



ESTABLISHING RESILIENT ORGANIZATIONS AND PURSUING RESILIENCY FUNDING

American Association of Port Authorities

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Arcadis.
Improving quality of life.

WHAT IS RESILIENCE?

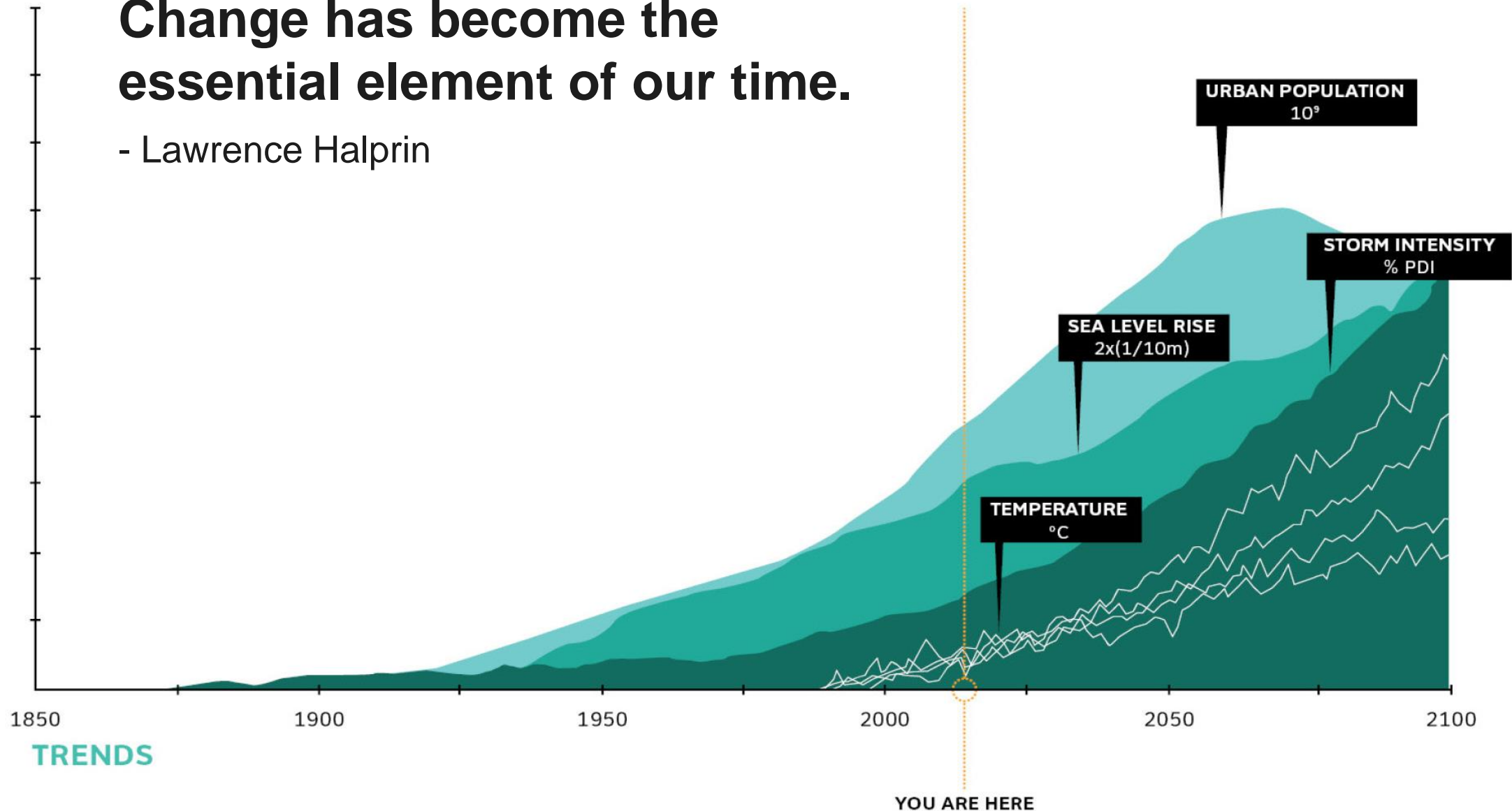
Resilience

The capacity of businesses, individuals, communities and systems to sidestep or operate, survive, adapt and grow no matter what kinds of chronic stresses and acute shocks they may face

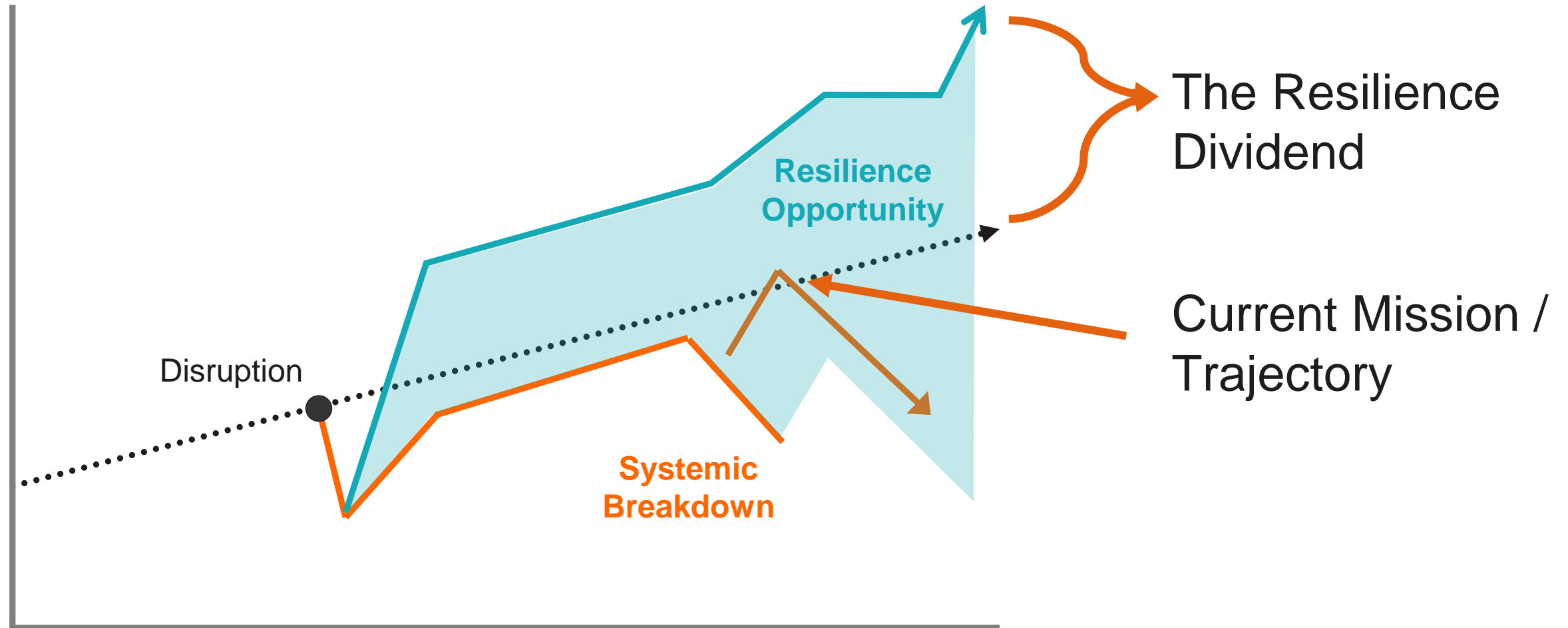
An ever changing climate...

