



24 SEPTEMBER 2024
GREEN FUTURES NETWORK

JAIME RAMIRO DIAZ
URBAN DESIGN DIRECTOR

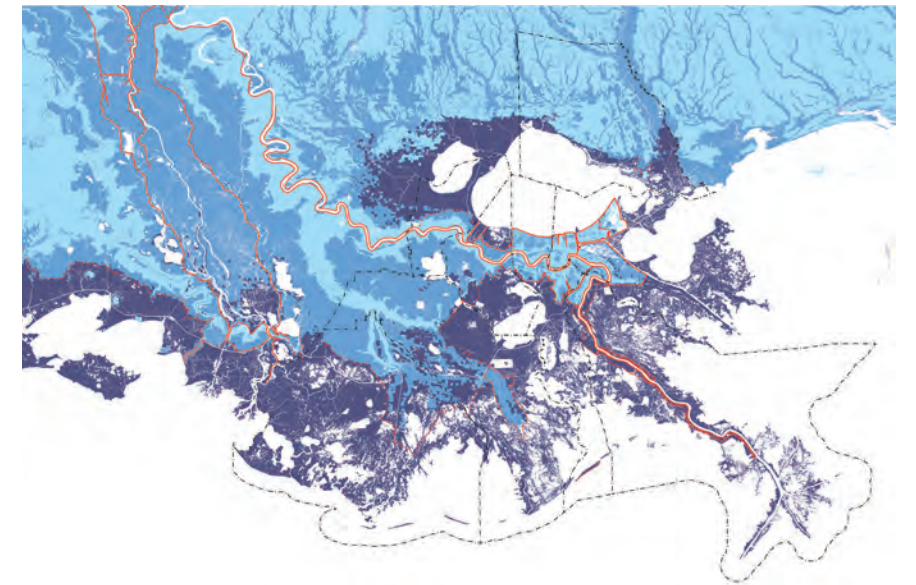
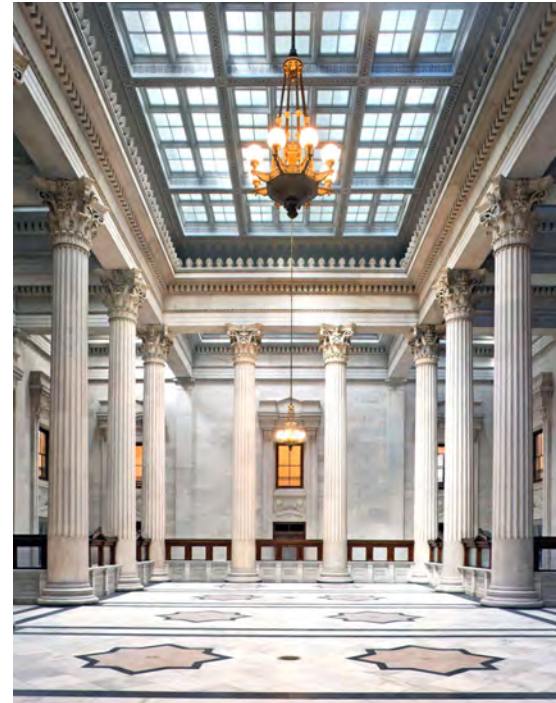
Living With Water®

