



CREATING A MORE RESILIENT TAMPA BAY

BRIAN COOK | DIRECTOR OF URBAN AND ENVIRONMENTAL DESIGN | APPLIED SCIENCES
FOR THE FLORIDA STORMWATER ASSOCIATION (FSA) | 06.15.2022

FINDINGS AND
LESSONS LEARNED





BRIAN COOK

APPLIED SCIENCES CONSULTING, INC.
DIRECTOR OF URBAN AND ENVIRONMENTAL DESIGN

Landscape Architect
Urban Designer
Climate and Resilience Specialist

Research Professor, University of South Florida
Florida Center for Community Design and Research

Building with Nature perspectives

Cross-disciplinary BwN
approaches in coastal
regions

RESEARCH IN URBANISM SERIES (RIUS) Vol. 7

Janneke van Bergen, Steffen Nijhuis, Nikki Brand, Marcel Hertogh (Eds.)

BRIAN COOK

Recent Experience

- The Hillsborough County Community Vulnerability Study
- City of Tampa Regulatory Approach to Sea Level Rise
- City of Tampa Climate Action and Equity Plan
- Tampa Bay Regional Planning Council, Resilient Ready Tampa Bay
- City of Tampa North Tampa Closed Basin
- The Hillsborough River Historic Development Study (class)
- Palmetto Beach Living Coastline and Community Engagement

- Author: Building with Nature Perspectives (TU Delft)

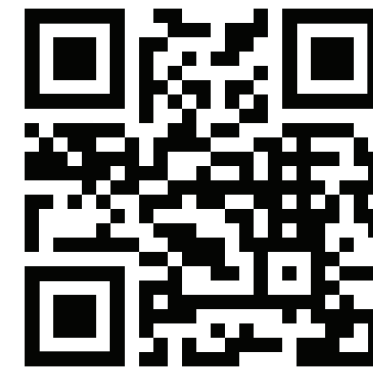




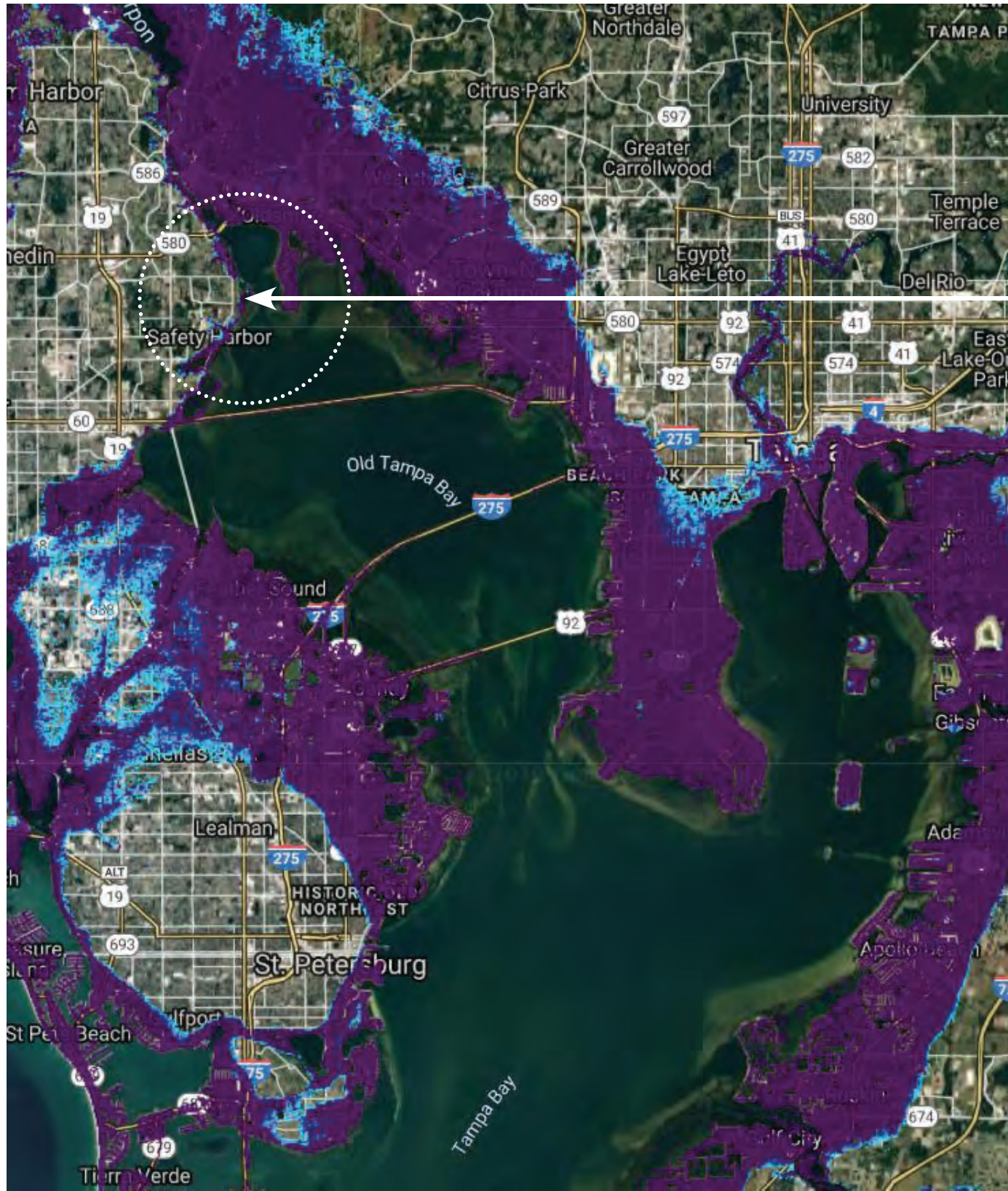
APPLIED SCIENCES

Service Lines

- Watershed Planning
- Urban Planning and Resilience
- Civil and Site Design
- Landscape Architecture



APPLIEDFL.COM

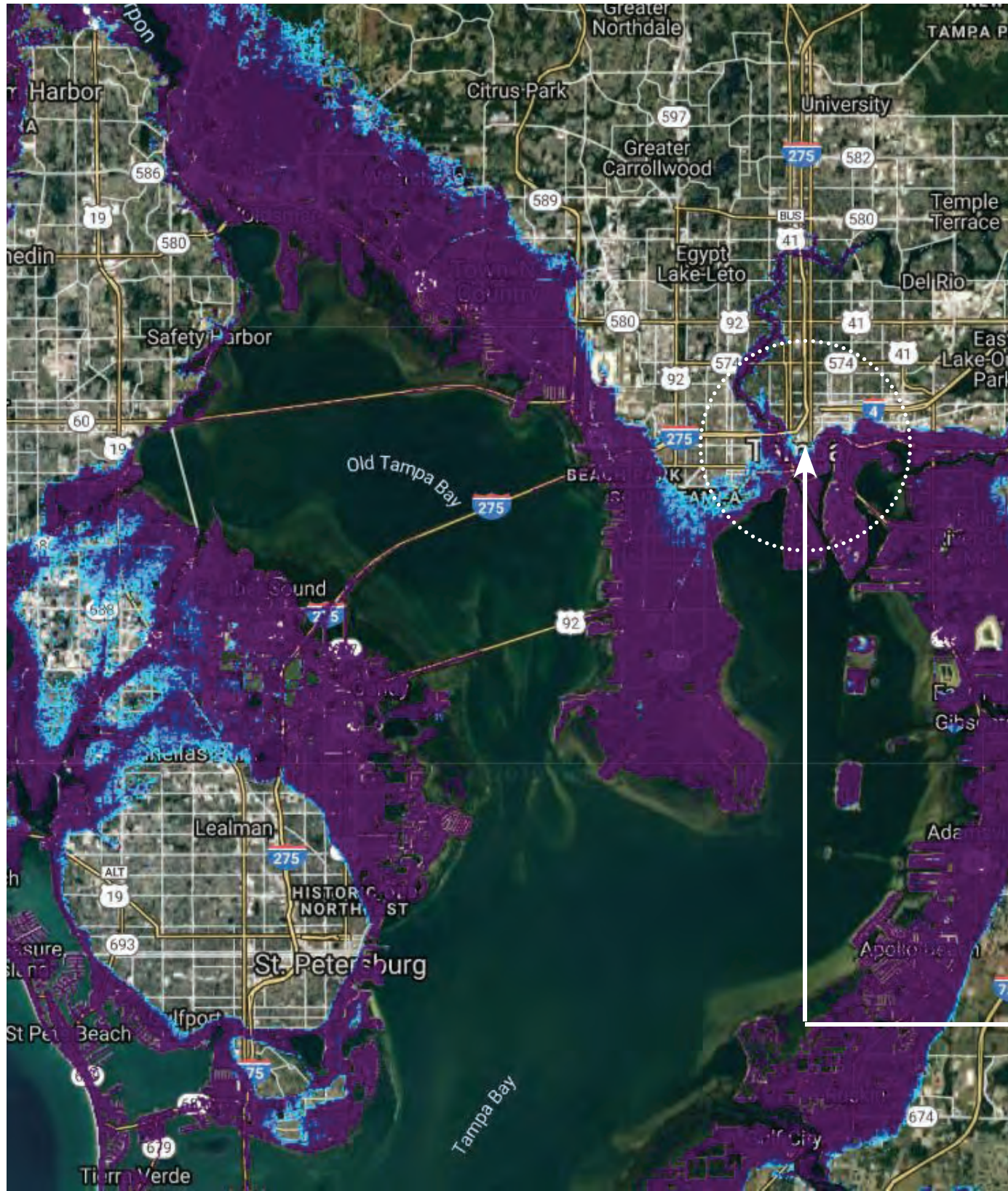


CATEGORY 3 STORM SURGE
 Source: Flood IQ Website

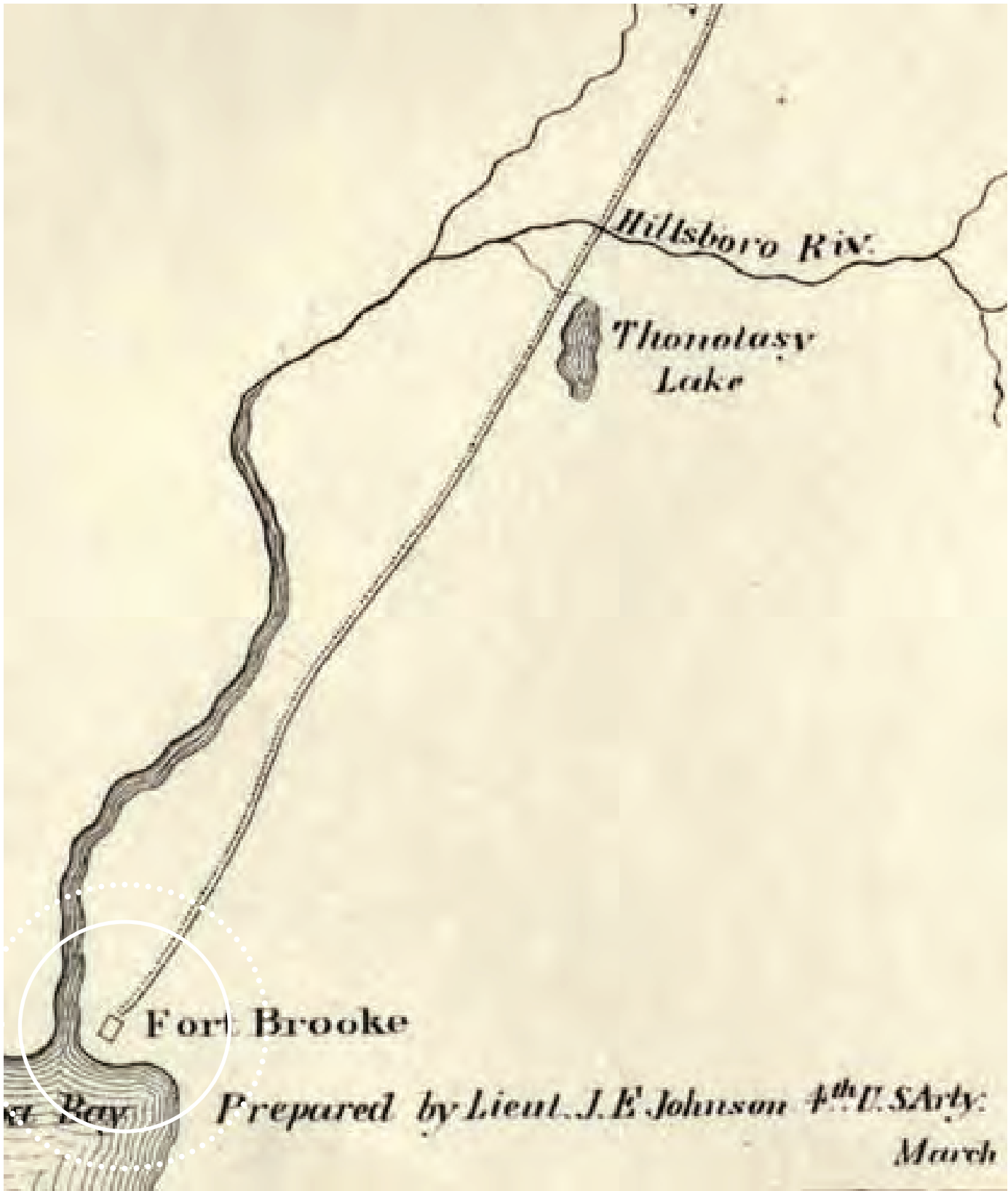


**900 TO 1500(S):
 TOCOBAGA INDIAN SETTLEMENT IN SAFETY HARBOR**

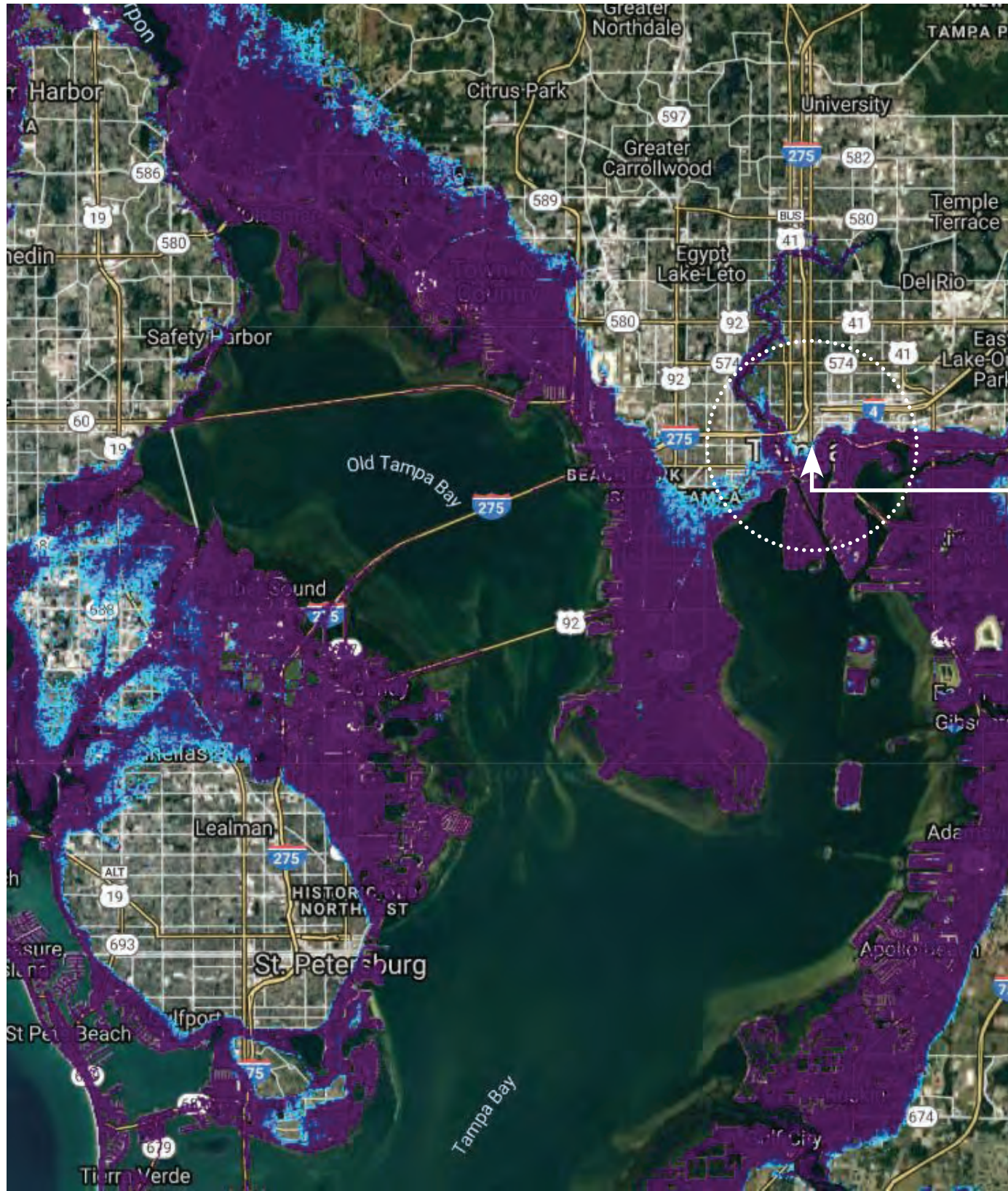
Source: Florida Center for Instructional Technology. (2002).
 Tocobaga Indians of Tampa Bay