Change has become the essential element of our time.

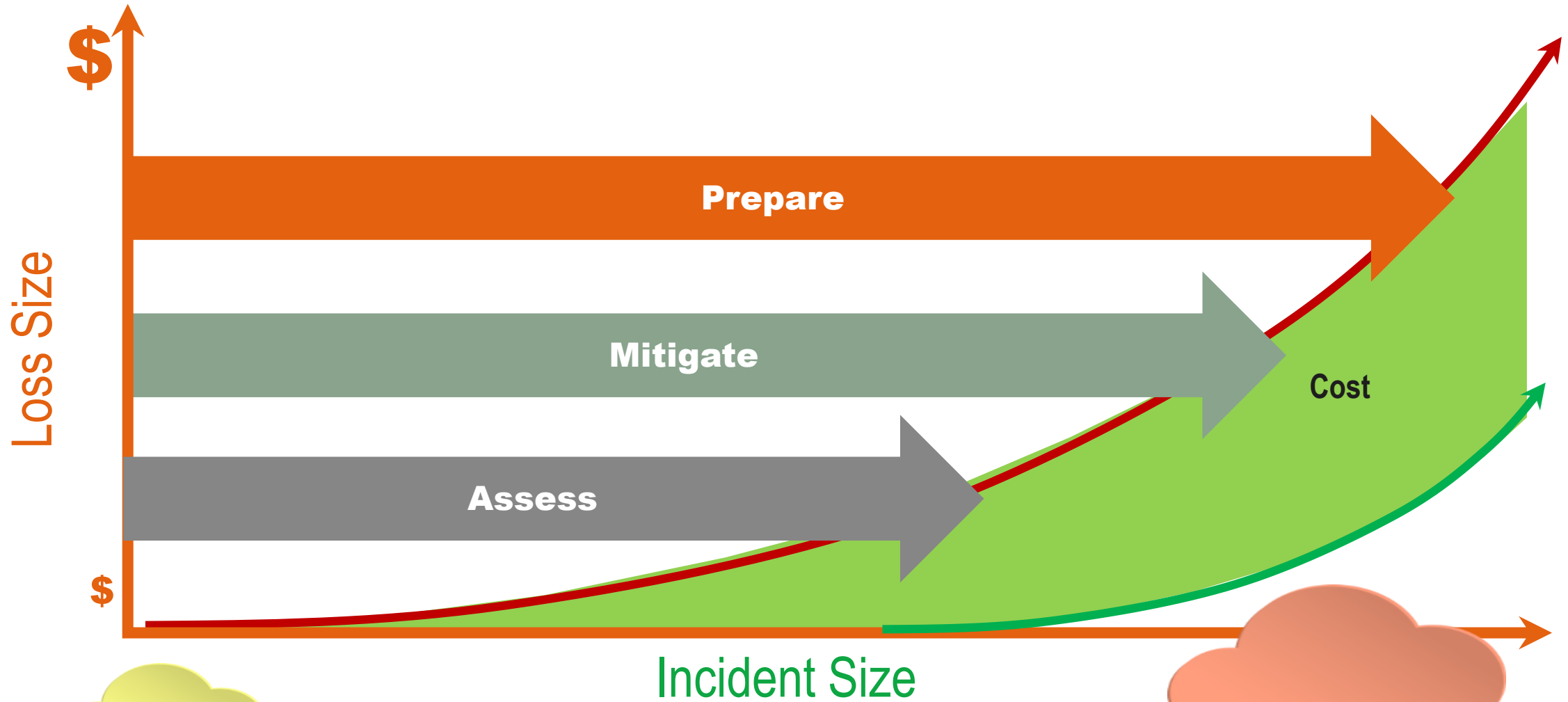
- Lawrence Halprin



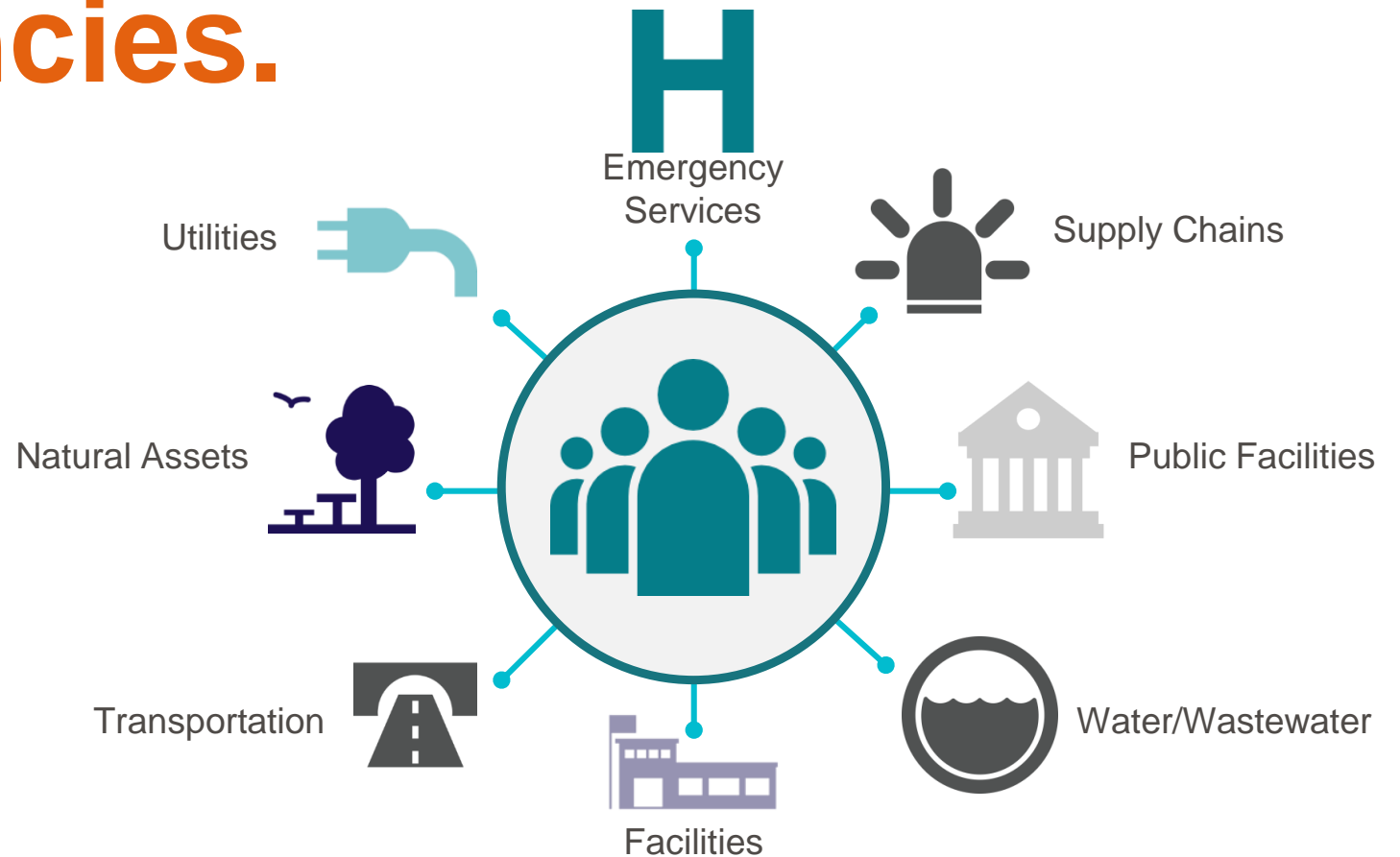
So how can we leverage risk to become opportunity?