Adaptation Community of Practice

Jaime Ramiro Diaz

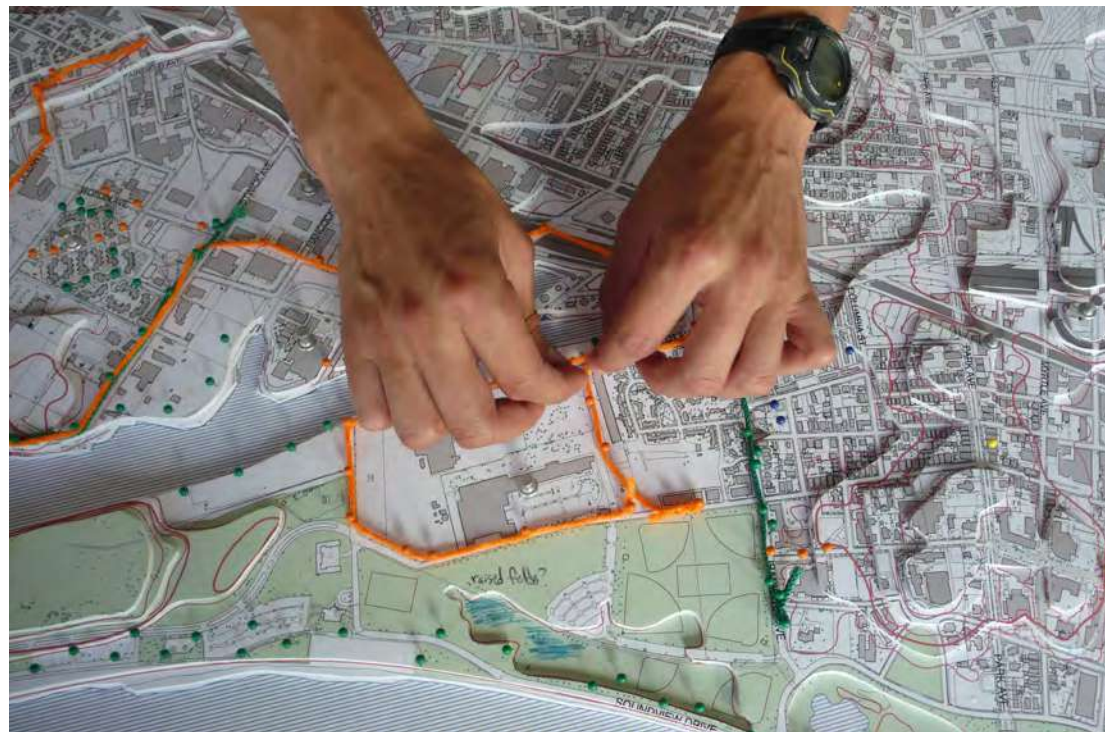
WAGGONNER
& BALL
A MOFFATT & NICHOL STUDIO

Architecture / Environment



We focus on education, historic preservation, and Living With Water™ projects at all scales.

