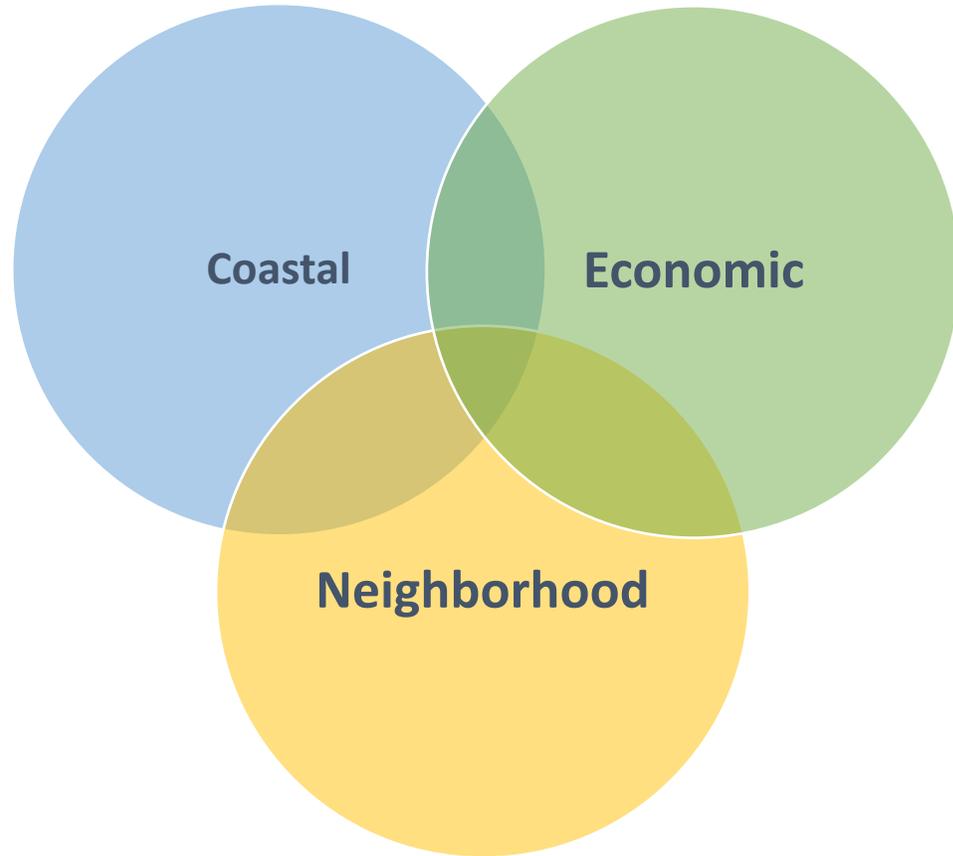


Resilience Quotient

Point-Based System for Managing Shocks & Stresses

Resilience Challenges in Norfolk



Coastal

- Recurrent flooding and SLR

Economic

- Navy and port are dominant; too little else

Neighborhood (Social)

- Concentrated poverty & disconnected communities



Building a Better Norfolk

a zoning ordinance
for the 21st century

How can Zoning
Respond to
Resilience
Challenges?

Flood Resilience Through Zoning



Norfolk has adopted “Rise Above the Risk” Approach

- Freeboard requirements:
 - 3 feet in SFHA
 - 18” in Shaded X
 - 16”-24” everywhere else in City
 - No new basements

Resilience Strategy in Zoning

Focus on flexibility and choice

- Must do—build into requirements
- Should do—create options
- Nice to do—provide a bonus

Add operational characteristics

Resilience Quotient is a blend of all



RESILIENCE FEATURES IN THE ORDINANCE

BASELINE RESILIENCE STANDARDS required for all development

STORMWATER MANAGEMENT
store first 1.25" of rainfall on site (rain barrels for SFD)

RISK REDUCTION
Flood and wind resistance

ENERGY SELF RELIANCE
Alternative energy sources and/or "generator ready"

RESILIENCE QUOTIENT POINTS required for all development

COASTAL RESILIENCE OVERLAY
(requires more resilience points)