It begins with breaking the response cycle.



Port vulnerability is also dependent upon external interdependencies.



With limited resources and increasing need, how do we prioritize?



2017

INFRASTRUCTURE
REPORT CARD



FINANCING THE IMPLEMENTATION

Identifying Potential Funding Sources

1. What is out there and available?
 1. Federal Funds – FEMA, HUD, USDOT, EPA, NOAA
 2. State Funds – Louisiana CPRA, Texas GCCPRD
 3. Local Funds
 4. Public-Private Partnerships
 5. The Other Guys – VW Settlement , BP Oil Spill Settlement
2. What is reasonably attainable?
3. Can we go for it?



Why important projects don't move forward

1. Responsibility and accountability were lacking
2. The project wasn't valuable to the people who could fund it
3. Not enough time spent developing and executing a funding strategy (perhaps this is an endurance issue?)
4. Too much time passed between initial project excitement and success



How do we succeed amidst these realities?

1. Empower a champion
2. Get scrappy (Build a creative, adaptive, and aggressive funding strategy)
3. Develop a clear and flexible value proposition
4. Use quick wins to build momentum (slice and dice, wherever you can)
5. Build a coalition



Process



Track

Know what money is available



Slice

Understand the projects within a project



Pursue

Go after the money



Leverage

Resources, voices, fund sources to maximize opportunity



Strategy



Understand and Communicate Your Story

Problem Alleviating / Objective

What are we changing? (Existing conditions)

How much and what kind of change? (Project scope)

Who will benefit and how?

How will we know we've succeeded? (metrics – may or may not be quantified)

Why should _____ care?



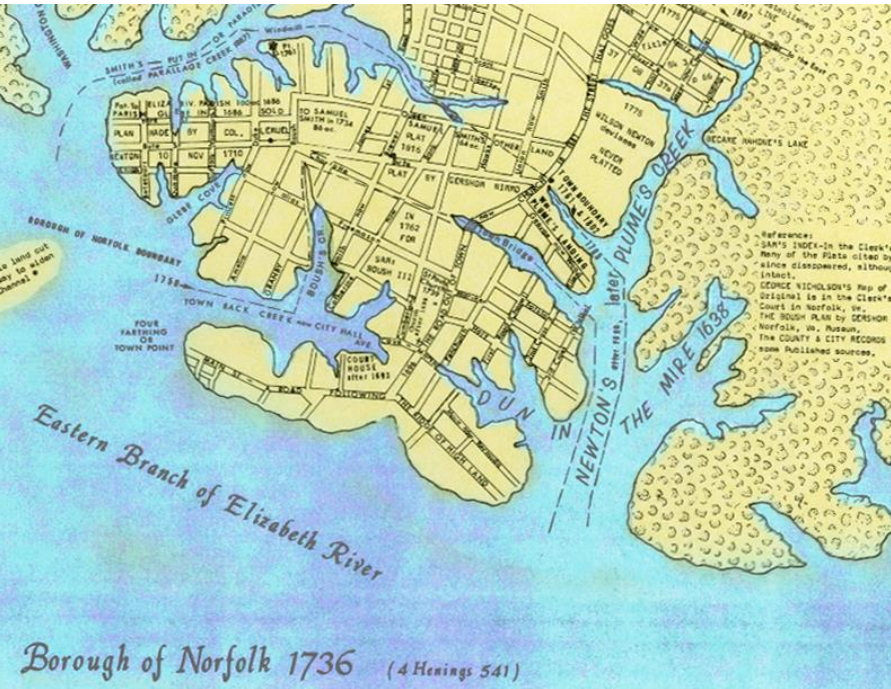
BENEFIT-COST ANALYSIS

HELPING OTHERS SEE THE VALUE

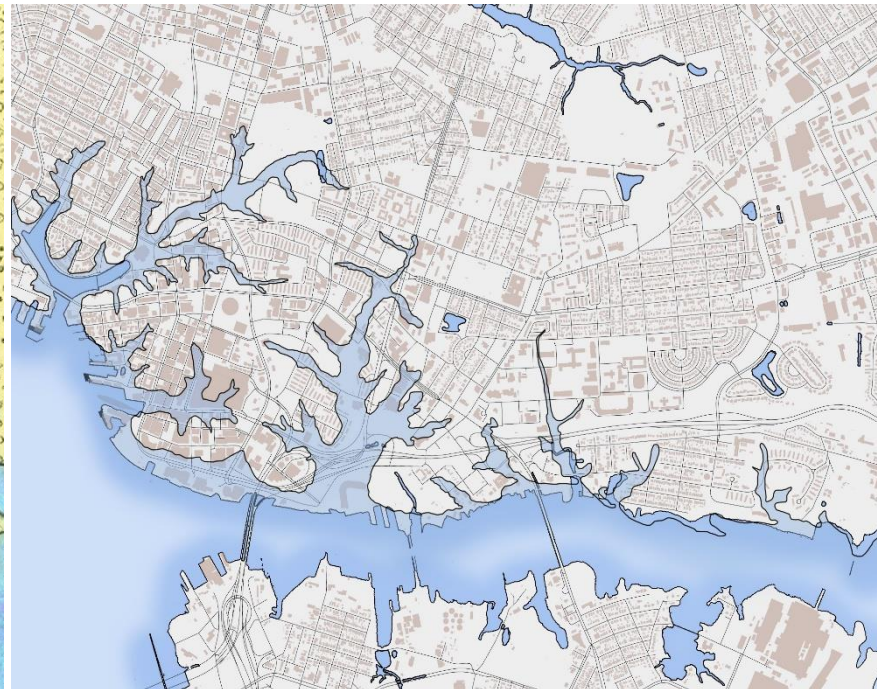
THE BCA HELPS TO JUSTIFY THE EXPENDITURE



THE BCA MEASURES EXPECTED CHANGE OVER TIME



Historic shoreline



Today's flooding



Future flooding with sea level rise



Capital Costs




Maintenance and
Operations

Costs



Duplicated Benefits



Added Risks, Costs
and External
Impacts



Resiliency



Economic

Benefits



Social



Environmental



Losses
Avoided



Economic

Value Added



Social



Environmental

EXAMPLES OF RESILIENCY BENEFITS

Direct Physical Damages (Structures)

Displacement

- Relocation Costs
- Economic Loss of Function
- Shelter Needs (captured under relocation costs, but numbered)

Public and Essential Facility Loss of Service

Lifeline Impacts

- Communications
- Transportation
- Utilities

Detailed Economic Impacts (direct, indirect, induced effects)

- Economic impacts due to utility loss
- Employment Loss
- Labor Income Loss
- Output Loss

Human Impacts

- Loss of Life
- Mental Stress and Anxiety
- Lost Productivity

EXAMPLES OF VALUE ADDED

Economic Value Added

- Added Employment
- Added Output

Recreational Benefit

Health Benefits

Aesthetic Benefits

Ecosystem Services

- Climate Regulation
- Water Retention
- Air Quality

- Erosion Control
- Pollination
- Food
- Waste Filtration
- Raw Materials
- Water Supply
- Rainfall Interception
- Nutrient Cycling
- Pollution Control

Be Prepared to Slice and Dice





CASE STUDIES



National Disaster Resilience Competition

Promotes risk assessment and planning and will fund the implementation of **innovative resilience projects** to better prepare communities for future storms and other extreme events.