CATEGORY 3 STORM SURGE
 Source: Flood IQ Website

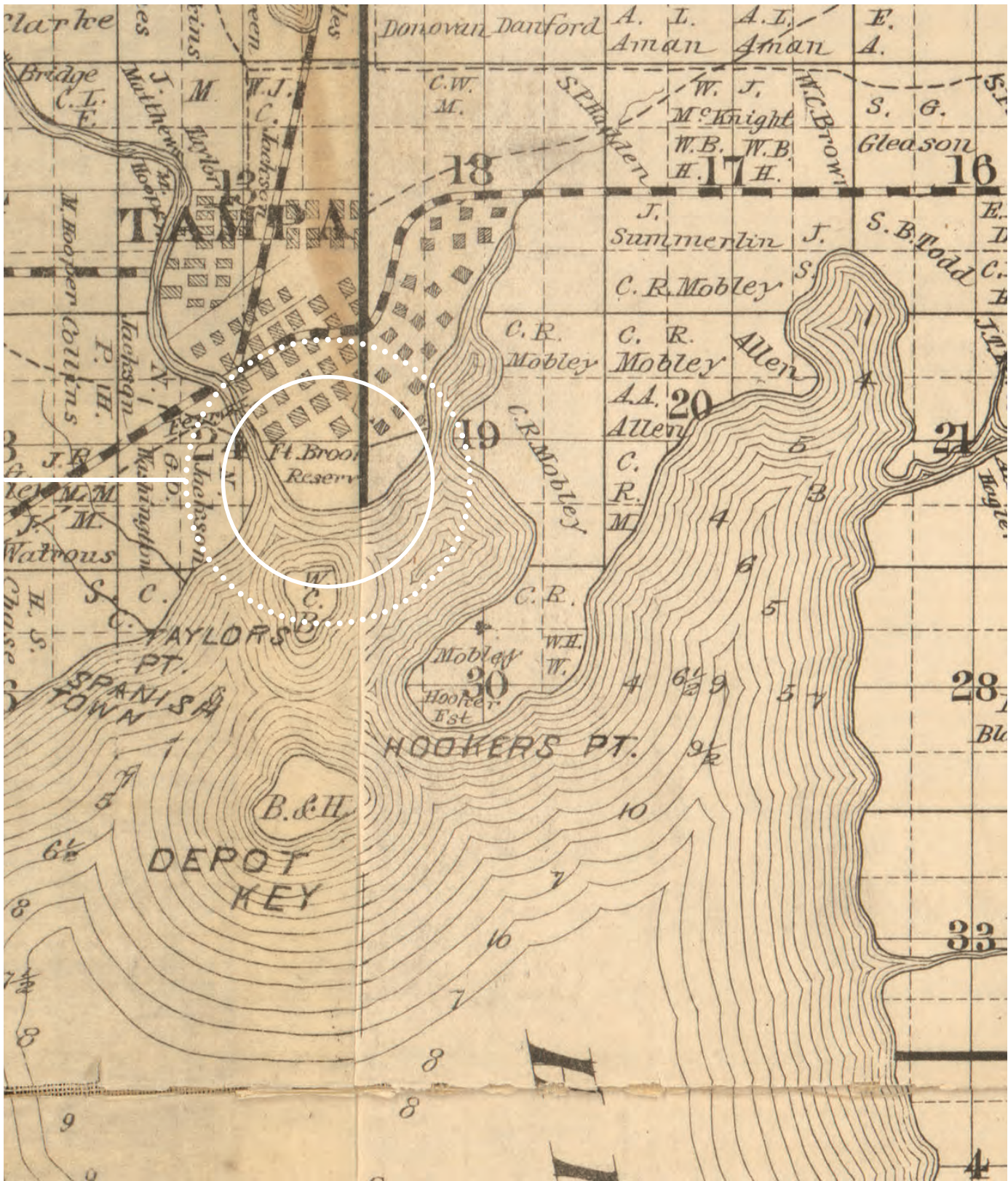


1835: FORT BROOKE
 Source: Florida Center for Instructional Technology. (2007).
 Detail Map of Major Dade Battle Ground: Fort Brooke.



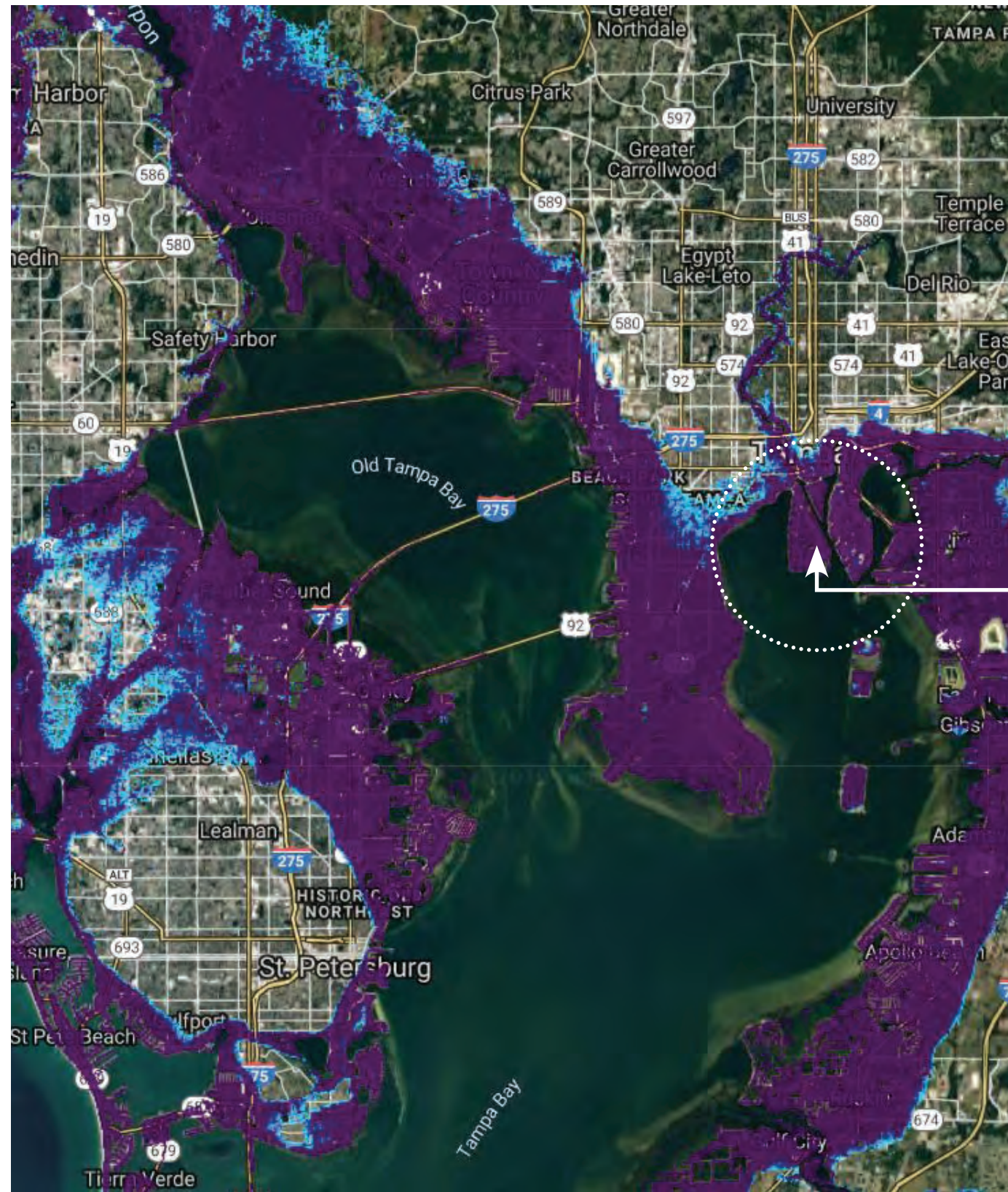
CATEGORY 3 STORM SURGE

Source: Flood IQ Website

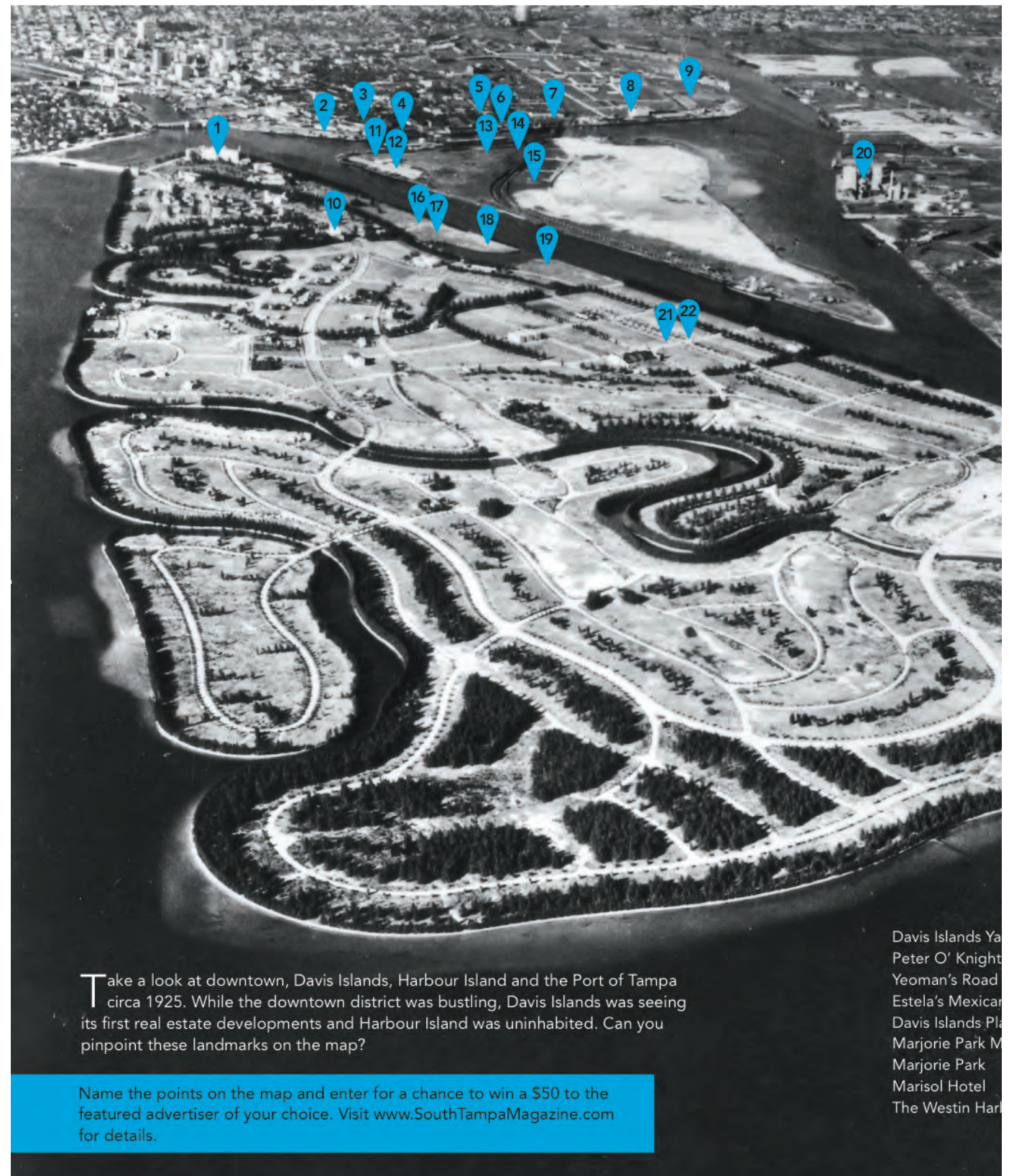


1882: HILLSBOROUGH BAY

Source: Florida Land And Improvement Co, Bourquin, F. & Treveres, J. J. (1882)
Map of Hillsborough County, Florida.



CATEGORY 3 STORM SURGE
 Source: Flood IQ Website

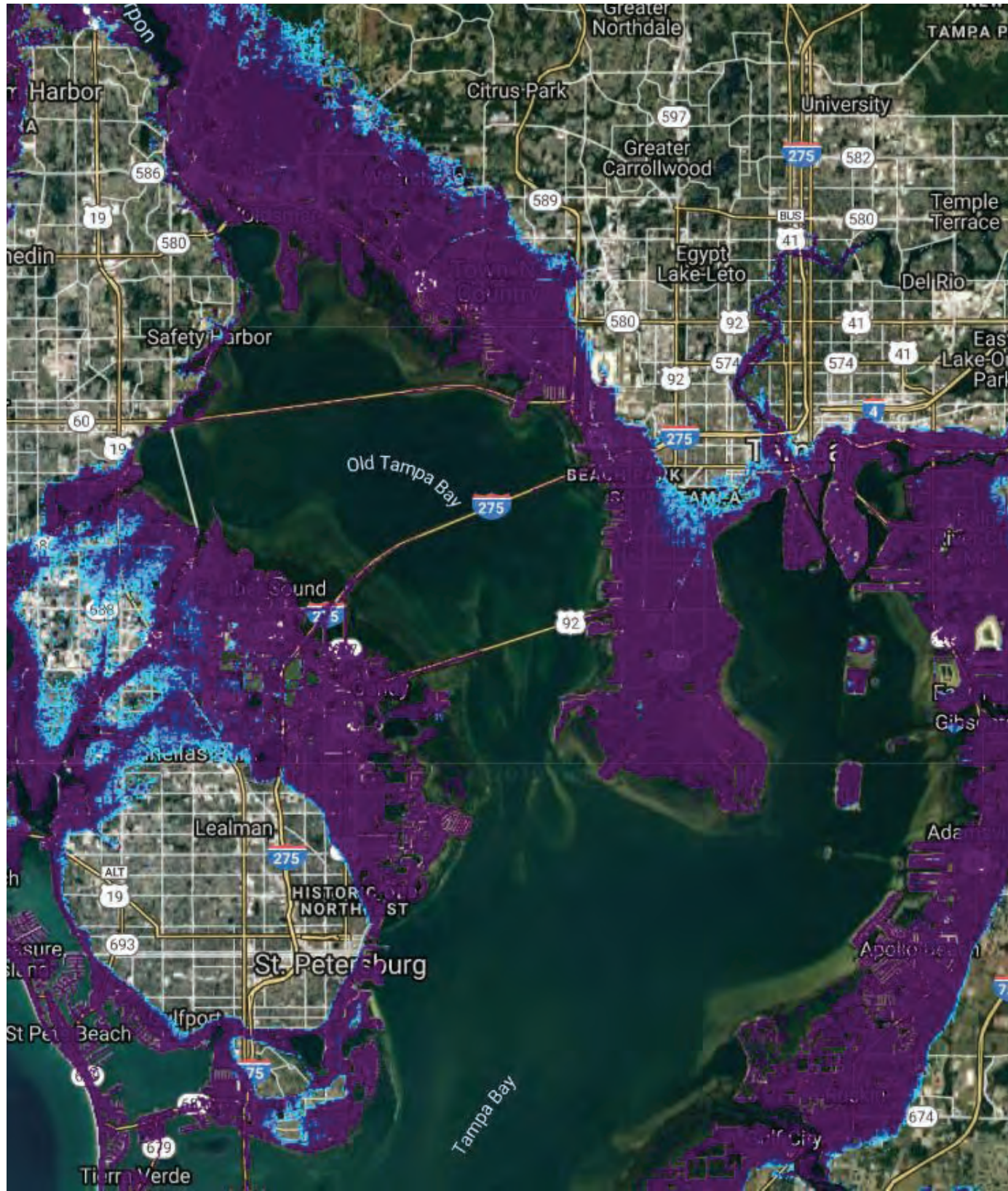


Take a look at downtown, Davis Islands, Harbour Island and the Port of Tampa circa 1925. While the downtown district was bustling, Davis Islands was seeing its first real estate developments and Harbour Island was uninhabited. Can you pinpoint these landmarks on the map?

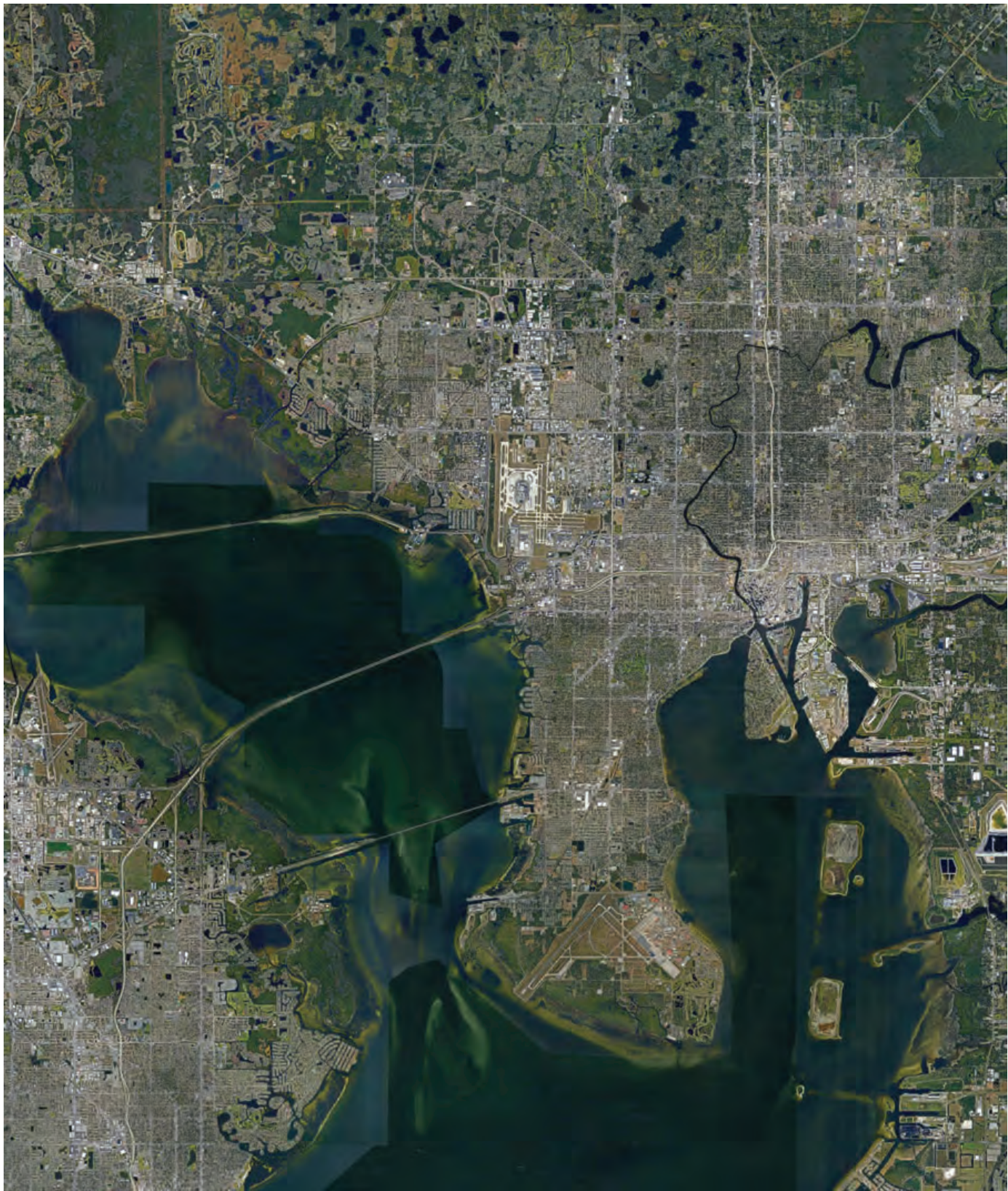
Name the points on the map and enter for a chance to win a \$50 to the featured advertiser of your choice. Visit www.SouthTampaMagazine.com for details.