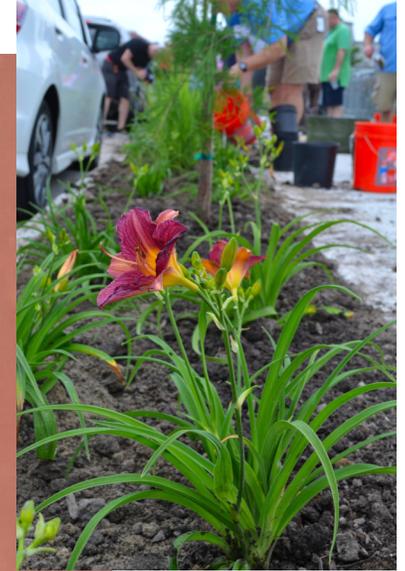
RESILIENCE BONUS PROVISION
Allows development rights to be converted to resilience points

UPLAND RESILIENCE OVERLAY
(requires fewer resilience points)

Easements on dwelling units in Coastal Resilience Overlay can be used as Resilience Quotient Points in Upland Resilience Overlay

Resilience Quotient

- Point-based system with many choices
- Intended to be both flexible and impactful
- Provides individuals with opportunity to be part of the solution



Resilience Quotient

Creating the most resilience-focused zoning ordinance in America

- Encouraging the use of resilient technologies
- Stormwater management
- Risk mitigation
- Energy resilience
- Required of new development

TABLE 5.12.6: RESILIENT POINT SYSTEM FOR RESIDENTIAL DEVELOPMENT	
Resilient Development Activity	Points Earned
Component 1: Risk Reduction	
Construct building to meet 110-mile wind load design requirements of the VUSBC	2.00
Elevate the ground story finished floor and all significant electrical and mechanical equipment no less than 3 feet above highest adjacent grade	1.00, plus 0.50 per ft. above 3 ft.
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
Establish operating procedures for how the project will handle loss of off-site or grid power, transition to a backup source of power, and transition back to normal operation	0.50
Component 2: Stormwater Management	
Install a "green roof" on at least 50 percent of the total roof area (25 percent for renovated buildings) and only plant materials permitted in Section 5.2, Landscaping Standards	2.00
Install a "green roof" on at least 25 percent of the total roof area and only plant materials permitted in Section 5.2, Landscaping Standards	1.00

C. ALTERNATIVE N

Any multiple dwelling resilience quotient sta

of the portion of the site plan review process established in Section 5.12.4, Compliance with Resilience Quotient Standards, above. The point system provides options within each of three components and each development shall achieve a minimum number of points from the menu of options shown in Table 5.12.6, Resilient Point System for Residential Development, based on the number of dwelling units within the development as shown below.

- (1) 1 to 5 units: 4 points total, no less than 1 point per component.
- (2) 6 to 29 units: 5 points total, no less than 1.5 points per component.
- (3) 30 to 89 units: 6 points total, no less than 1.5 points per component.
- (4) 90 to 199 units: 8 points total, no less than 2 points per component.
- (5) 200 or more units: 10 points total, no less than 2 points per component.

Resilience Quotient Administration

- Point system is only one option of several:
 - Elevating the structure (8-16 inches) and capturing stormwater (200 gallons for SFD, first 1.25 inches of rainwater for others)
 - Structures achieving LEED Gold or equivalent are exempt
 - Historic rehabs are exempt
- Zoning Administrator authorized:
 - To approve minor deviations from point system, or
 - To review proposed alternatives that achieve the same resilience goals

Resilience Quotient Example



The Tern Conceptual Master Plan

Norfolk, Virginia
May 2, 2018

SITE DATA:

Total Site Area: +/-7.2 a.c.
Proposed Zoning: PD

Units Provided:	96 Units
 4 Story Townhomes (20'x47'):	22 Units
 3 Story Townhomes (21'x34'):	49 Units
 Carriage Homes (26'x26'):	25 Units