\$1 Billion available nationwide

- 2 Phases
 - Phase 1: Framing Phase
 - Phase 2: Design and Implementation Phase
- Requirement: Presidential Disaster Declaration between 2011 and 2013
- Target areas must meet Most Impacted, Distressed, and Unmet Need thresholds



The “Dry-Line,” winning proposal for NYC by Bjarke Ingels Group & ARCADIS



The Big U





PROJECTS HAVE MULTIPLE PERSONALITIES



Holland Tunnel

NYCT - Subway

Hospital

Power Generation

Telecommunication

High Rise Offices

Data center

IS THIS AN INFRASTRUCTURE PROTECTION PROJECT?



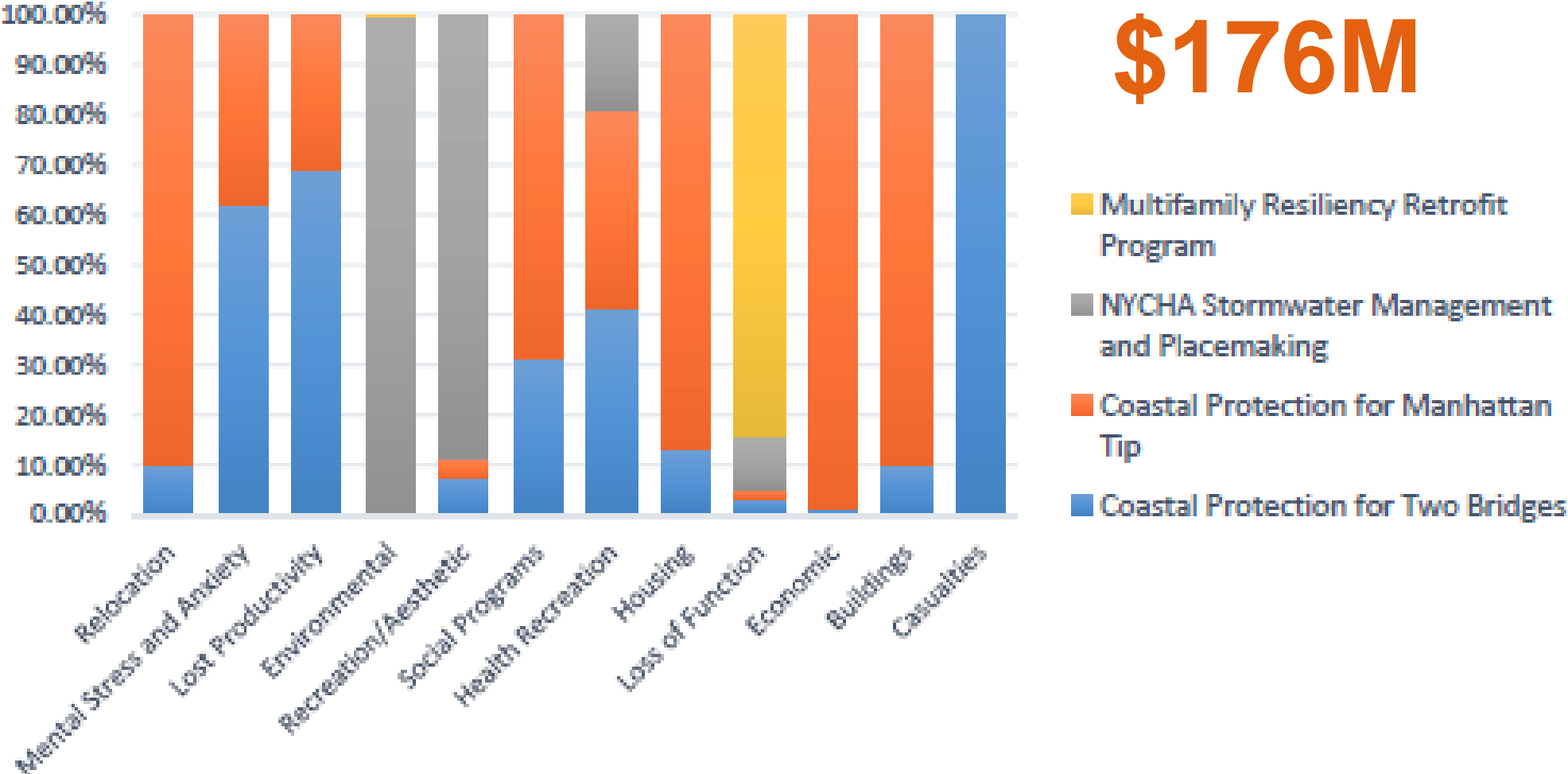
- EXISTING COMMUNITY RECREATIONAL FACILITY**
- A- Coleman Square Playground
 - B- Murry Bergtraum Softball Field
 - C- Alfred E. Smith Recreation Center
 - D- Martin F. Tanamey Playground
 - E- Cherry Clinton Playground
 - F- Rutgers Park
 - G- Little Flower Playground
 - H- Basketball City
 - J- NYCMA Two Bridge Community Center
- PROPOSED COMMUNITY RECREATIONAL FACILITY**
- Community Gathering Space
 - Playground/Fitness Area
 - Art Walk
 - Dog Park
 - Passive Seating Area
 - Skateboard Park
 - Dancing Area
 - Climbing Wall
 - Basketball Courts
 - Fitness

OR COMMUNITY ENRICHMENT?