- Davis Islands Yacht Club
- Peter O' Knight
- Yeoman's Road
- Estela's Mexican
- Davis Islands Plaza
- Marjorie Park Mall
- Marjorie Park
- Marisol Hotel
- The Westin Harbour

1920'S: DAVIS ISLANDS



CATEGORY 3 STORM SURGE
Source: Flood IQ Website



PRESENT DAY
Source: Google Earth



STORMWATER PIPES

Image by Douglas R. Clifford, Tampa Bay Times.

“New \$#! has come to light!”

~ *the Dude, Lebowski*

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HURRICANE HARVEY, HOUSTON, 2017



HURRICANE MICHAEL, MEXICO BEACH, 2017



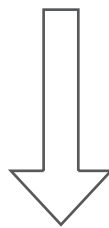
2017: \$306.2 BILLION

HURRICANE HARVEY, HOUSTON, 2017

HURRICANE MICHAEL, MEXICO BEACH, 2017

THE COMMUNITY VULNERABILITY STUDY (HILLSBOROUGH COUNTY)

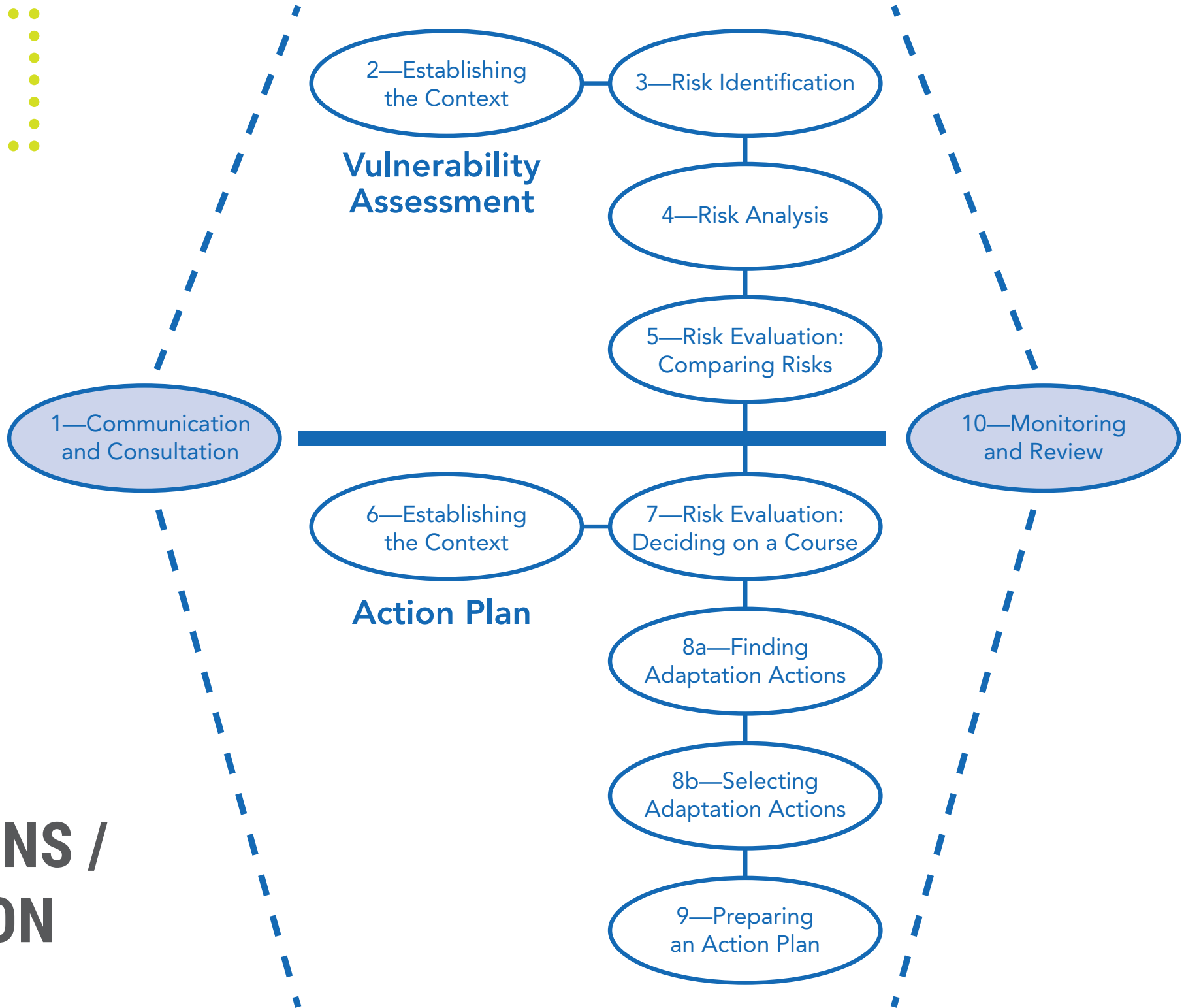
VOLUME 1: VULNERABILITIES



VOLUME 2: MITIGATION



VOLUME 3: RECOMMENDATIONS / IMPLEMENTATION



Source: Being Prepared for Climate Change (EPA)