Our Approach



**We collaborate with partners and communities all over the world.
Wherever we are, we work local.**

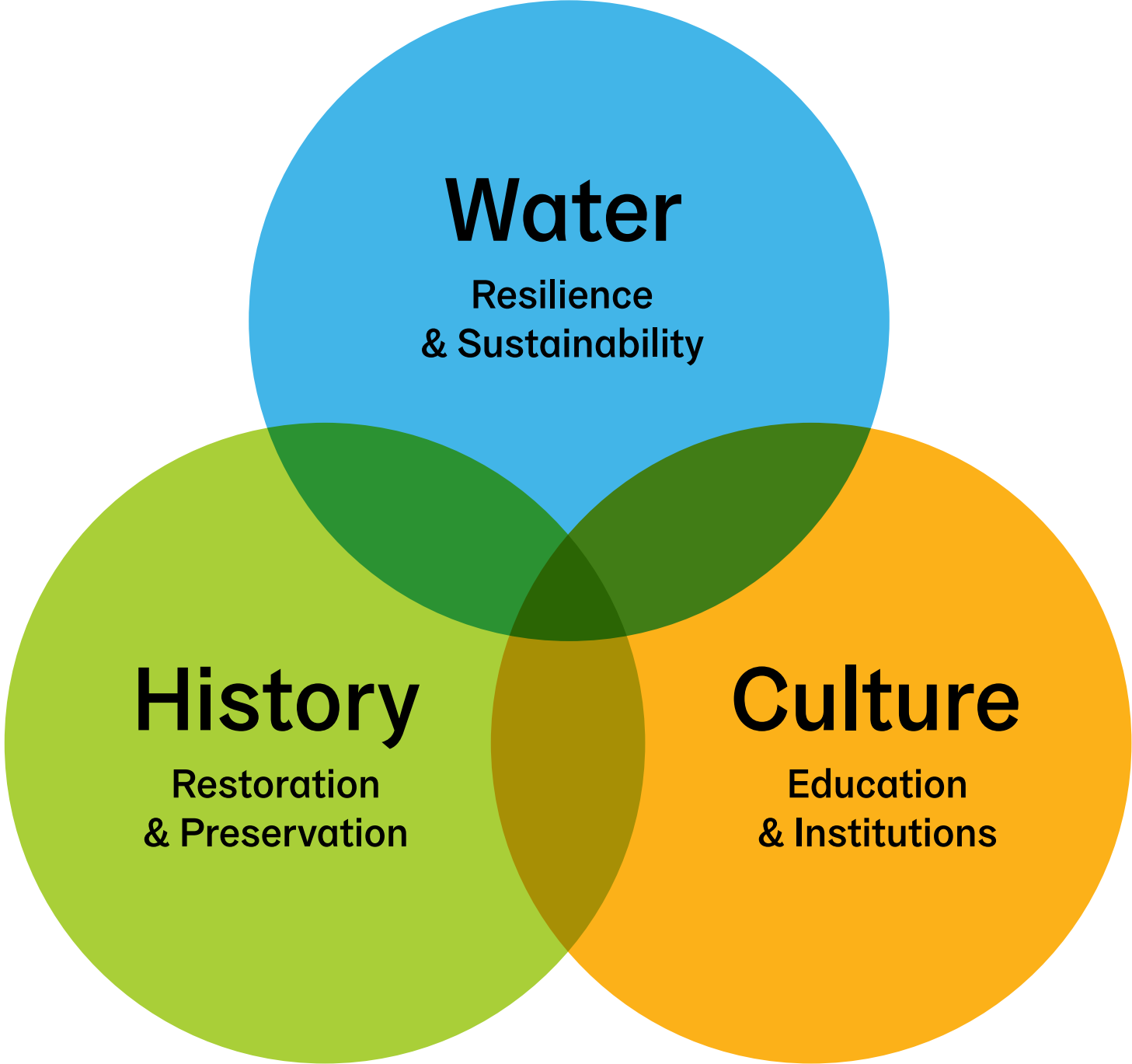
Focus Areas



Gretna City Park
Gretna, LA / Waggonner & Ball



Louisiana Children's Museum
New Orleans, LA / Mithun with Waggonner & Ball



U.S. Custom House