NYC NDRC Benefit Cost Analysis

**Award:
\$176M**

Share of Each Benefit Type by Project



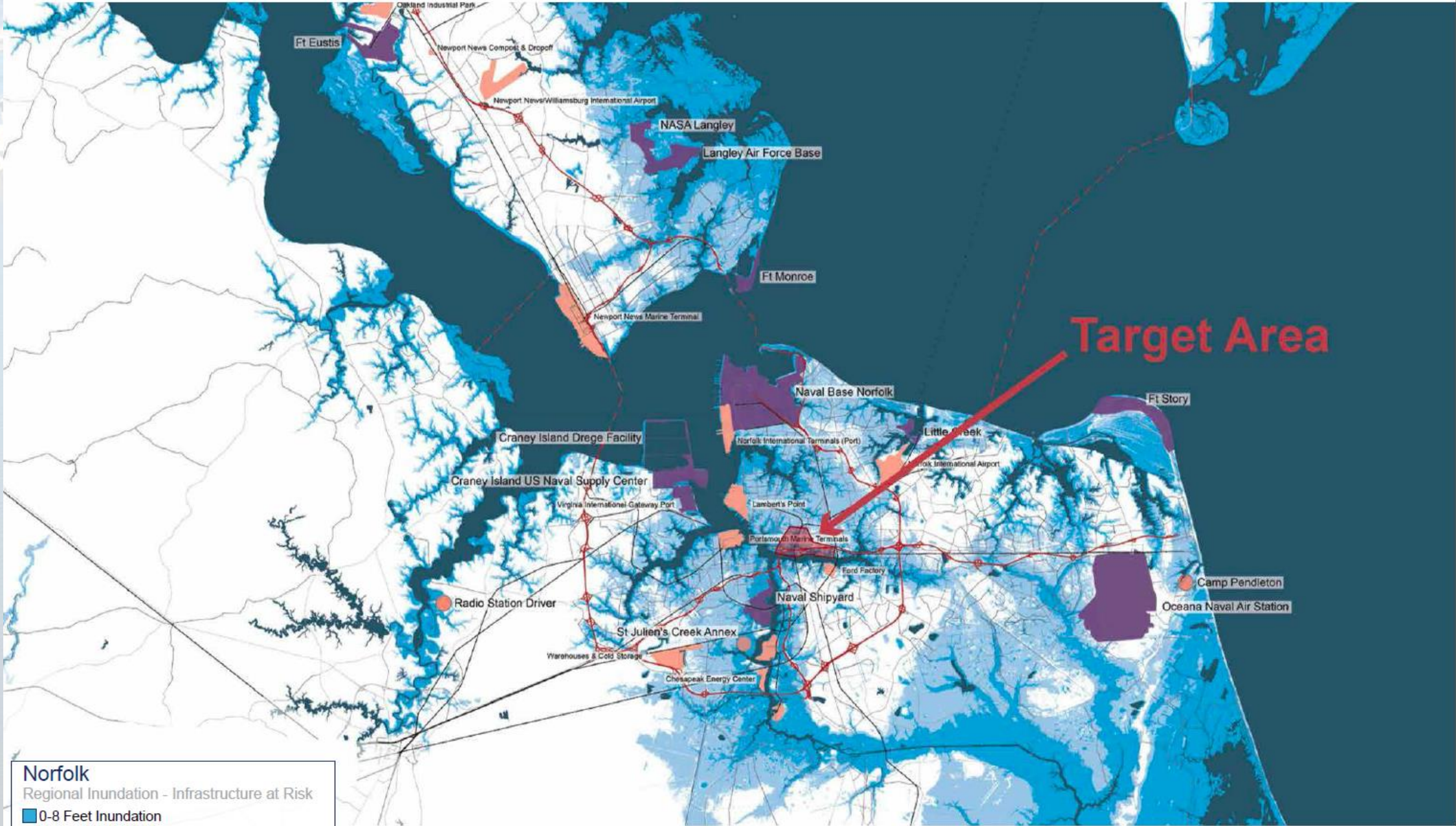
13,151
AFFORDABLE
HOMES
MADE MORE
RESILIENT

820
STRUCTURES
PROTECTED FROM
STORM SURGE

3,228
TONS CO₂
REDUCED ANNUALLY

18 MILLION
GALLONS
STORMWATER
RUNOFF
REDUCED ANNUALLY

\$433
MILLION
HEALTHCARE
COSTS
AVOIDED

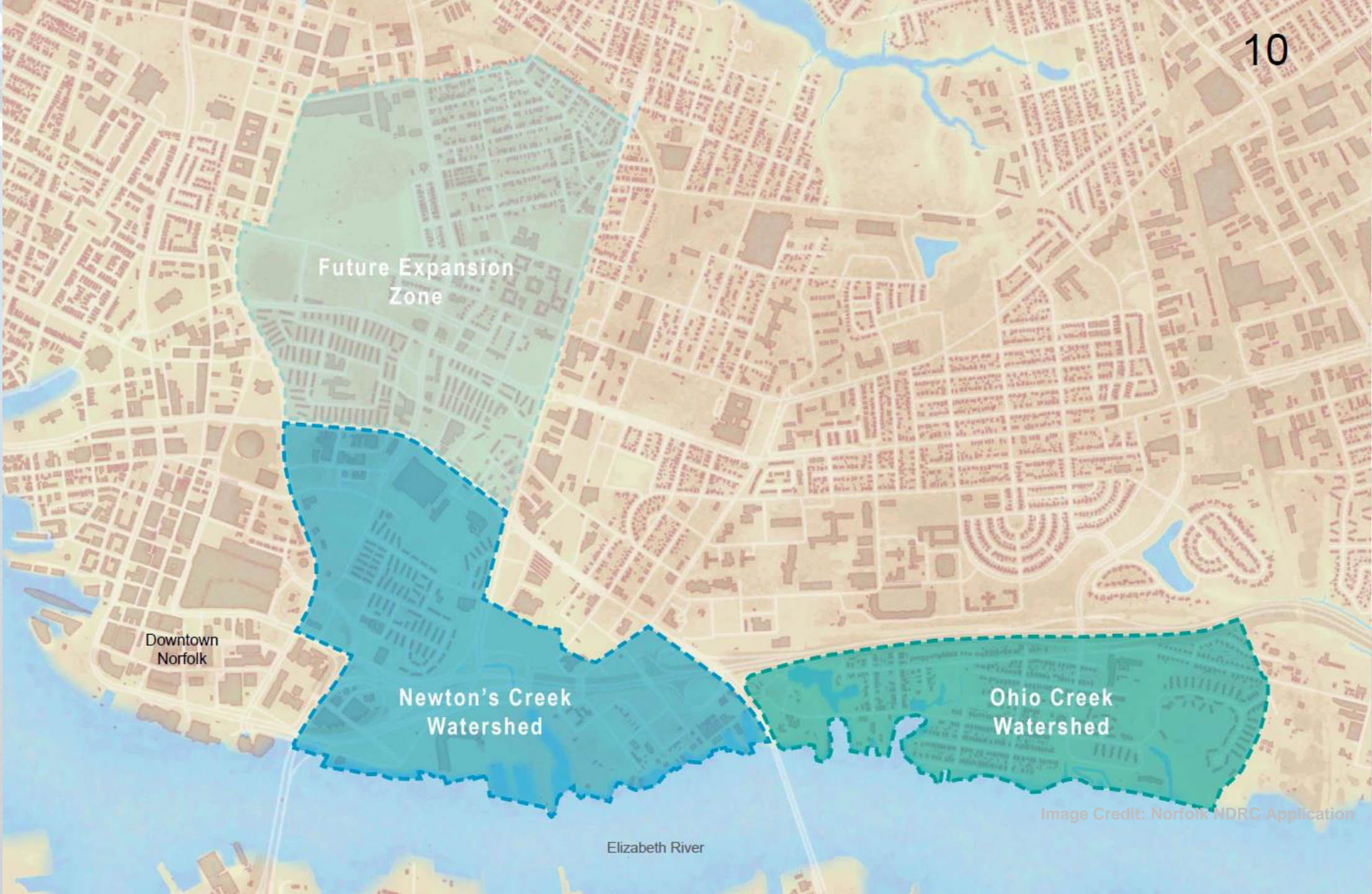


Norfolk

Regional Inundation - Infrastructure at Risk

- 0-8 Feet Inundation
- 8-13 Feet Inundation
- Military Sites
- Critical Infrastructure Sites
- Major Highways
- Railways

