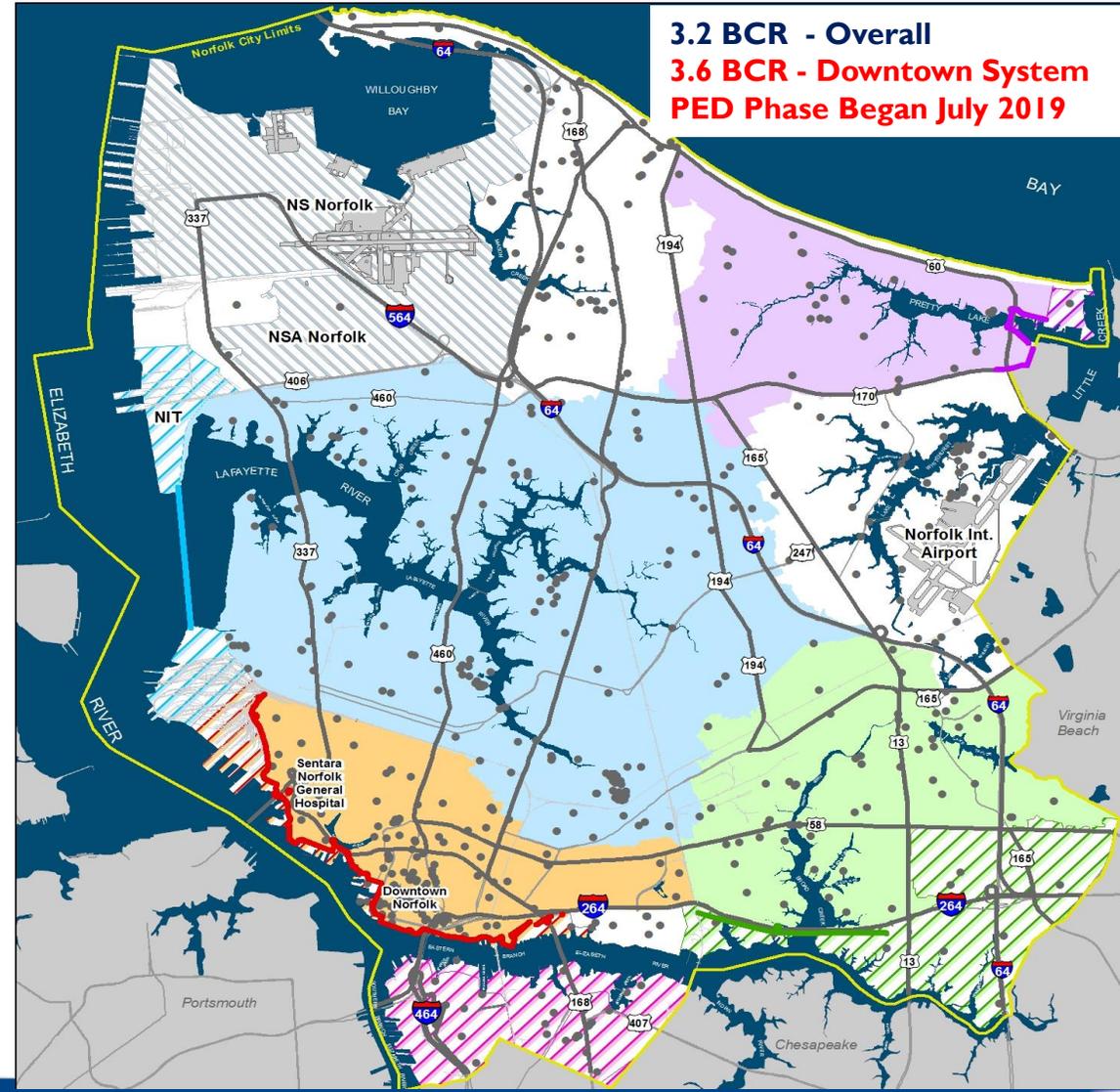
**flood risk reduction**

# Neighborhood Development and Engineering Efforts

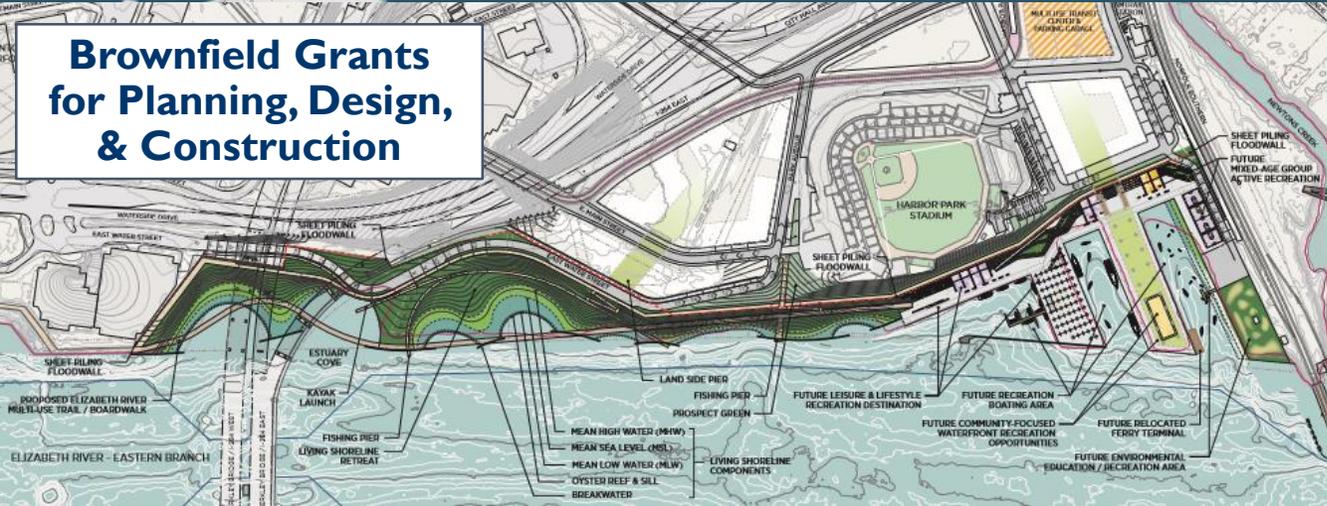