New Orleans, LA / Waggonner & Ball



Historic New Orleans Collection
New Orleans, LA / Waggonner & Ball

Hurricane Katrina

New Orleans



source: Ralph Madison

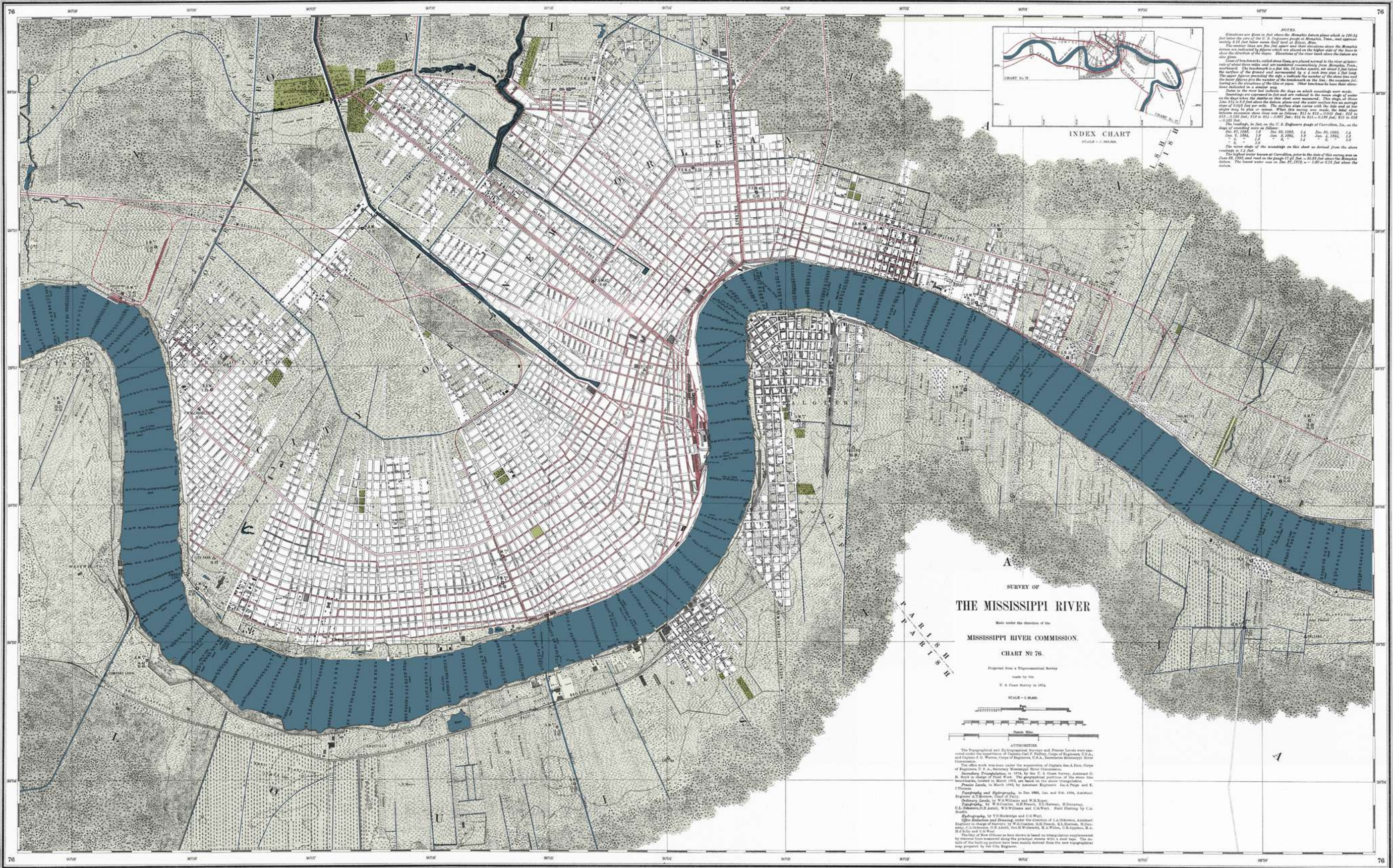
Flooded City, 2005

New Orleans

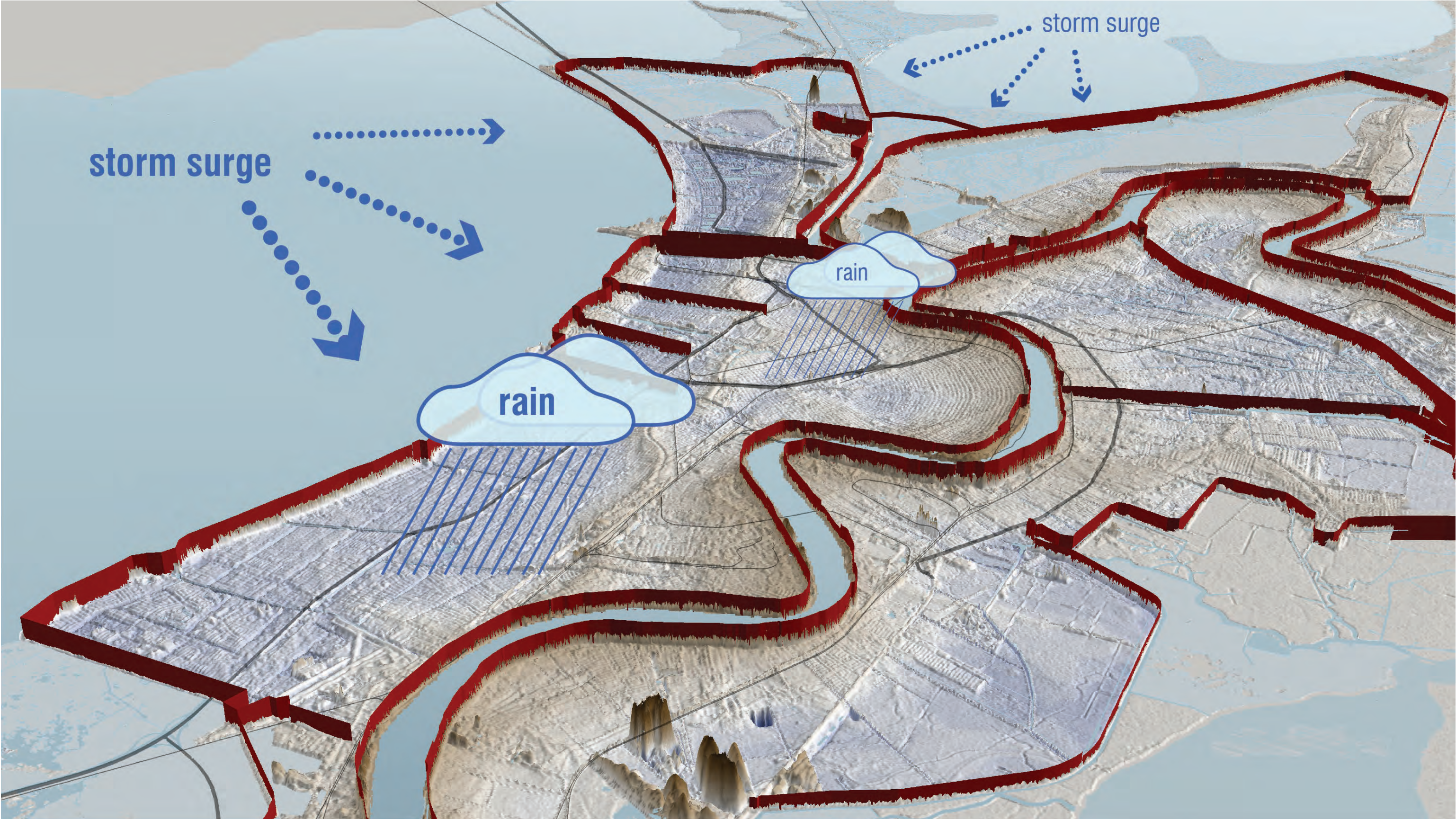


Historic City, 1888

New Orleans