Image Credit: Norfolk NDRC Application



Future Expansion Zone

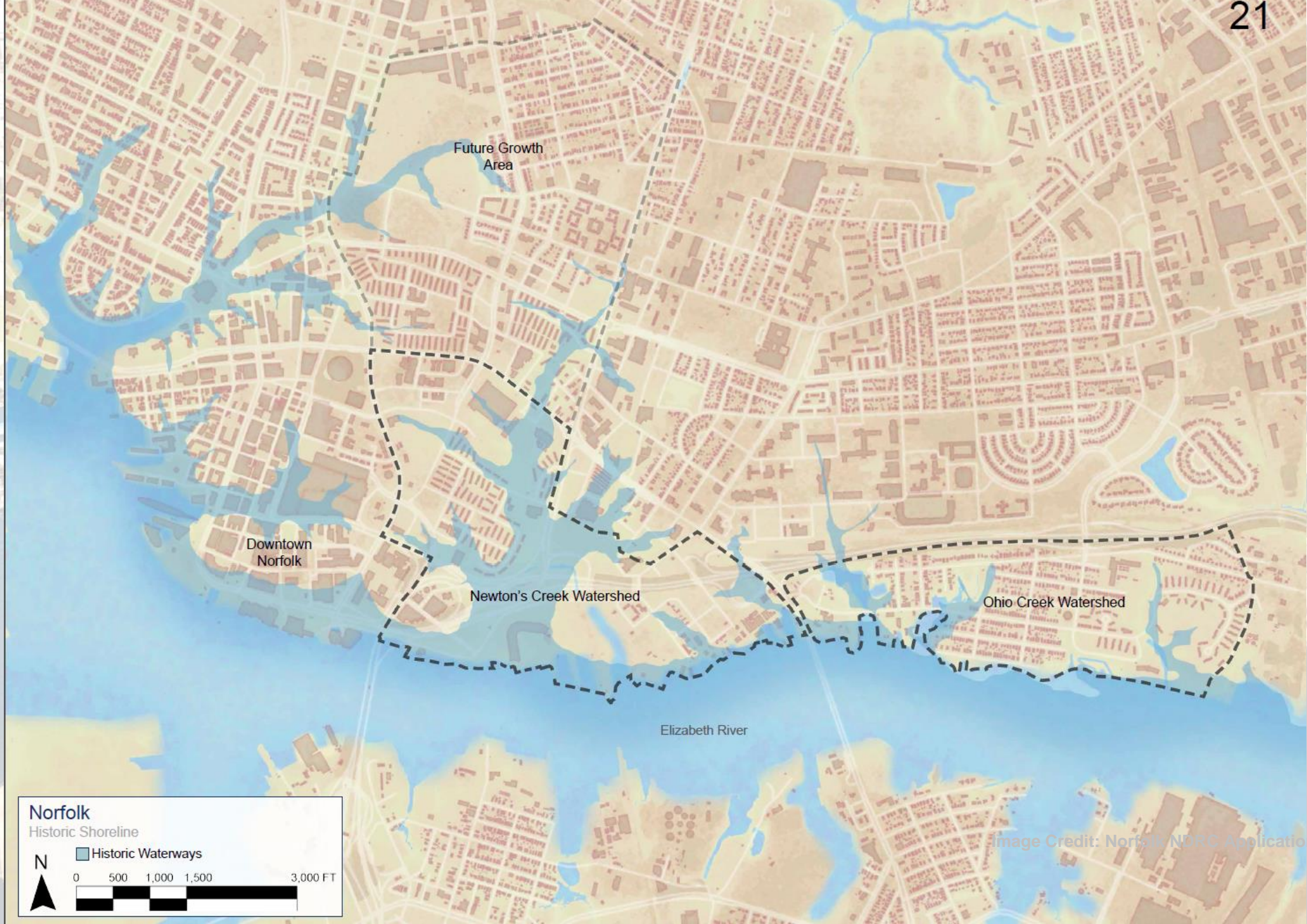
Downtown Norfolk

Newton's Creek Watershed

Ohio Creek Watershed

Elizabeth River

Image Credit: Norfolk NDRC Application



Future Growth Area

Downtown Norfolk

Newton's Creek Watershed

Ohio Creek Watershed

Elizabeth River

Norfolk
Historic Shoreline

N

Historic Waterways

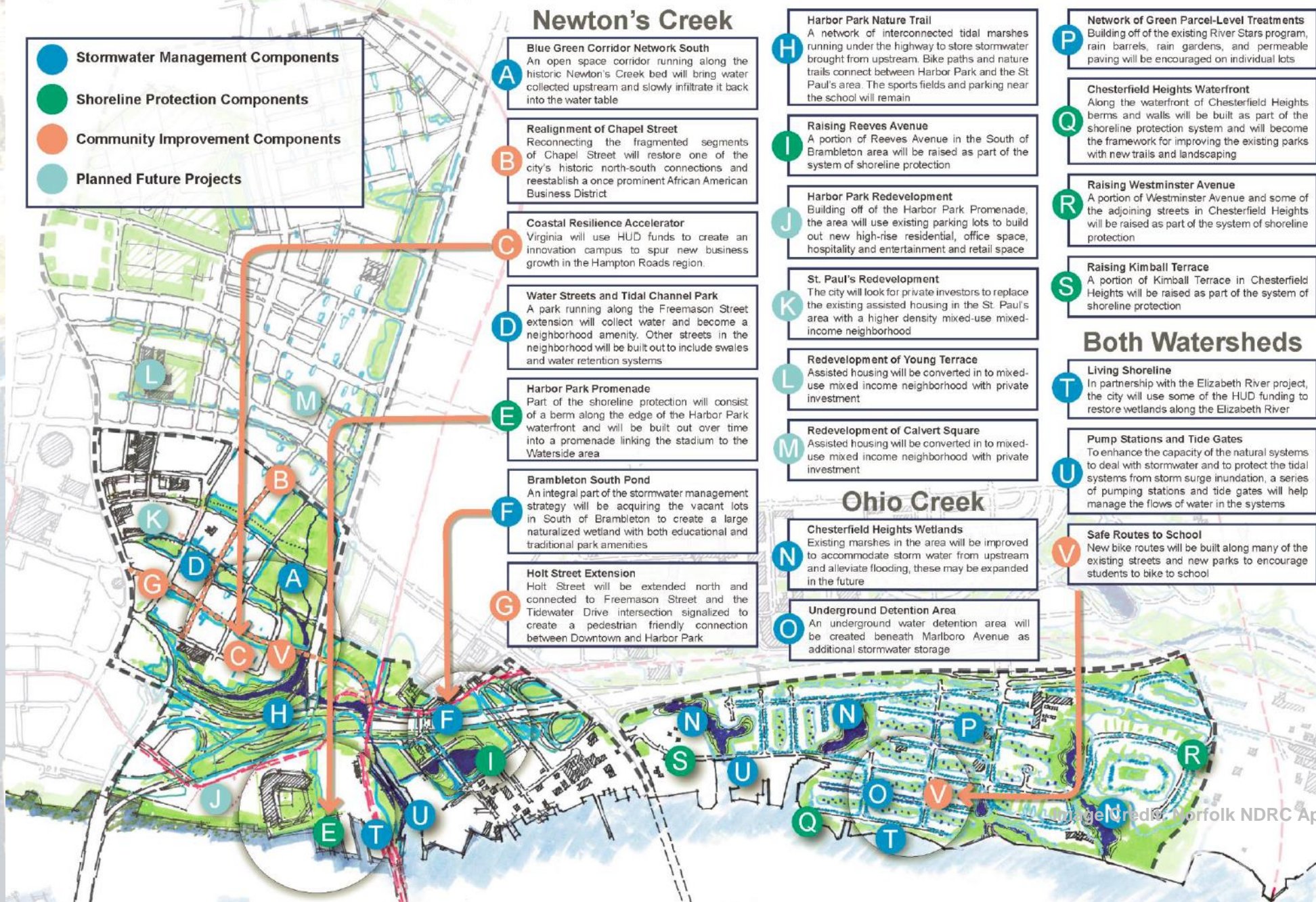
0 500 1,000 1,500 3,000 FT



Norfolk Coastal Adaptation and Community Transformation Plan

Key Intervention Sites for NDRC Application

- Stormwater Management Components
- Shoreline Protection Components
- Community Improvement Components
- Planned Future Projects



Newton's Creek

- A** **Blue Green Corridor Network South**
An open space corridor running along the historic Newton's Creek bed will bring water collected upstream and slowly infiltrate it back into the water table
- B** **Realignment of Chapel Street**
Reconnecting the fragmented segments of Chapel Street will restore one of the city's historic north-south connections and reestablish a once prominent African American Business District
- C** **Coastal Resilience Accelerator**
Virginia will use HUD funds to create an innovation campus to spur new business growth in the Hampton Roads region.
- D** **Water Streets and Tidal Channel Park**
A park running along the Freemason Street extension will collect water and become a neighborhood amenity. Other streets in the neighborhood will be built out to include swales and water retention systems
- E** **Harbor Park Promenade**
Part of the shoreline protection will consist of a berm along the edge of the Harbor Park waterfront and will be built out over time into a promenade linking the stadium to the Waterside area
- F** **Brambleton South Pond**
An integral part of the stormwater management strategy will be acquiring the vacant lots in South of Brambleton to create a large naturalized wetland with both educational and traditional park amenities
- G** **Holt Street Extension**