“VULNERABILITIES” ASSESSMENT

Built Environment

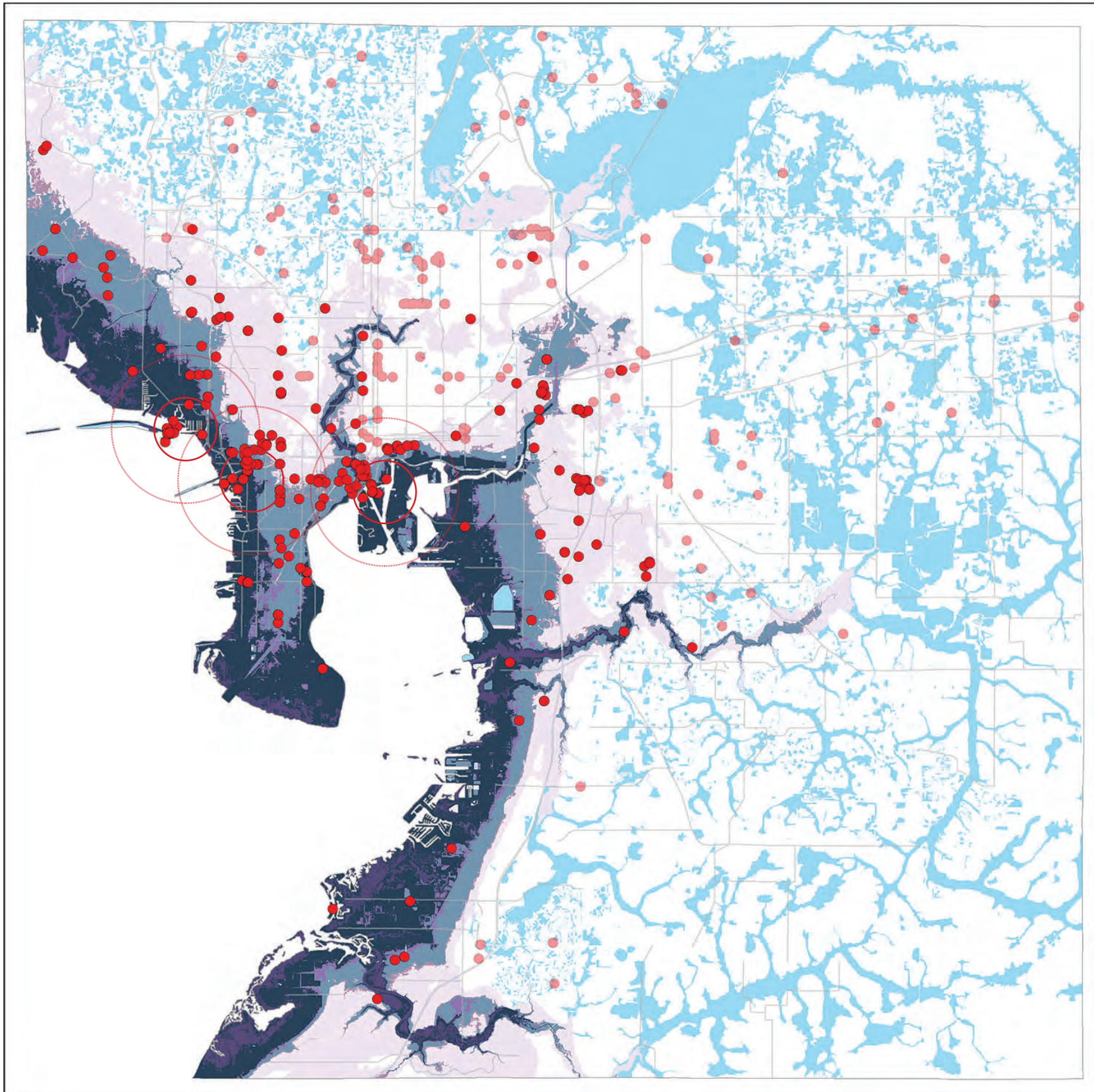


People



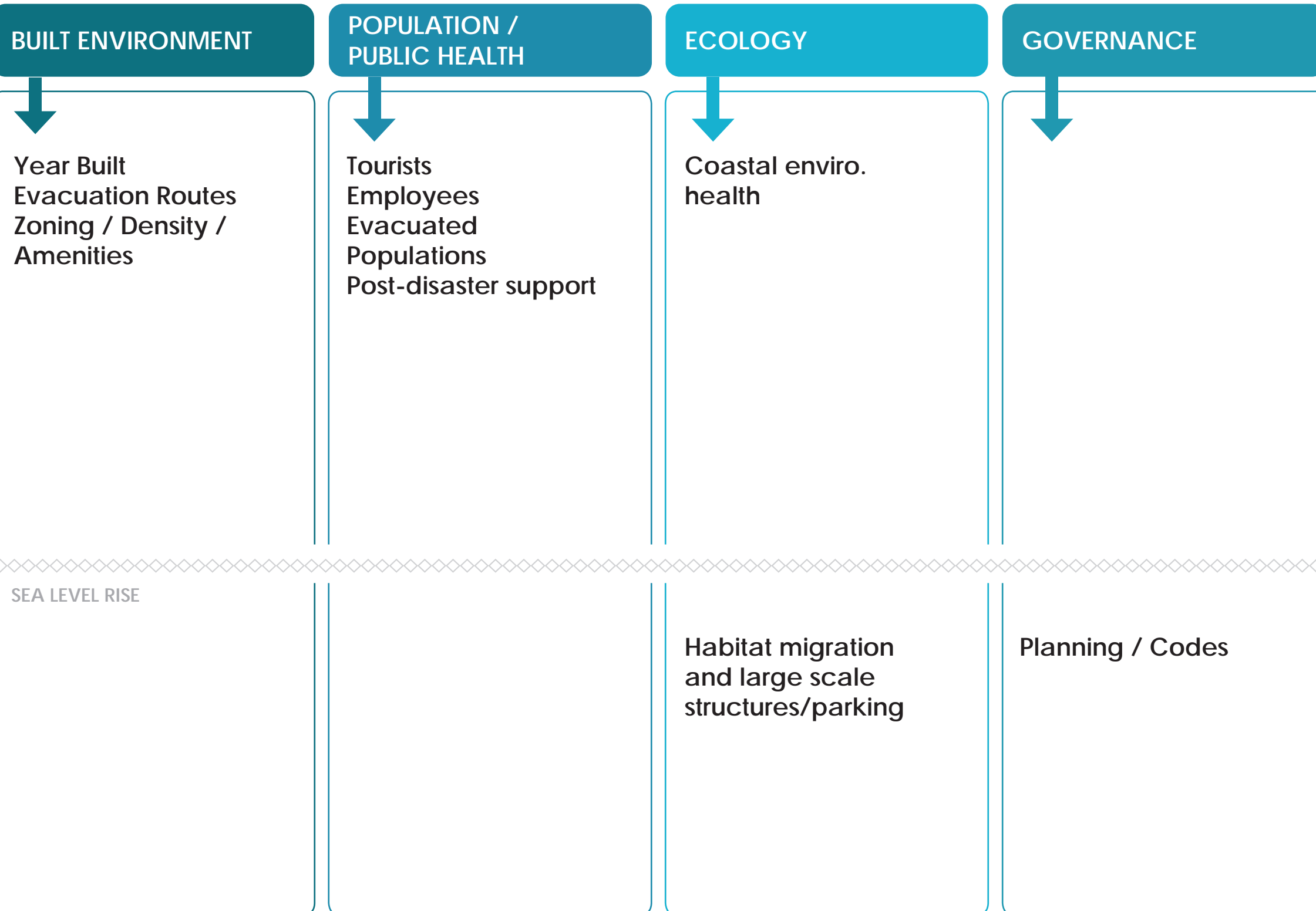
Environment

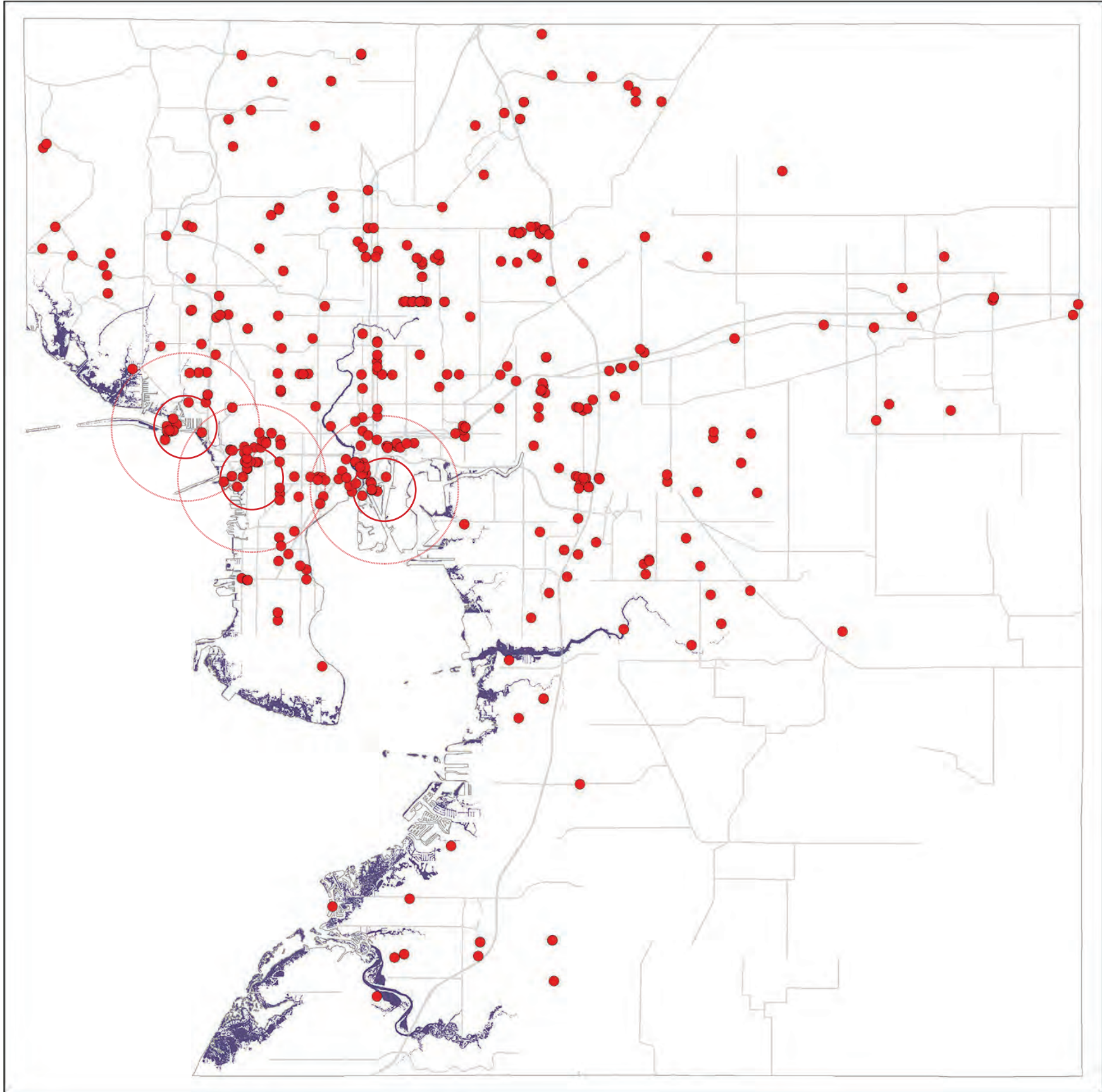




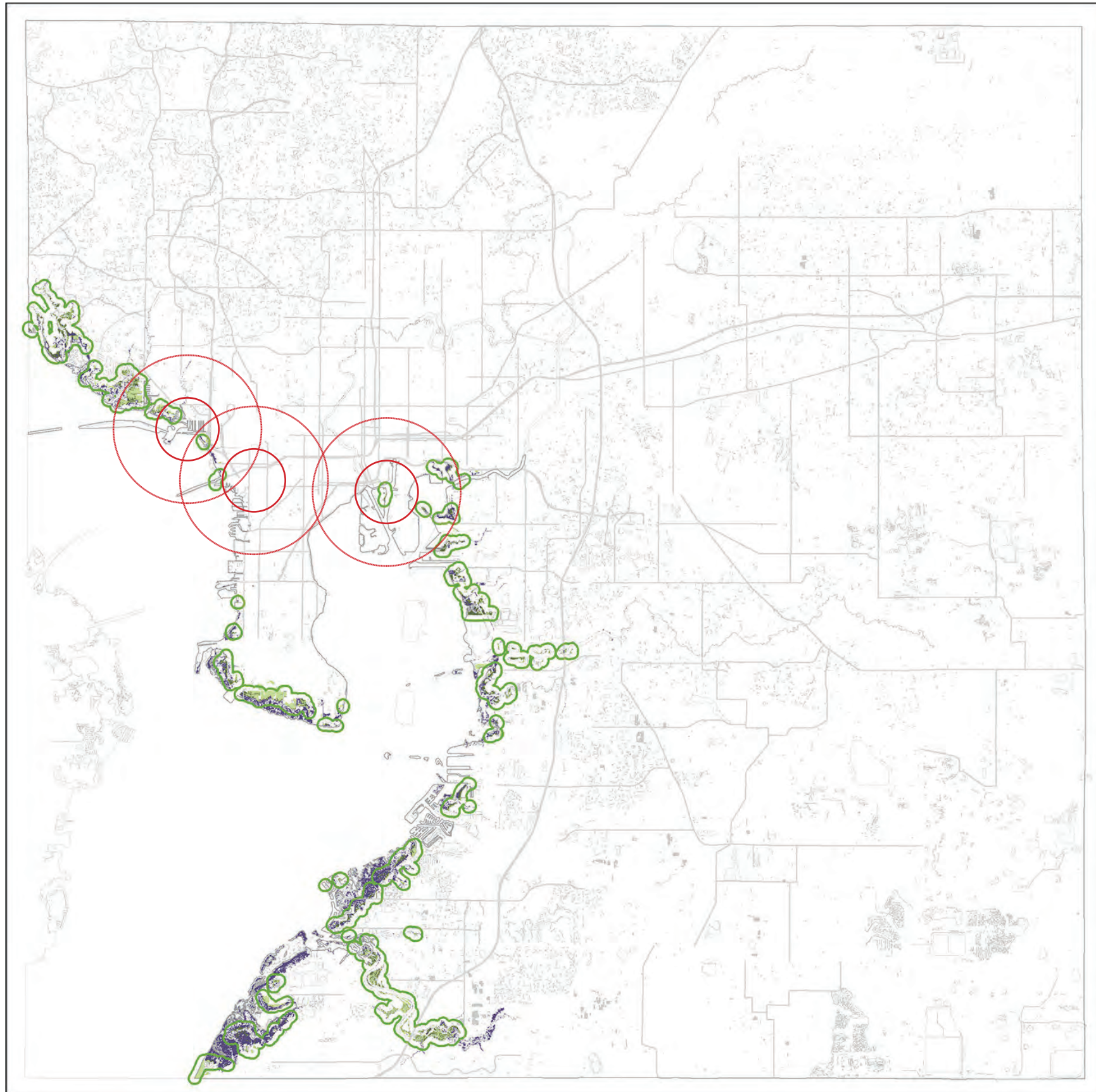
HOTELS + STORM SURGE

VULNERABILITY TITLE **HOTELS**

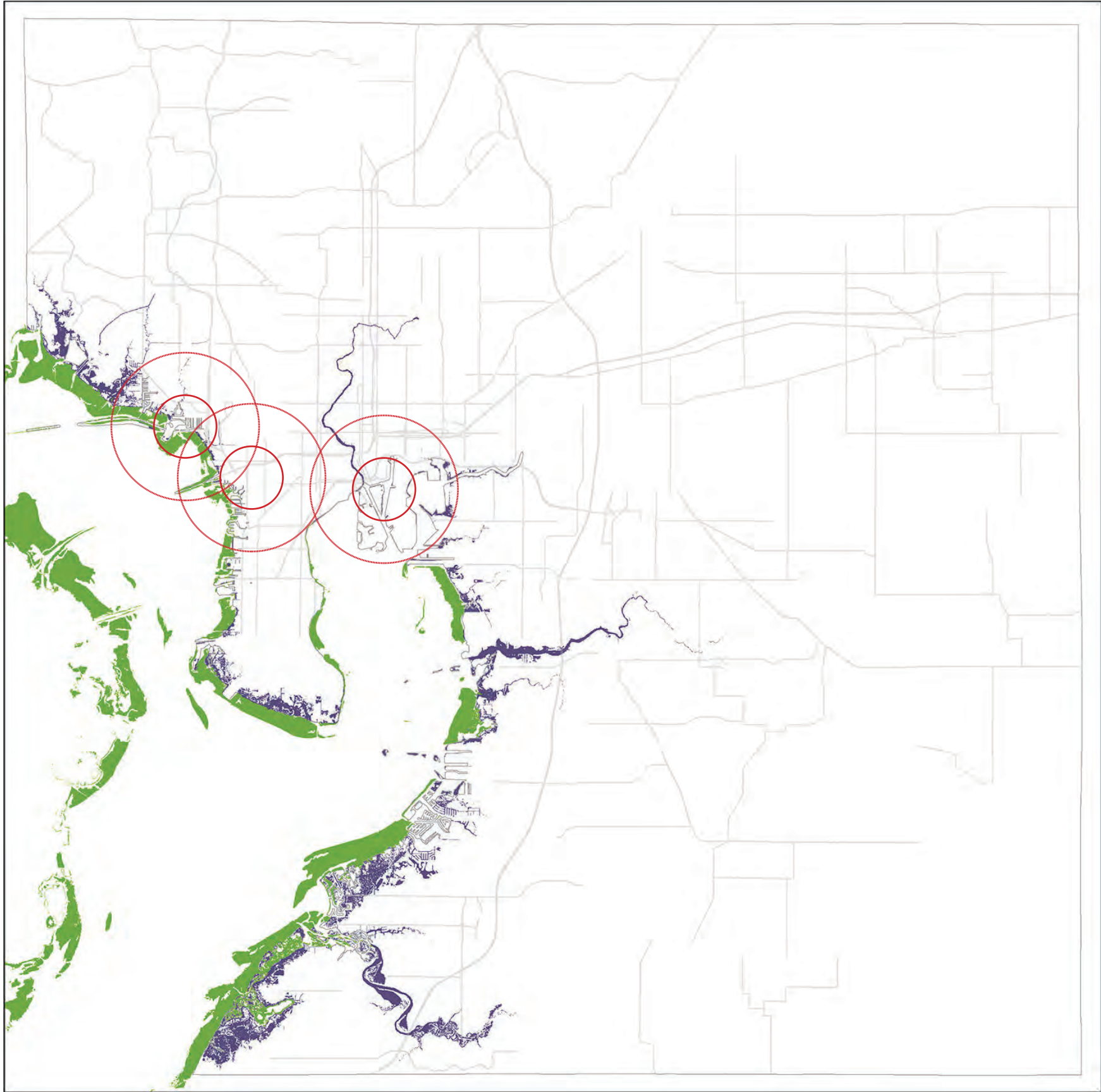




HOTELS + SEA LEVEL RISE



HOTELS + MARSH GRASS + SEA LEVEL RISE



HOTELS + SEA GRASS + SEA LEVEL RISE

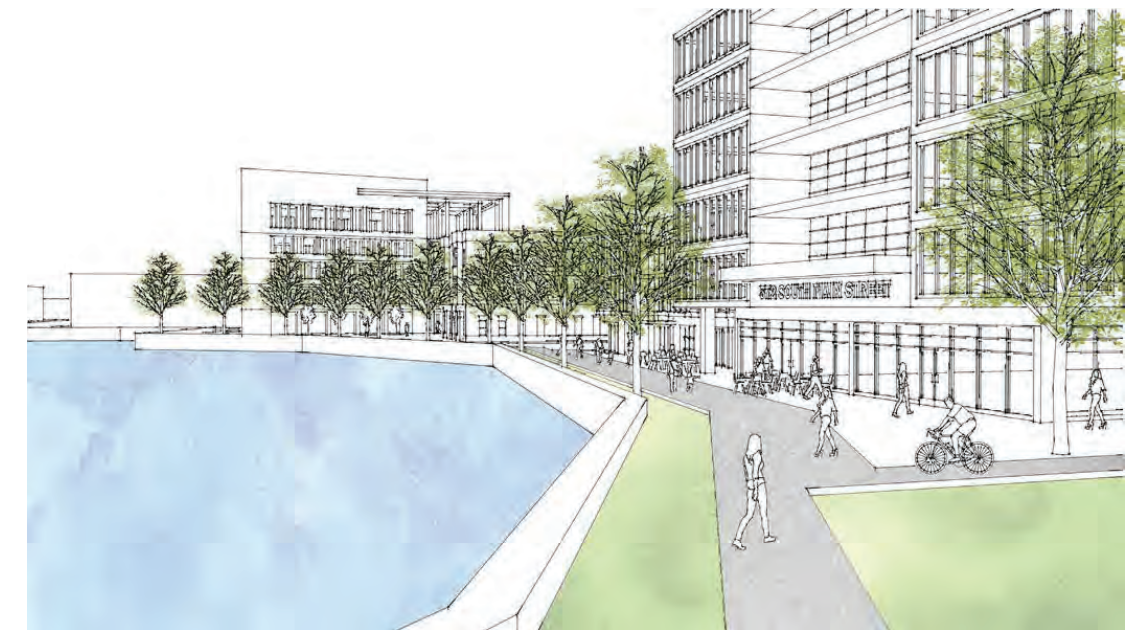
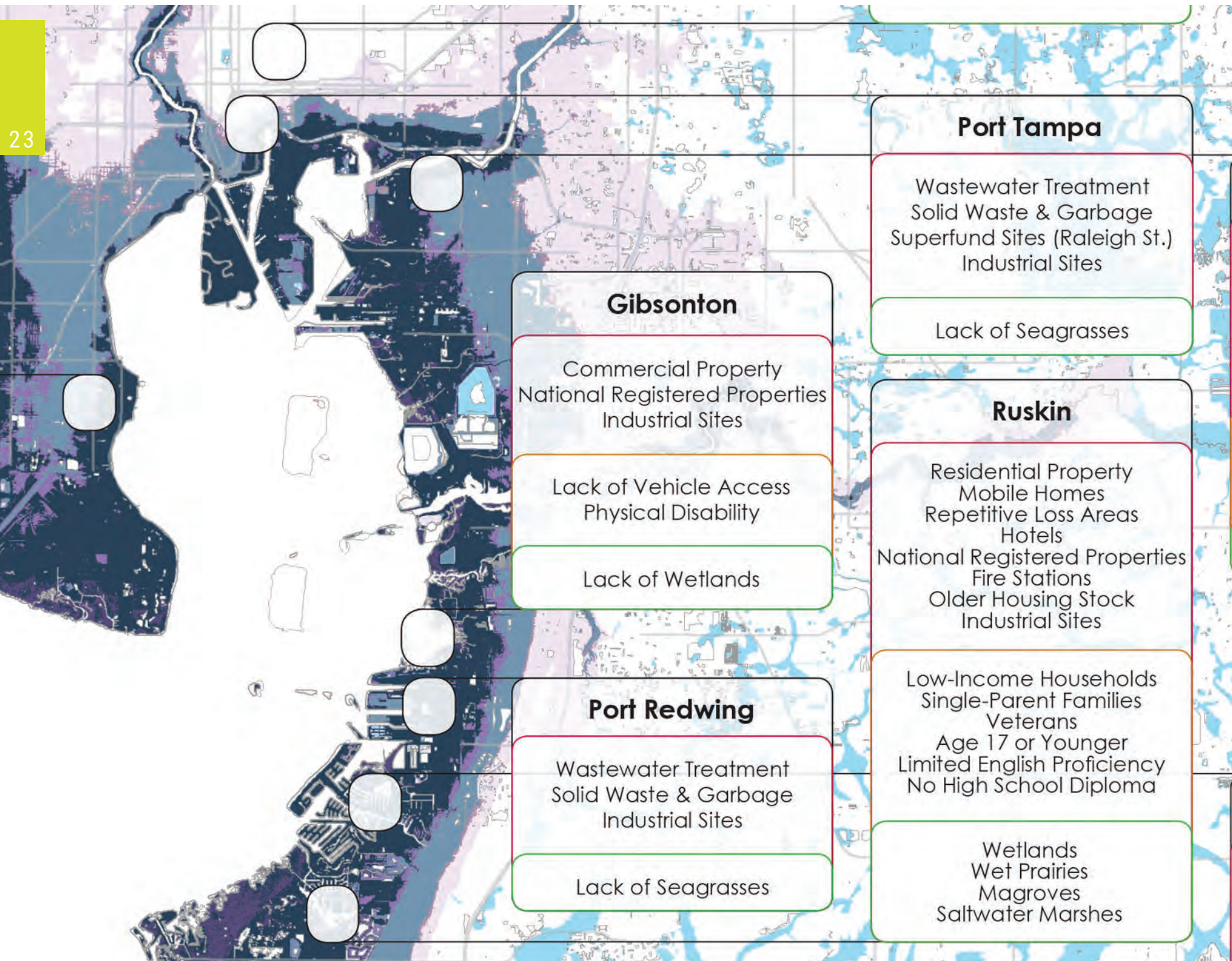


Fig. 134 Urban Mixed Use Hub.



Fig. 134 Recreational Flood System- Dry.



Fig. 135 Recreational Flood System- Wet.



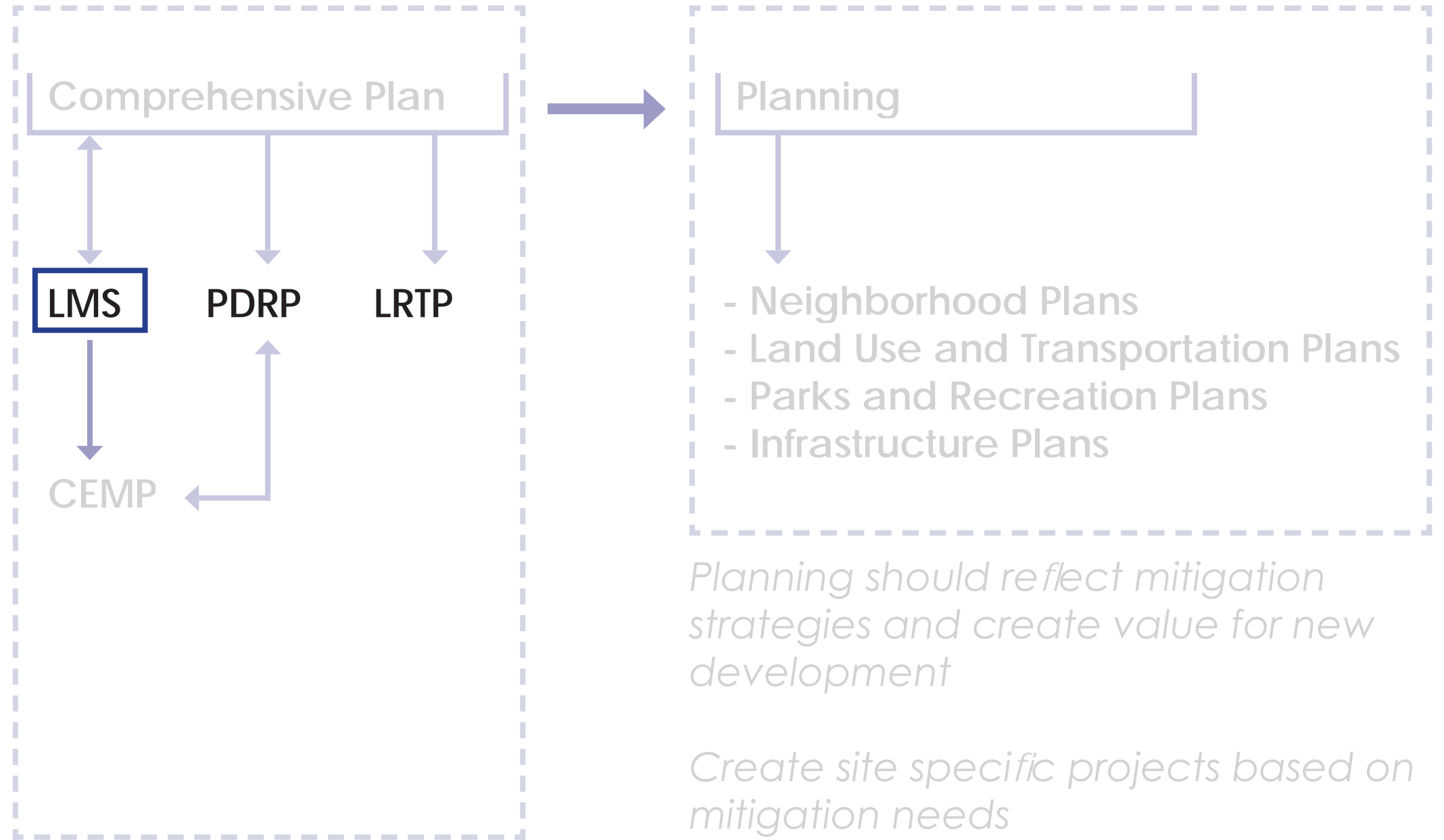
Fig. 136 Recreational Flood System- Dry.



Fig. 137 Recreational Flood System- Wet.