## Ohio Creek/Chesterfield Heights (NDRC)



## USACE – CSRM (Pre-Construction Engineering Design)



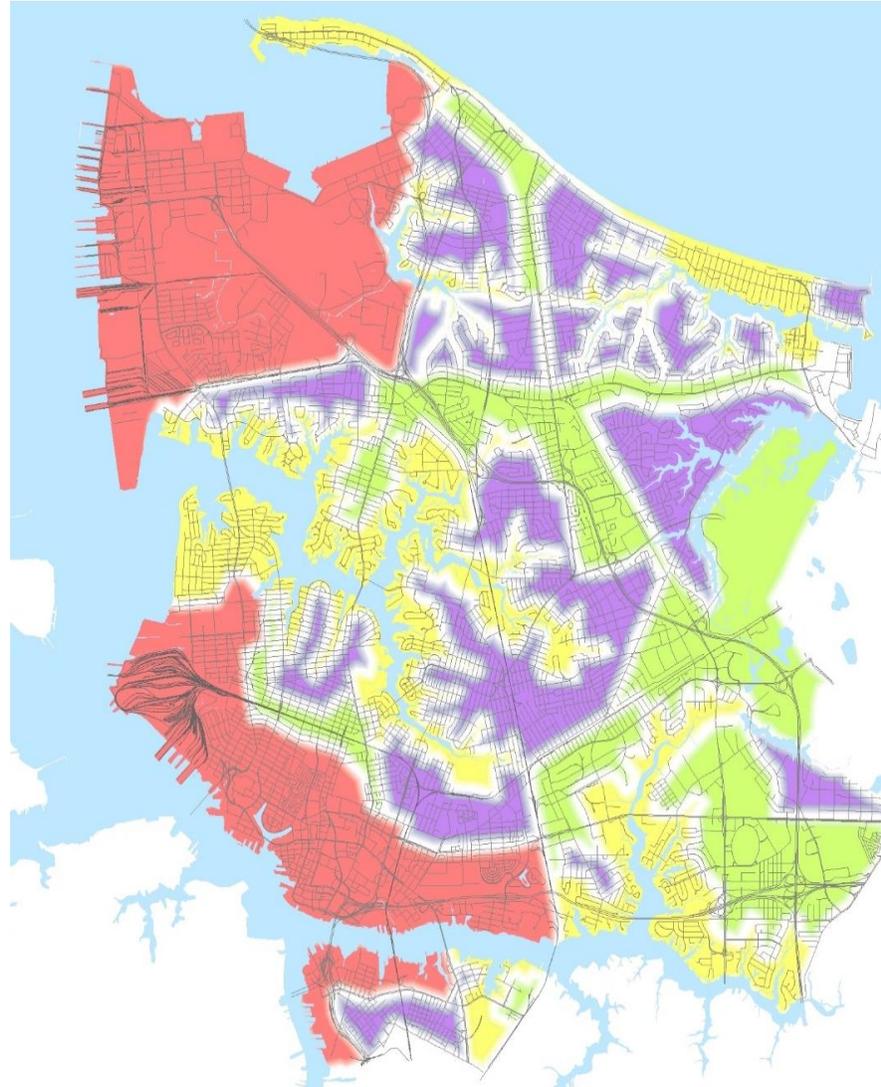
## Brownfield Grants for Planning, Design, & Construction