Holt Street will be extended north and connected to Freemason Street and the Tidewater Drive intersection signalized to create a pedestrian friendly connection between Downtown and Harbor Park

- H** **Harbor Park Nature Trail**
A network of interconnected tidal marshes running under the highway to store stormwater brought from upstream. Bike paths and nature trails connect between Harbor Park and the St Paul's area. The sports fields and parking near the school will remain
- I** **Raising Reeves Avenue**
A portion of Reeves Avenue in the South of Brambleton area will be raised as part of the system of shoreline protection
- J** **Harbor Park Redevelopment**
Building off of the Harbor Park Promenade, the area will use existing parking lots to build out new high-rise residential, office space, hospitality and entertainment and retail space
- K** **St. Paul's Redevelopment**
The city will look for private investors to replace the existing assisted housing in the St. Paul's area with a higher density mixed-use mixed-income neighborhood
- L** **Redevelopment of Young Terrace**
Assisted housing will be converted in to mixed-use mixed income neighborhood with private investment
- M** **Redevelopment of Calvert Square**
Assisted housing will be converted in to mixed-use mixed income neighborhood with private investment

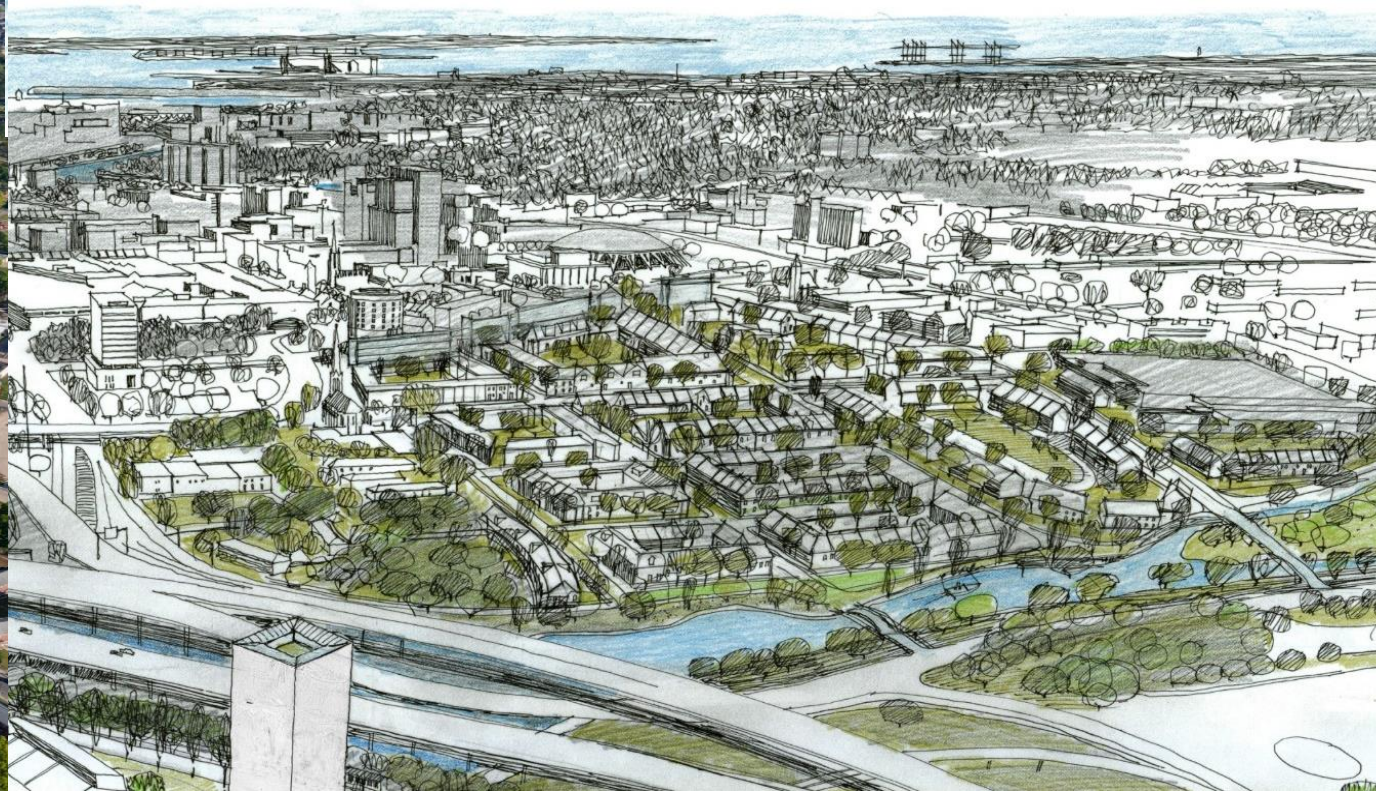
- P** **Network of Green Parcel-Level Treatments**
Building off of the existing River Stars program, rain barrels, rain gardens, and permeable paving will be encouraged on individual lots
- Q** **Chesterfield Heights Waterfront**
Along the waterfront of Chesterfield Heights berms and walls will be built as part of the shoreline protection system and will become the framework for improving the existing parks with new trails and landscaping
- R** **Raising Westminster Avenue**
A portion of Westminster Avenue and some of the adjoining streets in Chesterfield Heights will be raised as part of the system of shoreline protection
- S** **Raising Kimball Terrace**
A portion of Kimball Terrace in Chesterfield Heights will be raised as part of the system of shoreline protection