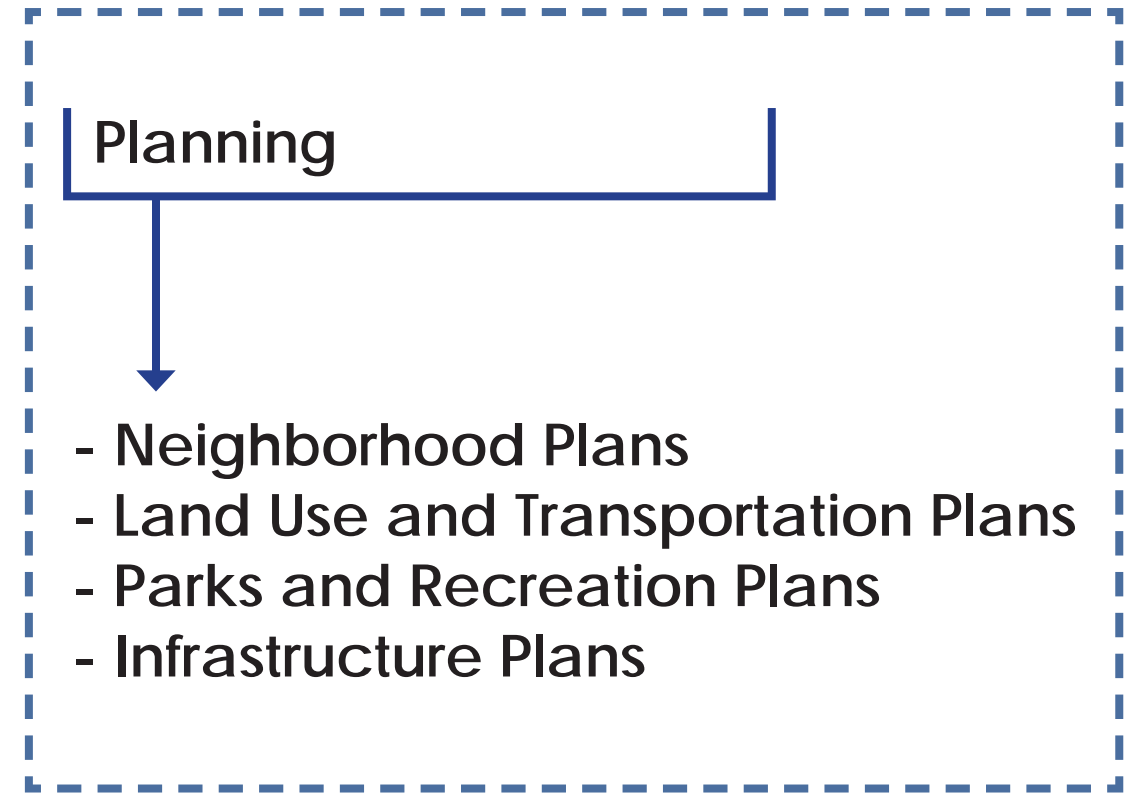
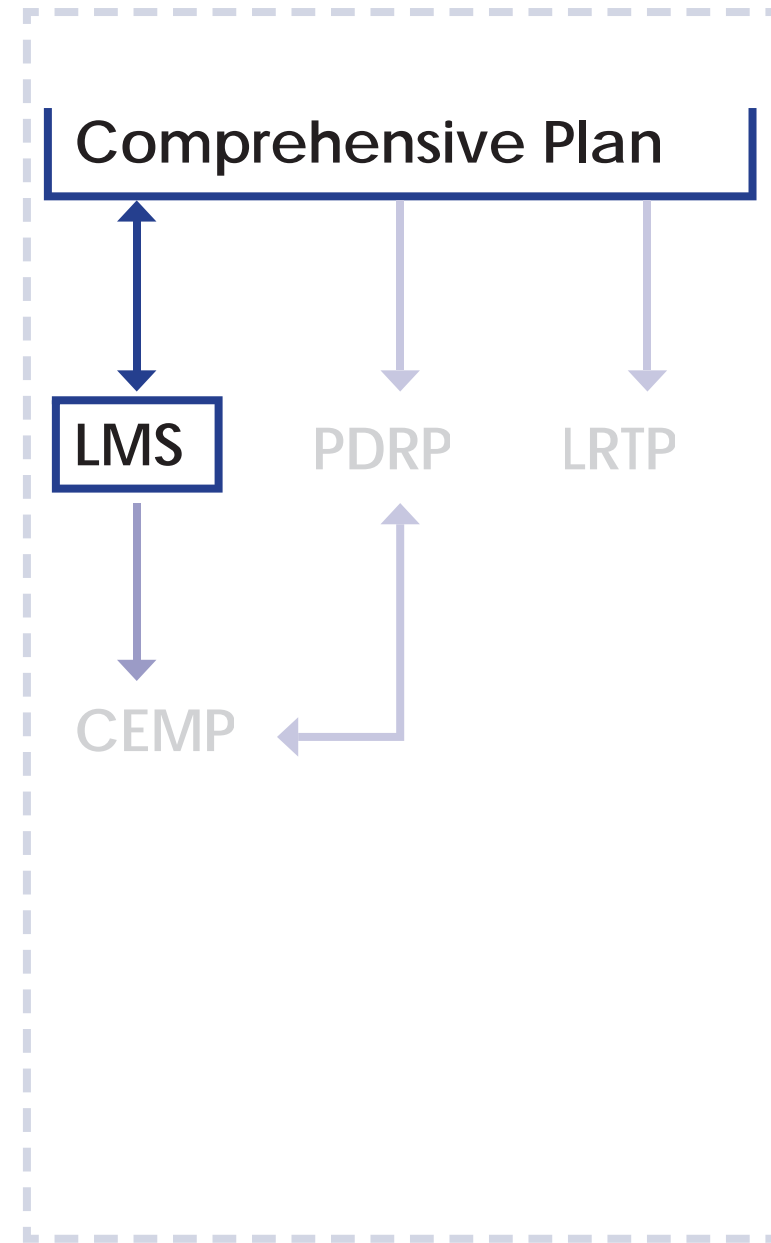
Vulnerability Assessments

Use the LMS process to **identify vulnerabilities** through a comprehensive assessment, but also learn about vulnerabilities through community engagement in the comprehensive planning process.



STATE FUNDING FOR VULNERABILITY ASSESSMENTS

Use the LMS process to **identify vulnerabilities** through a comprehensive assessment, but also learn about vulnerabilities through community engagement in the comprehensive planning process.

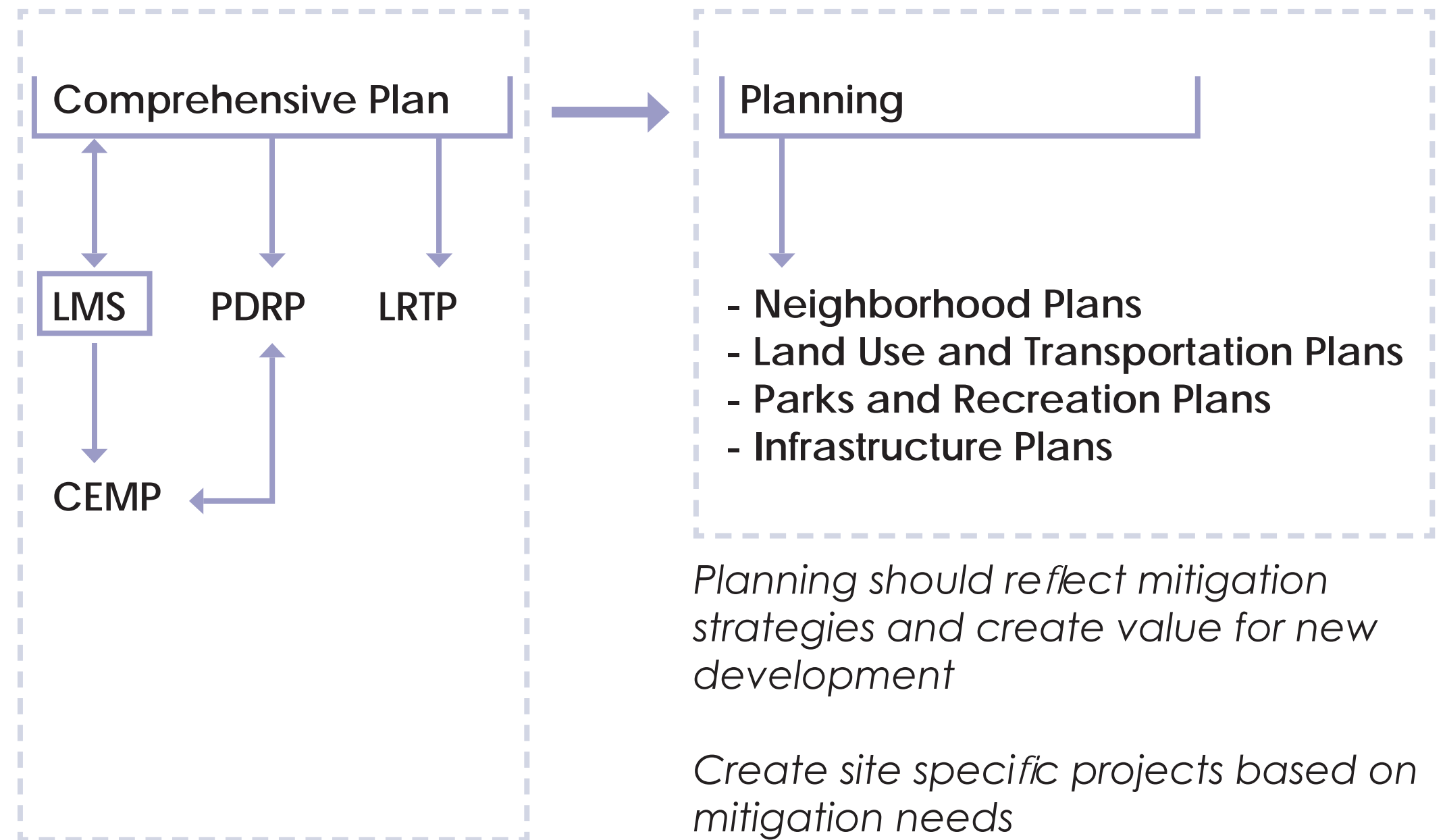


Planning should reflect mitigation strategies and create value for new development

Create site specific projects based on mitigation needs

FUNDING FOR COMPREHENSIVE PLANNING (PERIL OF FLOOD) // FOR PLANNING INDIVIDUAL PROJECTS

Use the LMS process to **identify vulnerabilities** through a comprehensive assessment, but also learn about vulnerabilities through community engagement in the comprehensive planning process.



FUNDING FOR IMPLEMENTATION OF PROJECTS

FUNDING STRATEGIES

Grants

Resilient Florida, FEMA BRIC/HMGP CDBG-MIT, BUILD, NOAA Coastal Resilience Fund

Local Mitigation Strategy

Projects List

Design Standard Ordinance

- Miami Beach

Resilience or Climate Action Millage

- Ann Arbor

Tax, to establish a Resilience or Climate Protection Fund

- Denver

INTEGRATING RESILIENCE INTO COMMUNITY PLANNING AND DESIGN

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Florida Adaptation Planning Guidebook