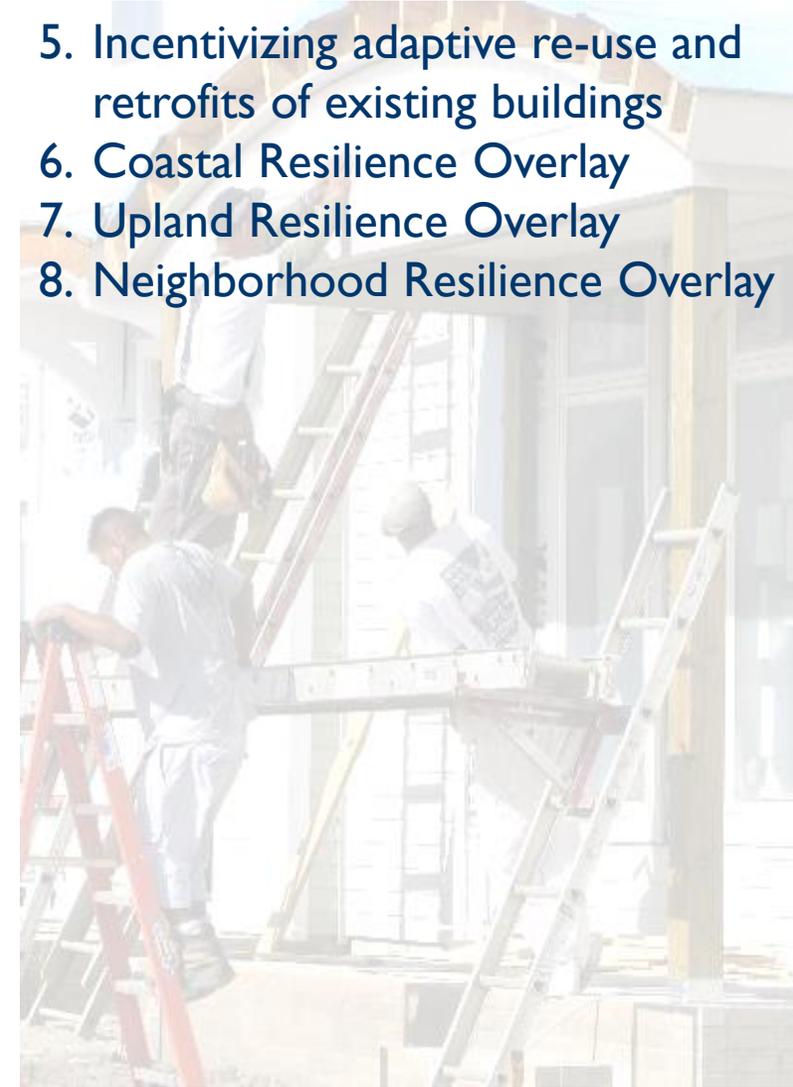
# Vision 2100 and Citywide Resilience Zoning Strategy