Ohio Creek

- N** **Chesterfield Heights Wetlands**
Existing marshes in the area will be improved to accommodate storm water from upstream and alleviate flooding, these may be expanded in the future
- O** **Underground Detention Area**
An underground water detention area will be created beneath Marlboro Avenue as additional stormwater storage
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- T** **Living Shoreline**
In partnership with the Elizabeth River project, the city will use some of the HUD funding to restore wetlands along the Elizabeth River
- U** **Pump Stations and Tide Gates**
To enhance the capacity of the natural systems to deal with stormwater and to protect the tidal systems from storm surge inundation, a series of pumping stations and tide gates will help manage the flows of water in the systems
- V** **Safe Routes to School**
New bike routes will be built along many of the existing streets and new parks to encourage students to bike to school

Both Watersheds

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404
STRUCTURES
PROTECTED
WITHIN HISTORIC
DISTRICT
+7
HISTORIC
STRUCTURES
PROTECTED



2,224
TREES
ADDED



1,673
UNITS OF
WELL-BUILT
& SAFE
AFFORDABLE
HOUSING
BUILT BY CITY &
PRIVATE INVESTORS



226.7
MILLION
GALLONS
STORMWATER
RUNOFF
REDUCED
ANNUALLY



OVER
600
JOBS
GENERATED

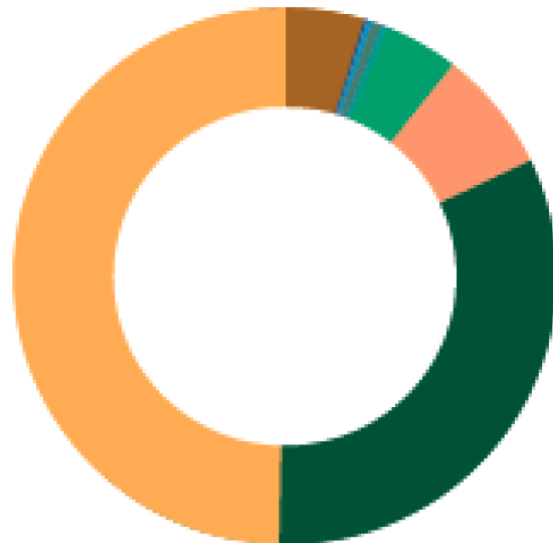


74 ACRES
NATURAL
COMMUNITY
GATHERING SPACE
ADDED

Norfolk, Virginia Community Transformation

**Award:
\$120M**

Ohio Creek Watershed



Newton's Creek Watershed



2.59% Direct Physical Damages
0.12% Relocation Costs
0.04% Casualties
0.21% Mental Stress and Anxiety
0.13% Lost Productivity
3.49% Critical Facilities Loss
4.47% Economic Loss
0.53% Environmental Benefits
21.27% Social Benefits
63.66% Economic Revitalization
3.22% Future Economic Revitalization

4.73% Direct Physical Damages
0.15% Relocation Costs
0.35% Casualties
0.59% Mental Stress and Anxiety
0.36% Lost Productivity
4.44% Critical Facilities Loss
7.33% Economic Loss
32.42% Environmental Benefits
49.62% Social Benefits

\$1.9 BILLION

NET PRESENT VALUE BENEFITS

BCR: 7.03

Calcasieu Ship Channel

Louisiana has the largest port complex in the nation

Cost to expand and maintain the ports escalates each year but the amount of federal appropriations remains constant or decreases

Calcasieu ship channel connects the Gulf of Mexico to the Port of Lake Charles

The ship channel is not being maintained – it is silting in – it cannot be utilized at low tide



Pivoting and Reframing the Project

Instead of channel maintenance funds, we pivot to viewing the channel as an important piece of the coast to sustain

Area is threatened by an eroding coast partly caused by fresh water intruding into the interior wetlands by the ship channel

Coastal restoration project that deepens the channel, installs rock structures to maintain a deepened channel, utilizes dredge material to construct wetlands in strategic locations around the ship channel to protect and sustain the structure



Result

The project was funded as a coastal restoration project as part of the CPRA Master Plan

Award: \$150 to \$225M

(still in design phase)



WHAT'S IN THE 2017 COASTAL MASTER PLAN FOR CALCASIEU PARISH?

PROJECT TYPES



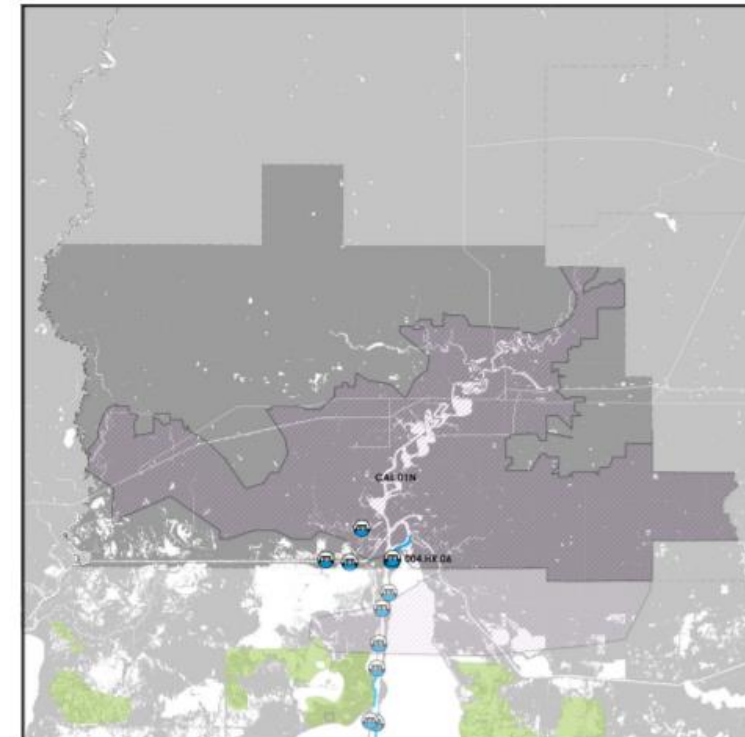
2017 MASTER PLAN PROJECTS

RISK REDUCTION PROJECTS: YEAR 1-30

+ CAL01N: Calcasieu Nonstructural Risk Reduction

RESTORATION PROJECTS: YEAR 1-10

+ 004.HR.06: Calcasieu Ship Channel Salinity Control Measures



Q & A