Plan Integration: Linking Local Planning Efforts

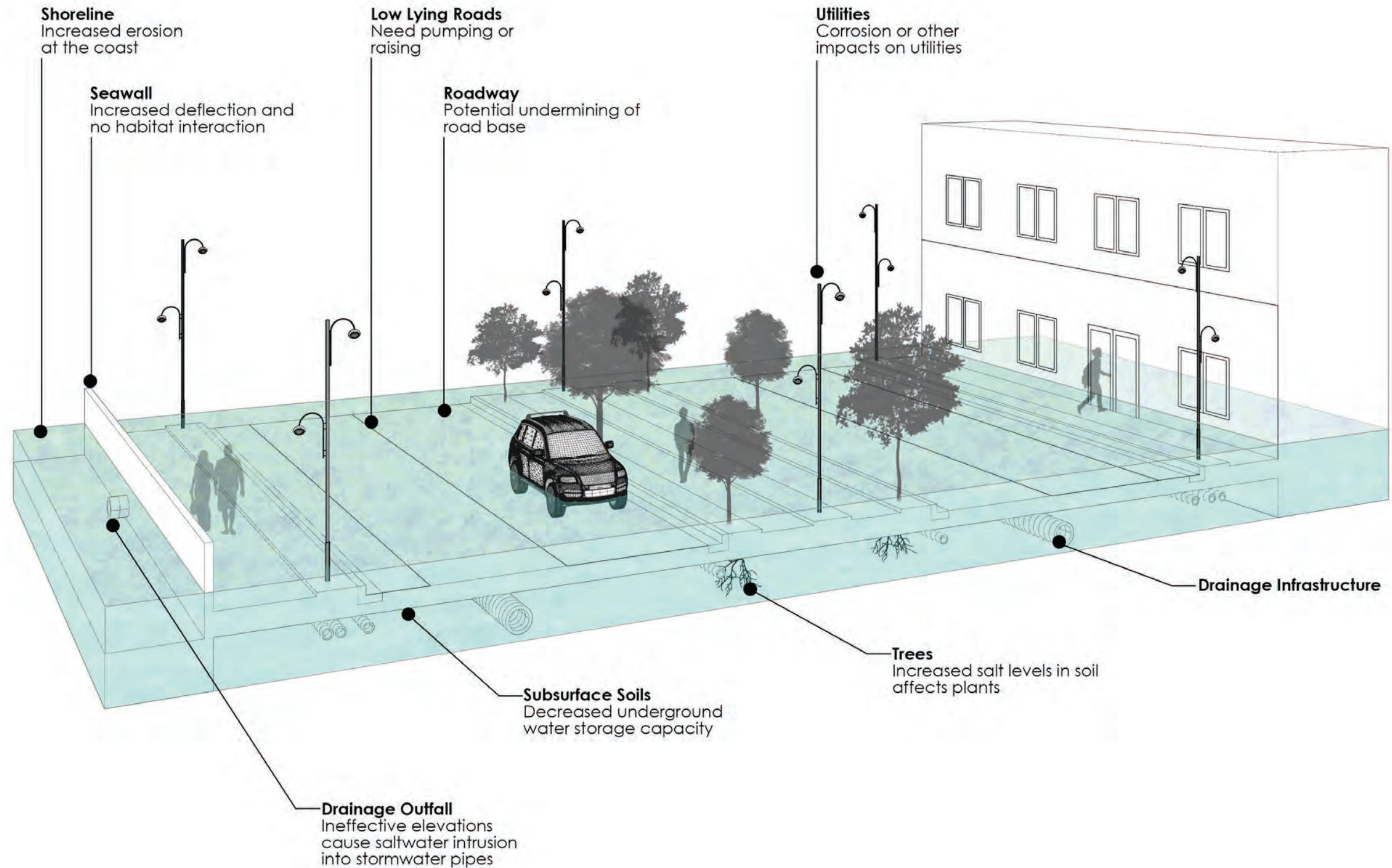
July 2015



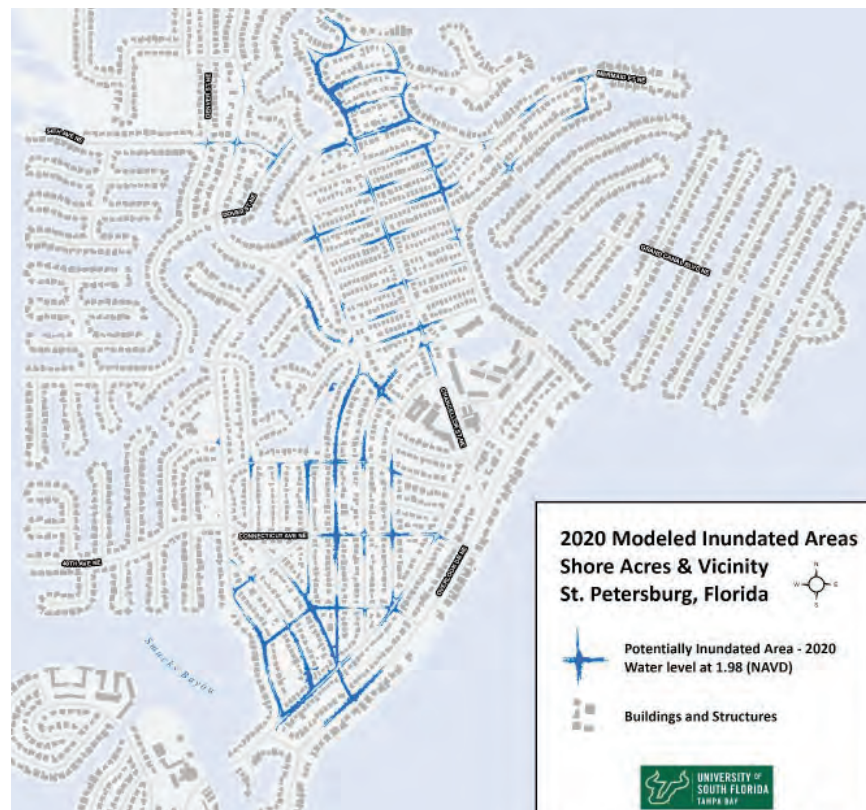
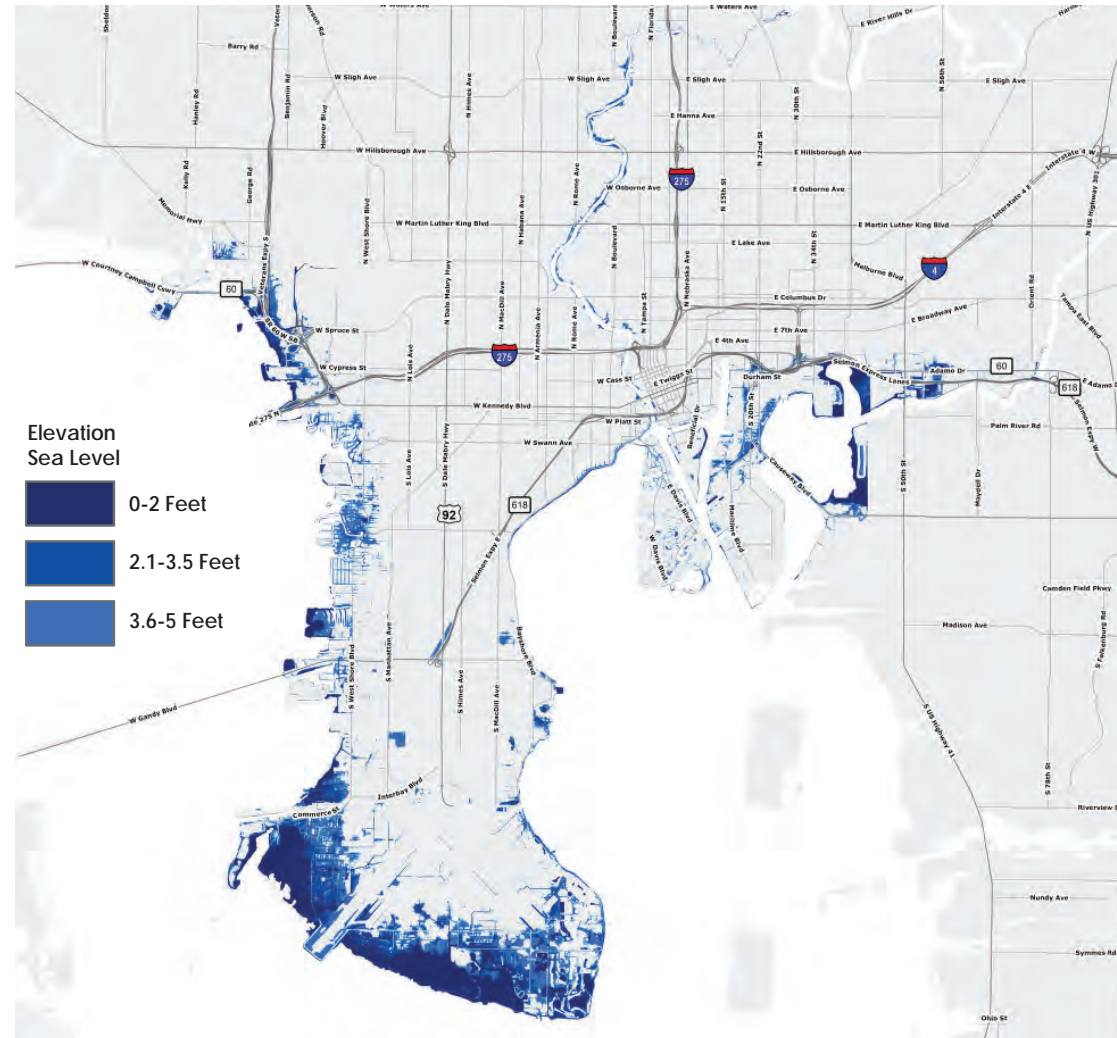
REGULATORY APPROACH TO SEA LEVEL RISE

(CITY OF TAMPA)

What are the impacts from sea level rise?



When are the impacts from sea level rise?



(Main) Areas that may possibly be experiencing high tide flooding (in darkest blue), or where this type of flooding can be expected in the near future.

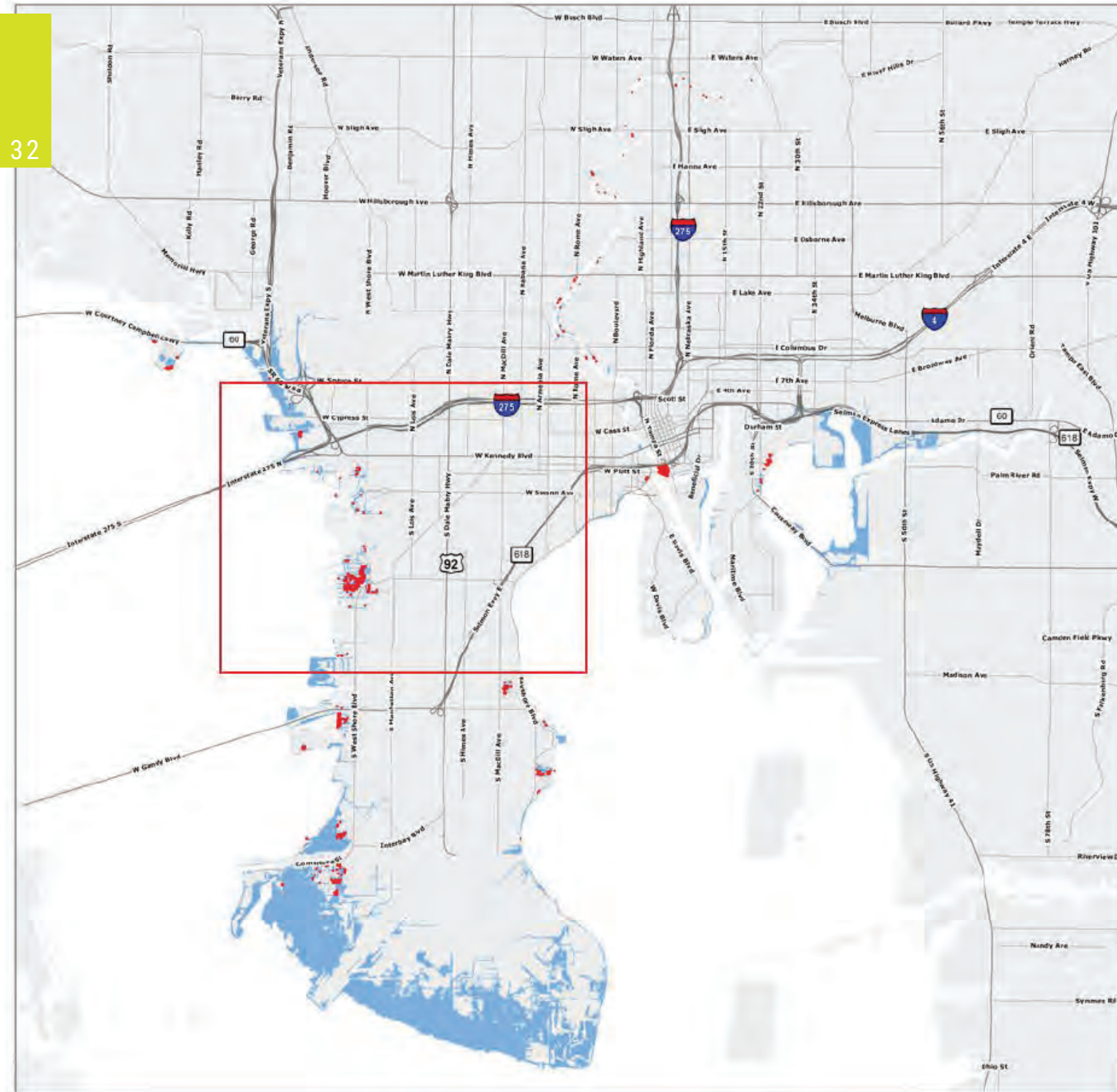
(Right bottom) The projected flood scenarios from the Climate Science Advisory Panel (CSAP, 2019), highlighting elevations that may be associated with seasonal floods.

	Year	NOAA Int-Low (feet)	NOAA Intermediate (feet)	NOAA High (feet)
2020	2000 ³	0	0	0
	2030	0.56	0.79	1.25
	2040	0.72	1.08	1.77
30 Years	2050	0.95	1.44	2.56
	2060	1.15	1.87	3.48
	2070	1.35	2.33	4.56
60 Years	2080	1.54	2.82	5.71
	2090	1.71	3.38	7.05
	2100	1.90	3.90	8.50

LEADING EDGE IMPACTS FROM SEA LEVEL RISE

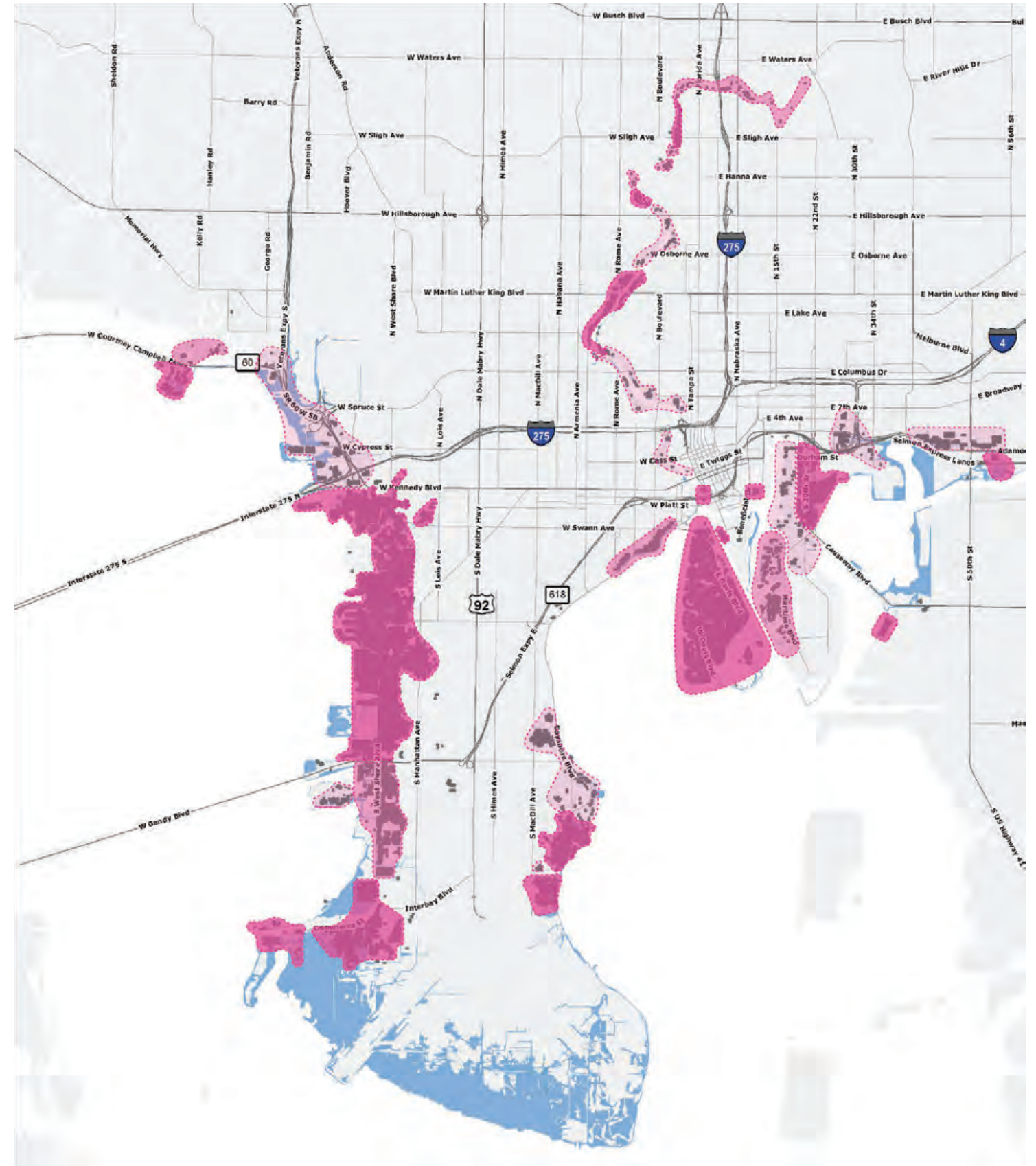
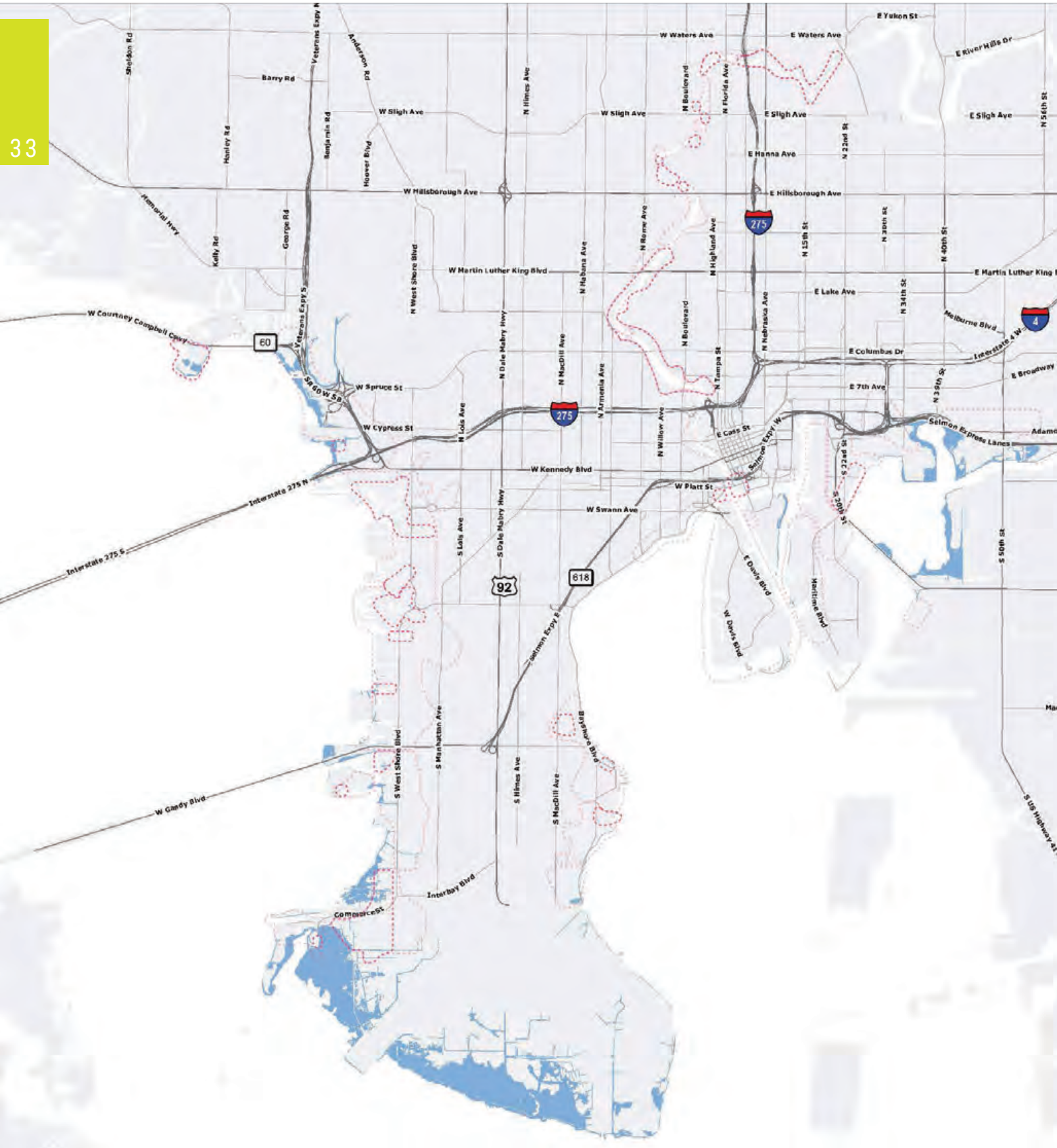
SHORE ACRES 'SUNNY DAY FLOODING'

Where are the impacts from sea level rise?