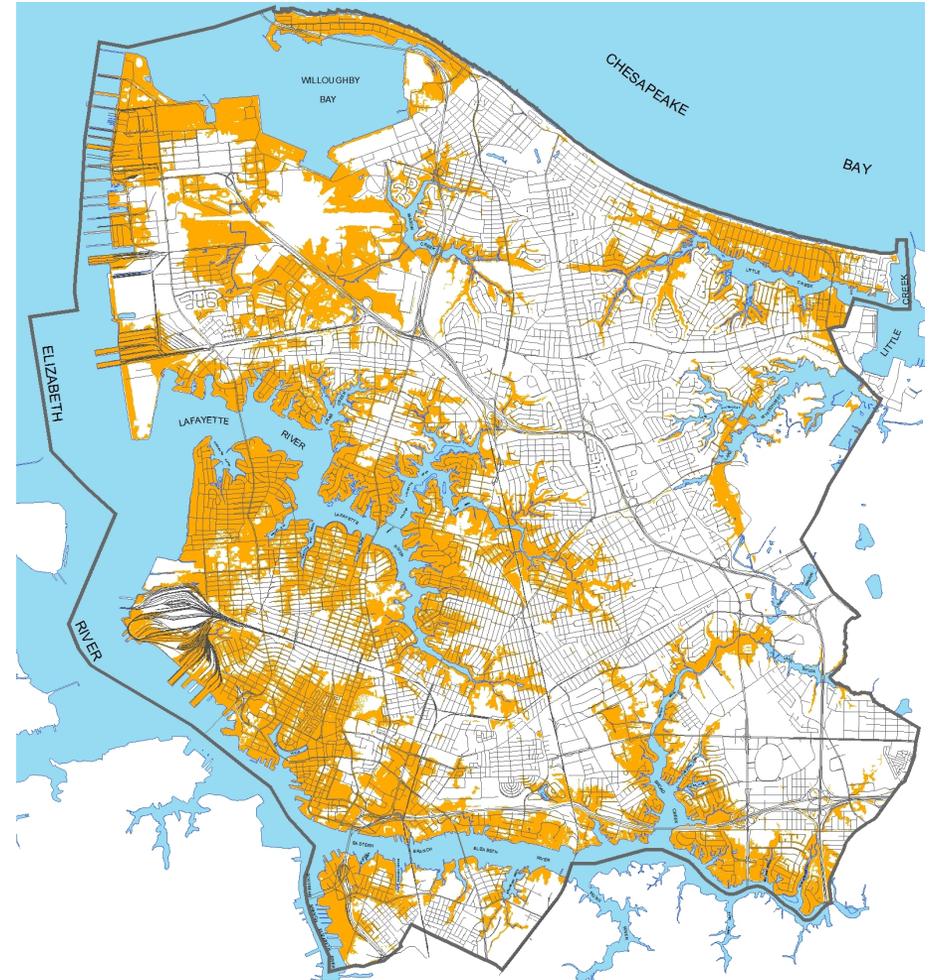
LAND PLANNING SOLUTIONS
10017 Harbour & York Rd., Suite 202
Richmond, VA 23234
© 2017 LPS, RBA & EDC HOMES
www.landplanning.com

Points Breakdown

Total Project (96 townhomes, 30,000 sf retail)	8.0 points
Component 1	3.0
Construct to 110-mile wind	2.0
Elevate the ground story first floor elevation	1.0
Component 2	3.0
Treat 25% of site generated runoff	1.0
Treat an additional 25% of site generated runoff	1.0
Provide fenced community space	1.0
Component 3	2.0
Equip each unit with a generator hookup	1.0
Provide 2 operable windows on 2 exterior walls	0.5
Re-use existing non-historic retail building	0.25
Install tankless water heating system (in 1/2 units)	0.25 (1/2)

Resilience Overlays

- Coastal Resilience Overlay
 - Applies to high flood risk areas
- Upland Resilience Overlay
 - Applies outside high flood risk areas
- Neighborhood Resilience Overlay
 - Applies to selected neighborhoods



Resilience Overlays

- Coastal Resilience Overlay (CRO)
 - Applies to all properties within a high-risk flood zone (V, A, or X-shaded)
 - Requires:
 - Additional points from Resilience Quotient table
 - All landscaping to be salt tolerant/native species
 - All parking and open space to be pervious
 - Limits parking to 110% of the minimum required



Lessons Learned

- Clearly connect the code provisions to the comprehensive plan and other city resilience goals
- A range of flexible options and alternatives is important
- Be open and adaptive to change during implementation
- Begin and maintain a dialogue with the local development community
- Repackage innovative solutions as case studies for future users
- Be prepared to go “off book” to adjust requirements in unique circumstances

Questions



For More Information

George M. Homewood, FAICP CFM

Director of City Planning

george.homewood@norfolk.gov

Jeremy E. Sharp, AICP

Zoning Administrator

Jeremy.sharp@norfolk.gov