1. Resilience standards
2. Resilience quotient
3. Ground-floor elevations 16" to 3ft above grade
4. Enhanced buffering, landscape, open space standards

- “Red” – “economic engines”
- “Yellow” – “adaptation areas”
- “Green” – “new urban centers”
- “Purple” – “future neighborhoods”



5. Incentivizing adaptive re-use and retrofits of existing buildings
6. Coastal Resilience Overlay
7. Upland Resilience Overlay
8. Neighborhood Resilience Overlay



# Coastal Community Laboratory

- RISE Wireless Communications Evaluation Program

- Vendors invited to install wireless gateways and sensors
- RISE's evaluation team will document the performance
- Coastal Community Resilience Challenge – \$1.5 million awarded
- **\$2M Coastal Community Resilience Challenge 2020**



- Dept. Homeland Security – Flood Sensor Collaborator

- 3 Performers with 11 sensors each
- Alpha sensor evaluation ended March 2019 – 15 Beta sensors on the way



- StormSense Project – VIMS (CCRFR)

- Installed Sensors in the HR Region for better tidal prediction and street-level flood forecasting



- dMIST Project – University of Virginia

- Smart Cities Approach to Sense, Predict, and Control Stormwater and Traffic Systems (NSF-CRISP)



# City Council Policy & Citizen Engagement Leading the Way

- Green Infrastructure Plan
- New Zoning Code
- Stormwater Fee Reduction program
- Vision 2100
- People First (St. Paul's Transformation)
- Citizen Engagement Programs
  - Retain Your Rain
  - Adopt a Drain
  - WAZE Connected Citizens
  - Bank On



**Building  
a Better  
Norfolk**  
a zoning ordinance  
for the 21st century

**TABLE 5.1.2.5.B: RESILIENT POINT SYSTEM FOR SINGLE FAMILY DEVELOPMENT**

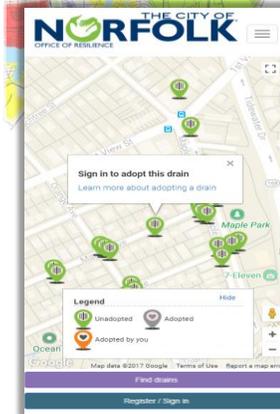
Resilient Development Activity	Points Earned
<b>Risk Reduction</b>	
Construct building to meet 110-mile wind load design requirements of the IRC	2.00
Elevate the ground story finished floor no less than 3 feet above highest adjacent grade	1.00
Install a whole house generator for power generation in the event of power failure	0.50
Construct an impact-resistant (hail, tree damage) roof	0.50
Install impact (hurricane or wind) resistant windows	0.50
Install operable storm shutters	0.50
When multiple flood zones are on the property, locate the building on the site outside of the least at-risk zone	0.50
<b>Stormwater Retention</b>	
Install a green or blue roof system on structure's roof	0.25
Divert roof drainage to rain barrels, appropriate stormwater retention system capacity)	0.25
Preserve five or more large, non-ex-	0.25

**B. MINIMUM NUMBER OF POINTS REQUIRED**

Multifamily development shall achieve the following minimum number of points from the menu of options shown in Table 5.12.6.B. Resilient Point System for Multifamily Development.

(1) 1 unit: 3 points total, 1 point per section
(2) 2 to 5 units: 4 points total, 1 point per section
6 to 29 units: 5 points total, 1.5 points per section
30 to 89 units: 6 points total, 1.5 points per section
90 to 199 units: 8 points total, 2 points per section
200 or more units: 10 points total, 2 points per section

Site	0.25
Signation	0.25



**A Green Infrastructure  
Plan for Norfolk:**  
BUILDING RESILIENT COMMUNITIES



Thank you!

Kyle Spencer, City Manager's Office of Resilience  
Deputy Chief Resilience Officer

Norfolk Resilience Strategy: [www.Norfolk.gov/resilience](http://www.Norfolk.gov/resilience)