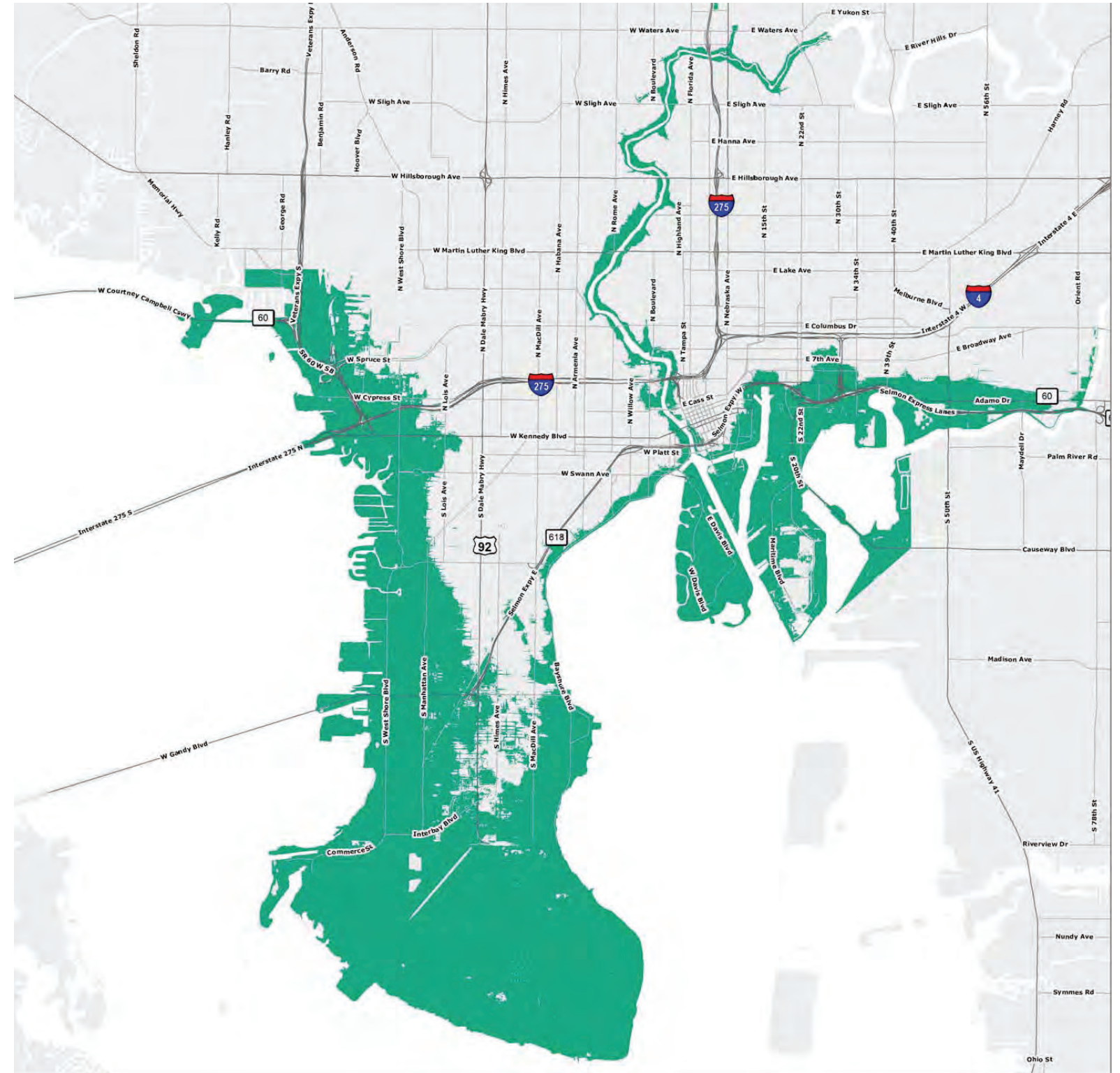
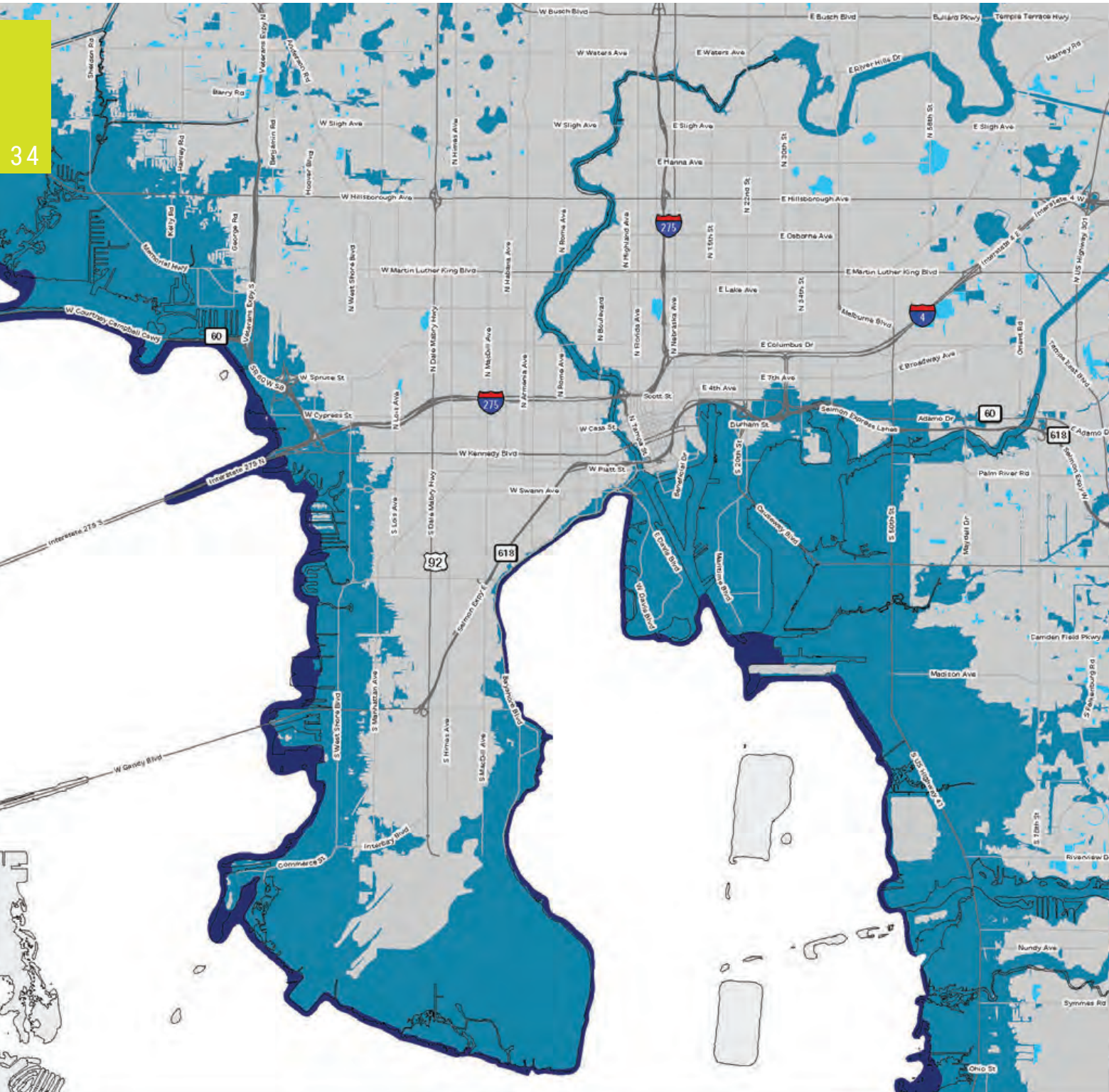


2060 HIGH / 2100 INTERMEDIATE SCENARIOS

STRATEGY: ESTABLISH OVERLAY ZONES, OR DEFINED PLANNING AREAS



STRATEGY: PLAN AND DESIGN FOR THE FUTURE



EXISTING FEMA FLOOD ZONES

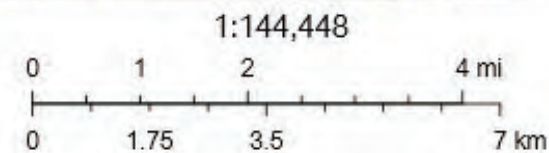
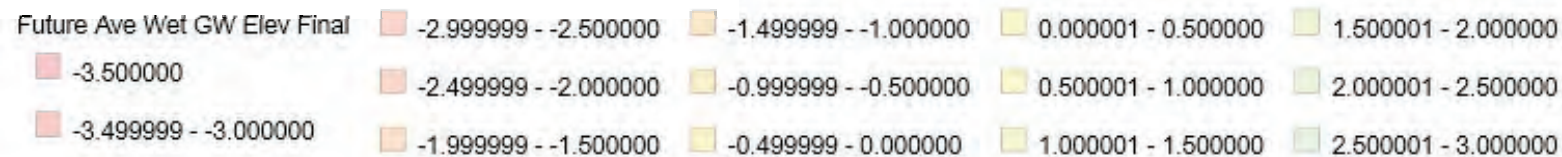
2060 PROJECTED FEMA FLOOD ZONES
BFE OF 9 + 3.48 FT

STRATEGY: PLAN AND DESIGN FOR THE FUTURE

Future Conditions Average Wet Season Groundwater Elevation Map



June 12, 2020



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

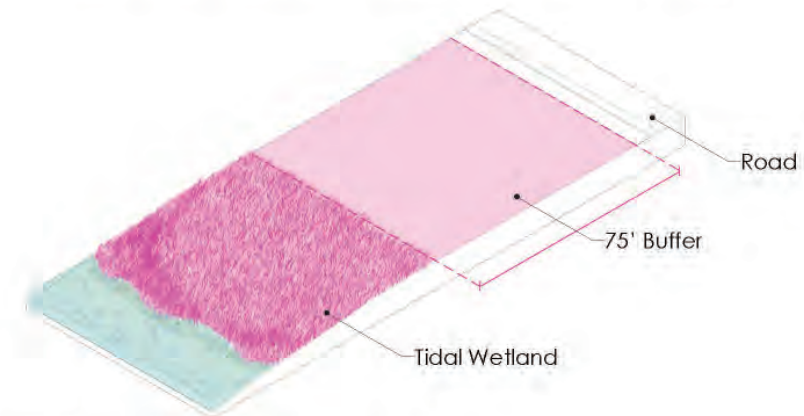
STRATEGY: PROMOTE FLEXIBILITY THROUGH LANDSCAPE SYSTEMS



PROPOSED POLICY: BUFFERS NEAR TIDAL WETLANDS

Situate roads other infrastructure and most new construction at least 75 feet from a tidal wetland.

New York State Tidal Wetlands Act (Land Use Law Center)

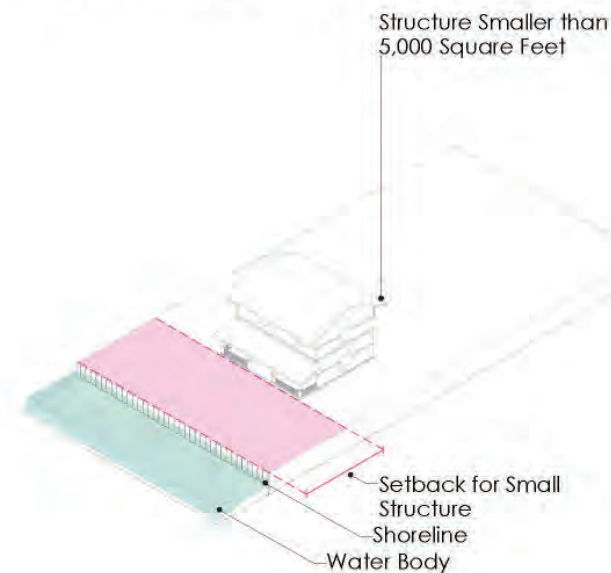


PROPOSED POLICY: TIERED SETBACK

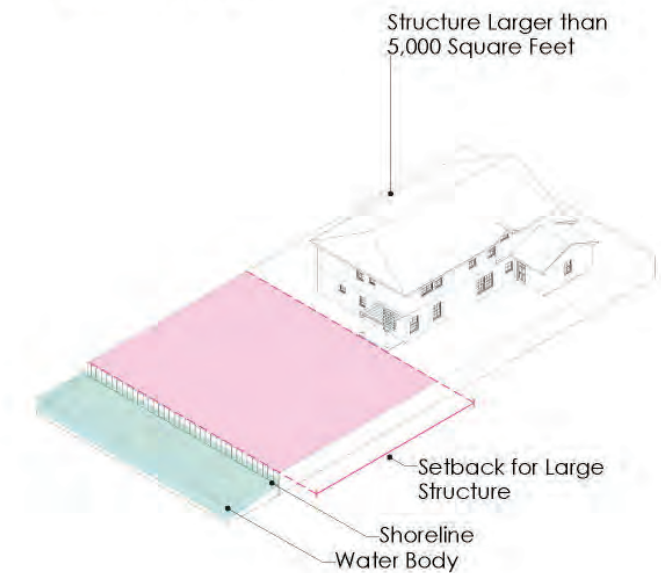
Setback smaller structures (less than 5,000 square feet) 30 times the erosion rate; larger structures must be set back 60 to 90 times the erosion rate based upon the size of the structure.

North Carolina; Grannis, 2011

Proposed Policy



Proposed Policy



FUNDING STRATEGY: IMPACT FEES FOR RESILIENCE AND MITIGATION

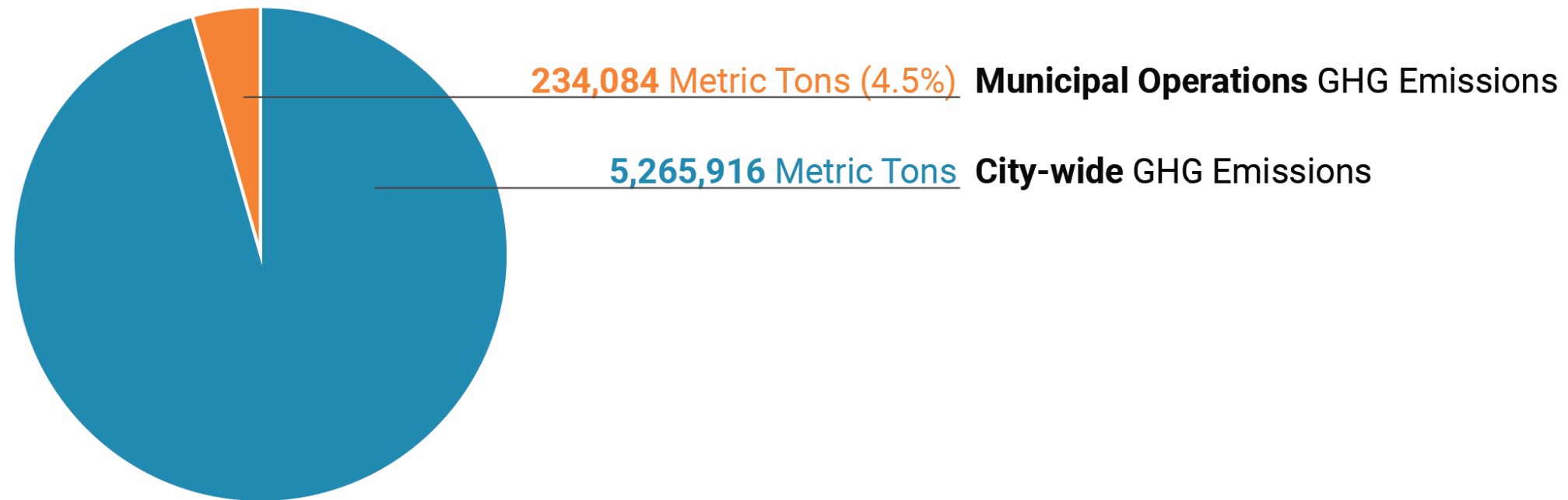


CLIMATE ACTION AND EQUITY PLAN

(CITY OF TAMPA)

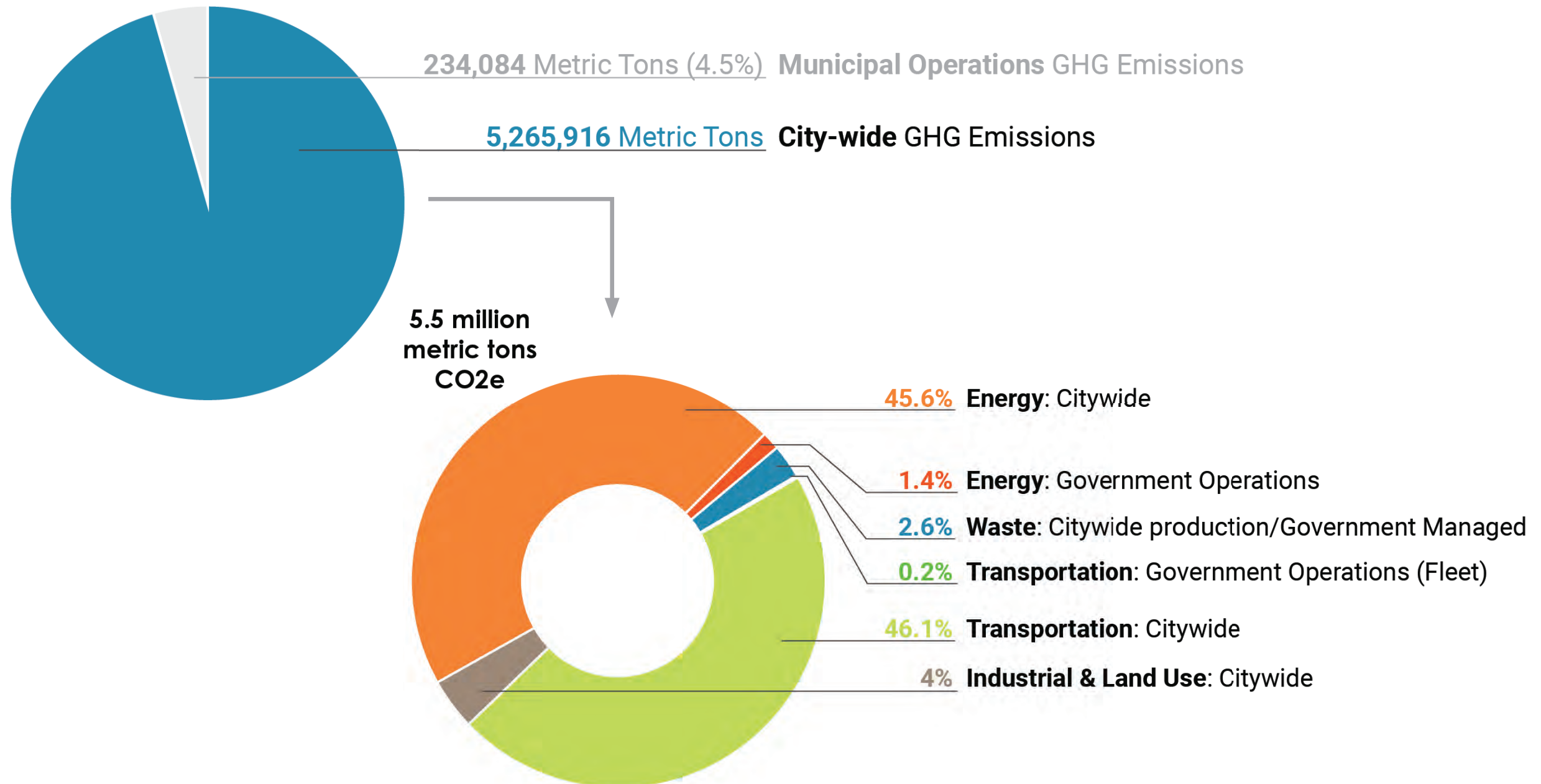
CARBON EMISSIONS

CITY-WIDE



CARBON EMISSIONS

CITY-WIDE



GOALS

- 1. Reduce Carbon Emissions (GHGs)**
- 2. Adapt to Climate Change**
- 3. Taking Care of People Along the Way**

FRAMEWORKS: CLIMATE ACTION CATEGORIES

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- Energy
- Water and Wastewater
- Mobility and Land Use
- Waste Management
- Stormwater
- Construction and Utilities
- Housing and Development
- Community
- Habitat and Environment
- Governing for Resilience



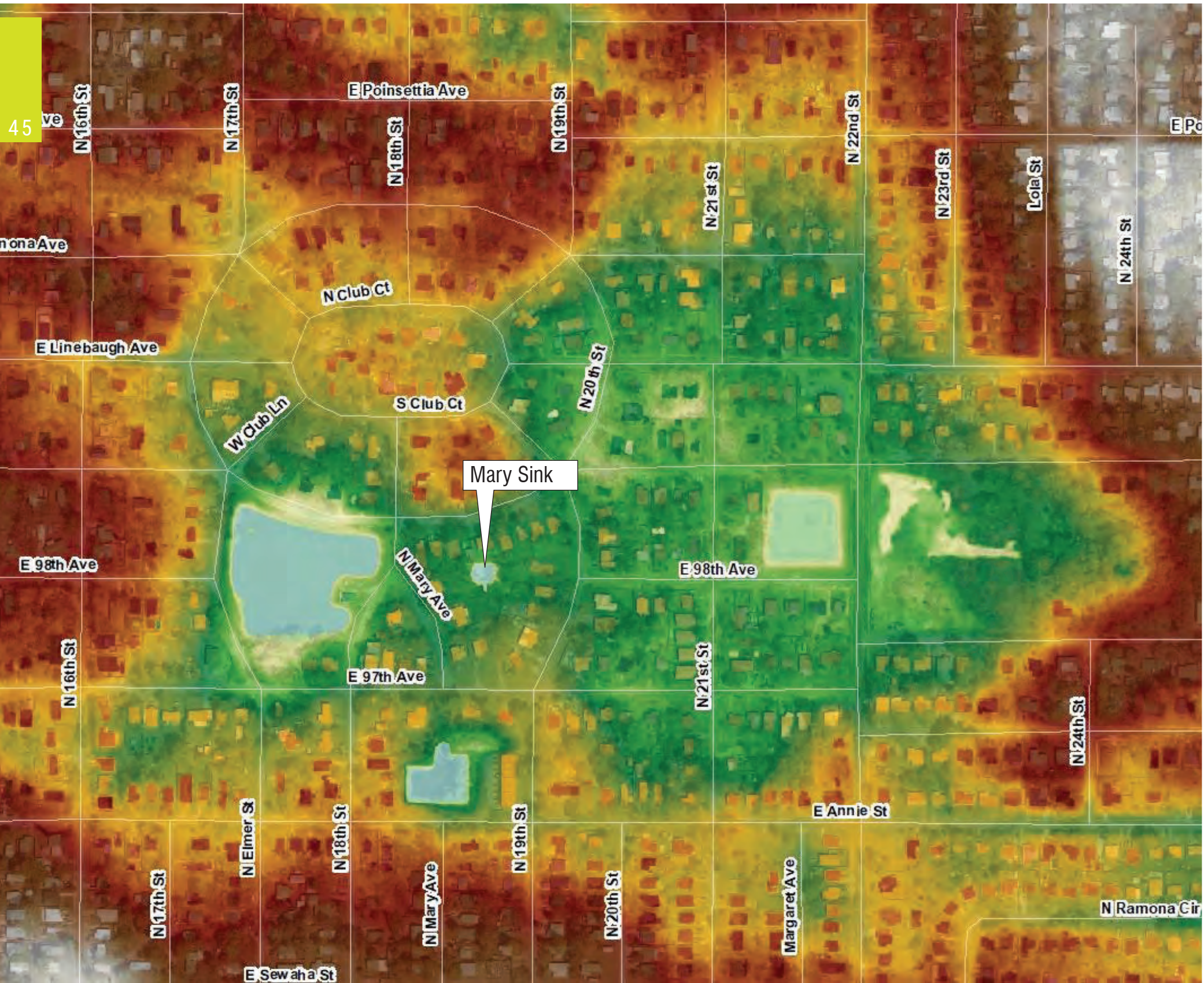
FRAMEWORKS



**HOW CAN WE MAKE
BETTER WATER
STORAGE?**



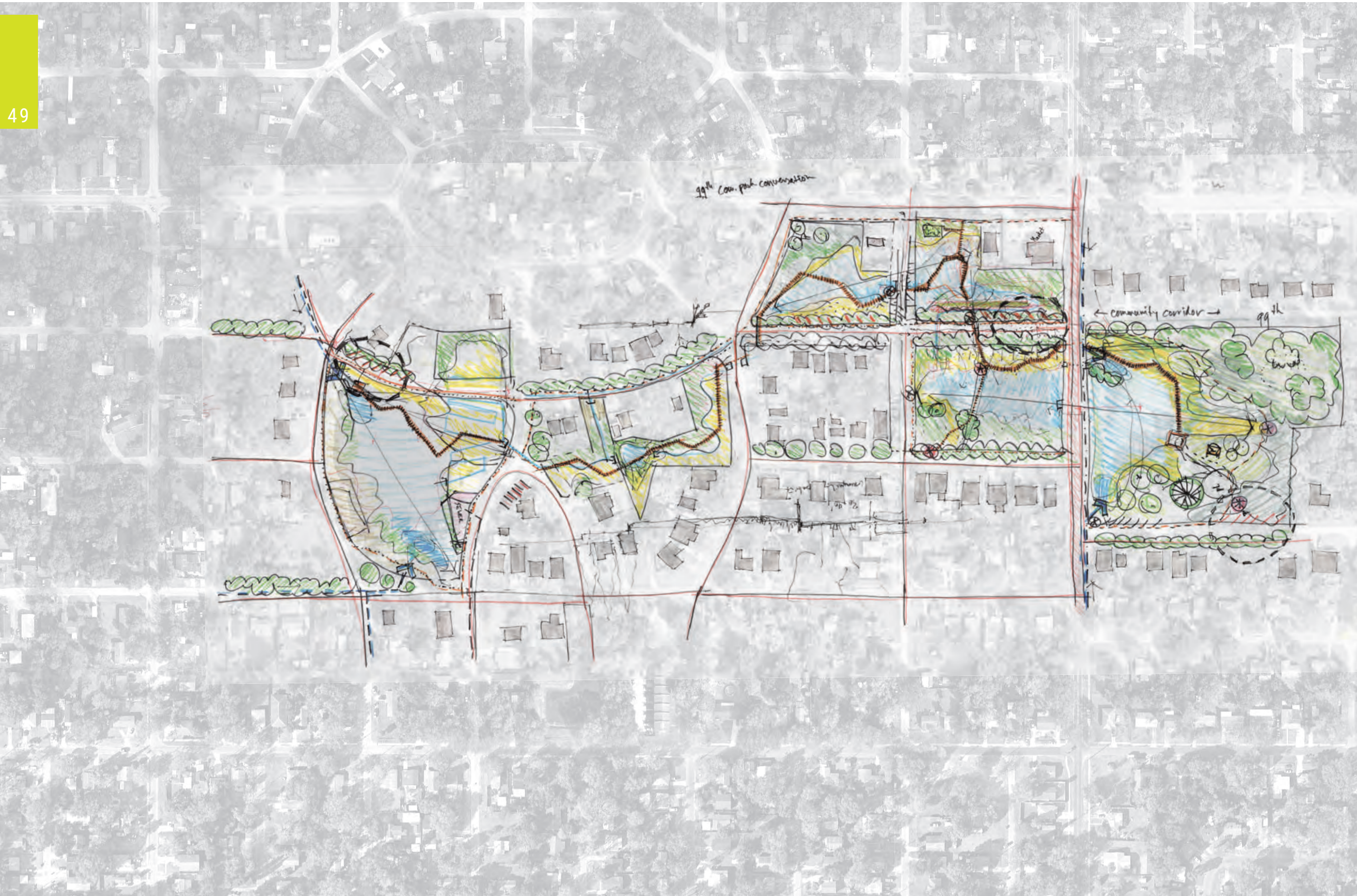
NORTH TAMPA CLOSED BASIN (CITY OF TAMPA)









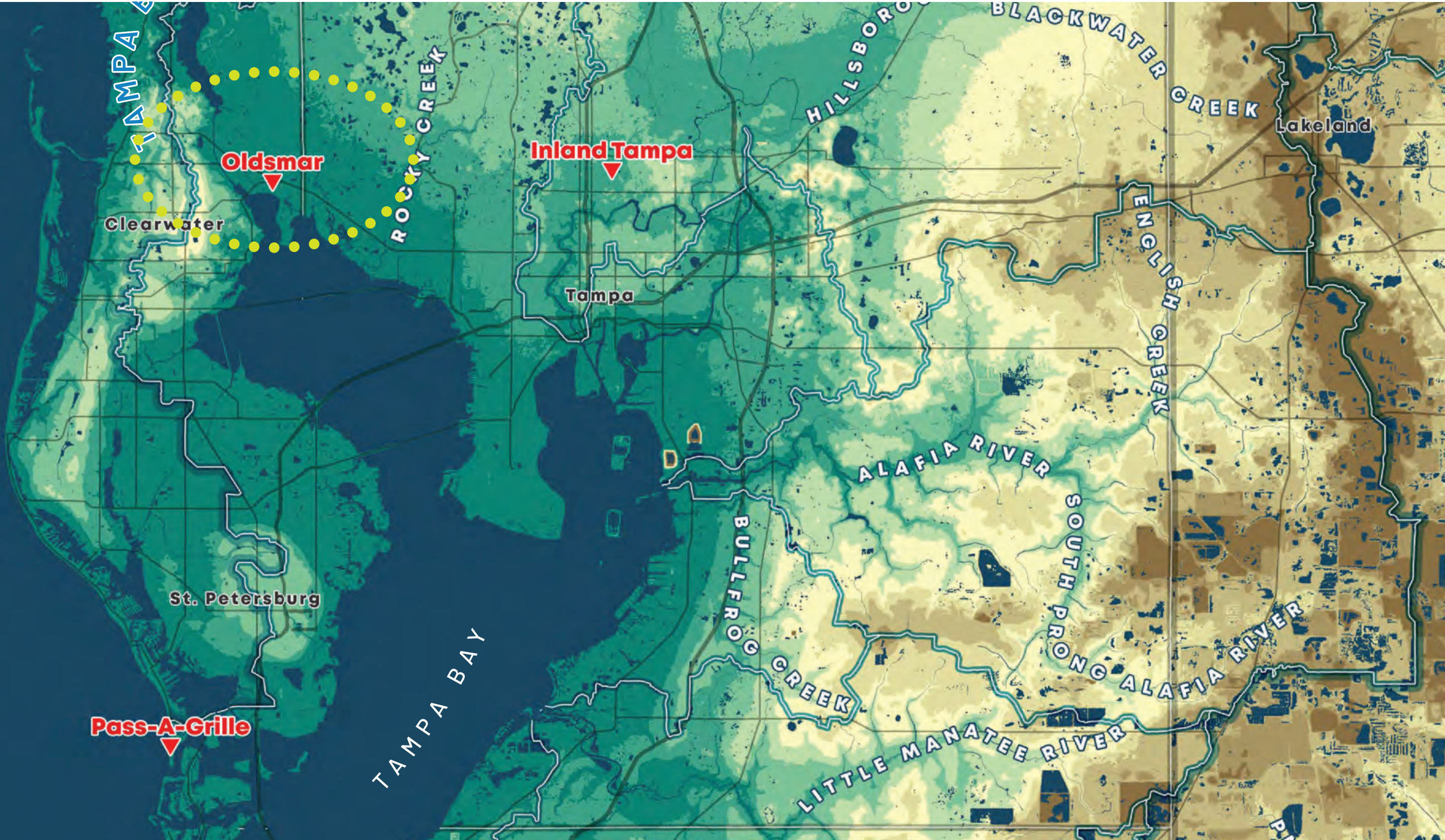




RESILIENT READY

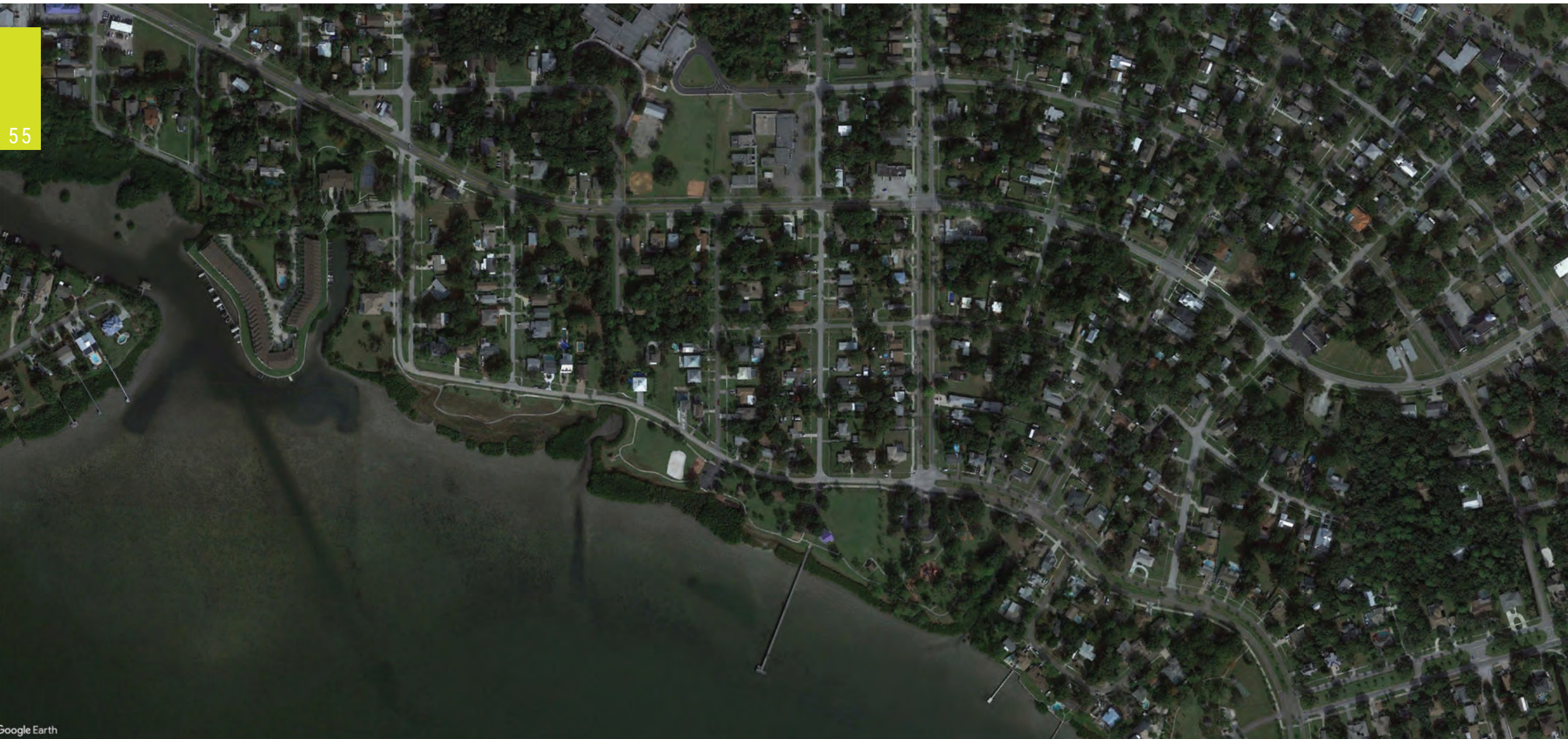
TAMPA BAY

(TAMPA BAY REGIONAL PLANNING COUNCIL)



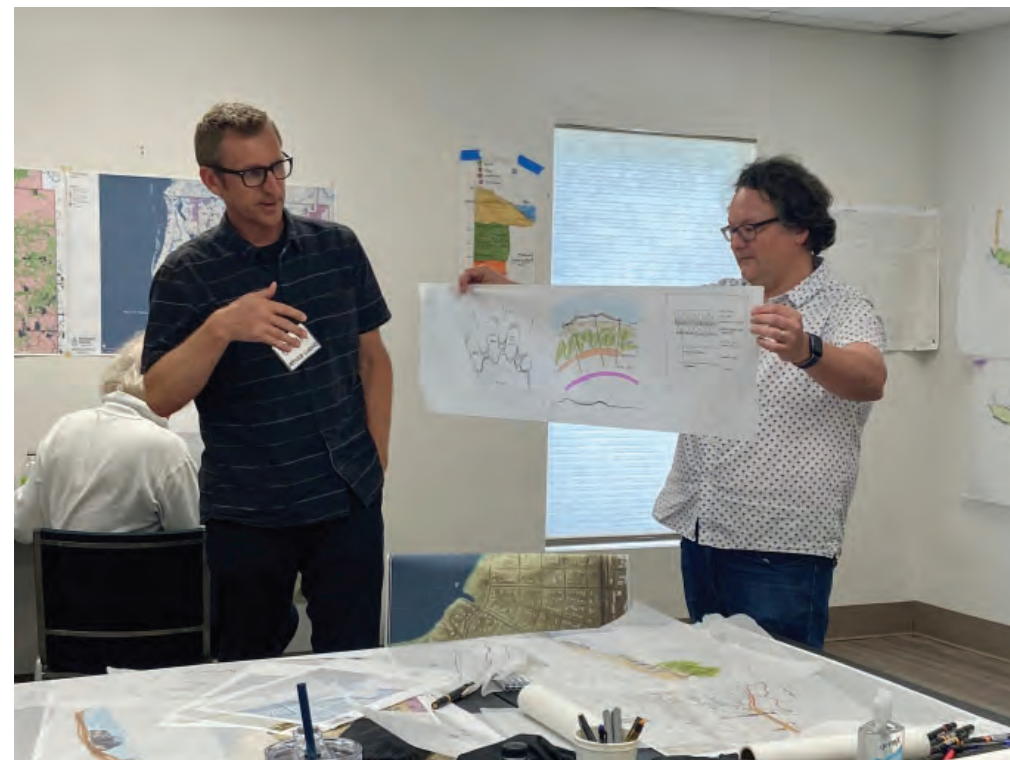












RESILIENCE

Reconciling urbanism with environmental systems

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BRIAN COOK | FOR THE FLORIDA STORMWATER ASSOCIATION (FSA) | 06.15.2022
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