Lines of Defense
New Orleans



Concealed Assets
New Orleans



Lines of Defense
New Orleans



Lines of Defense
New Orleans

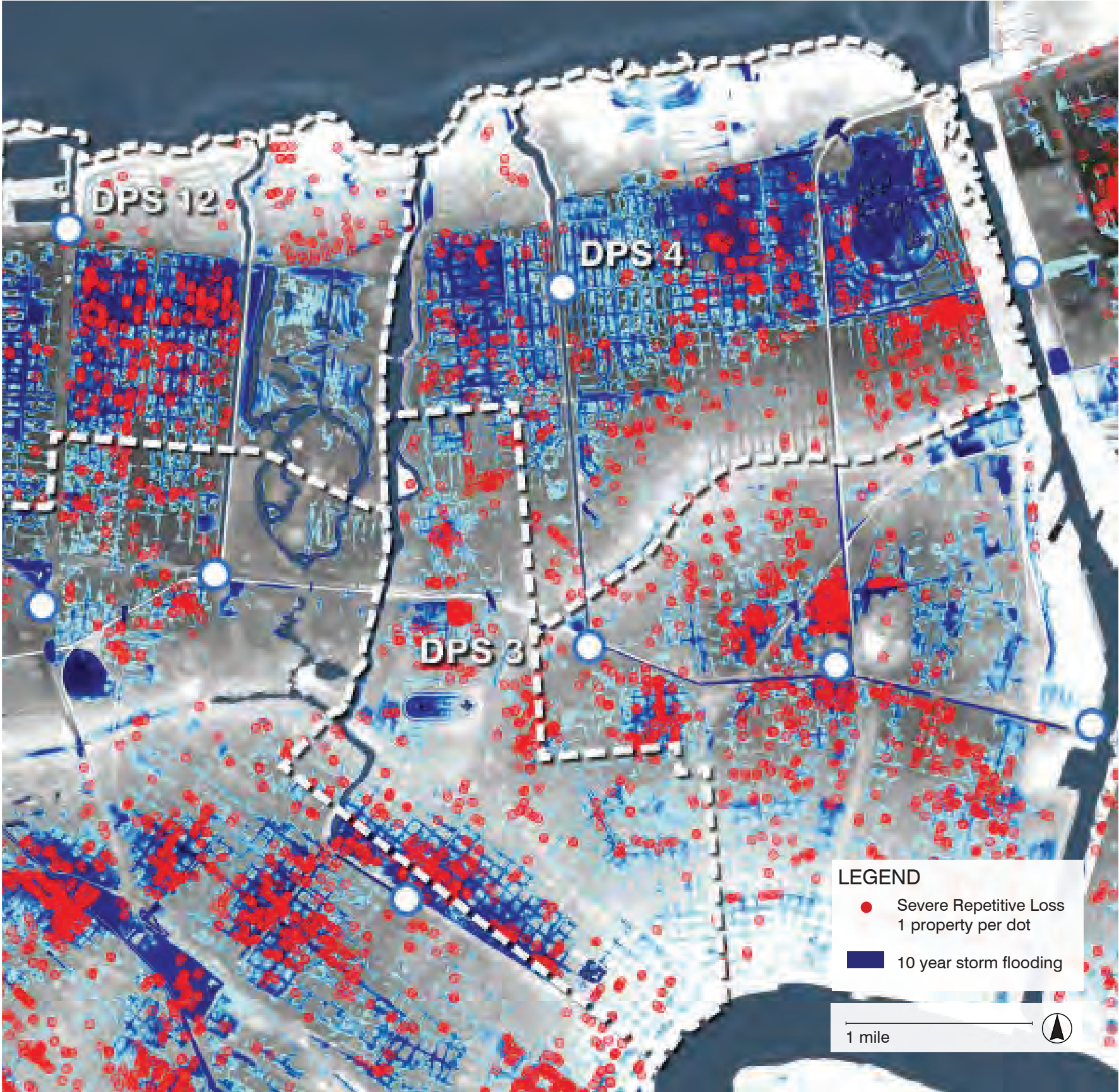


Street Flooding
New Orleans



Repetitive Flood Loss

Greater New Orleans Urban Water Plan



Integrated Flood Protection

Westzeedijk, Rotterdam

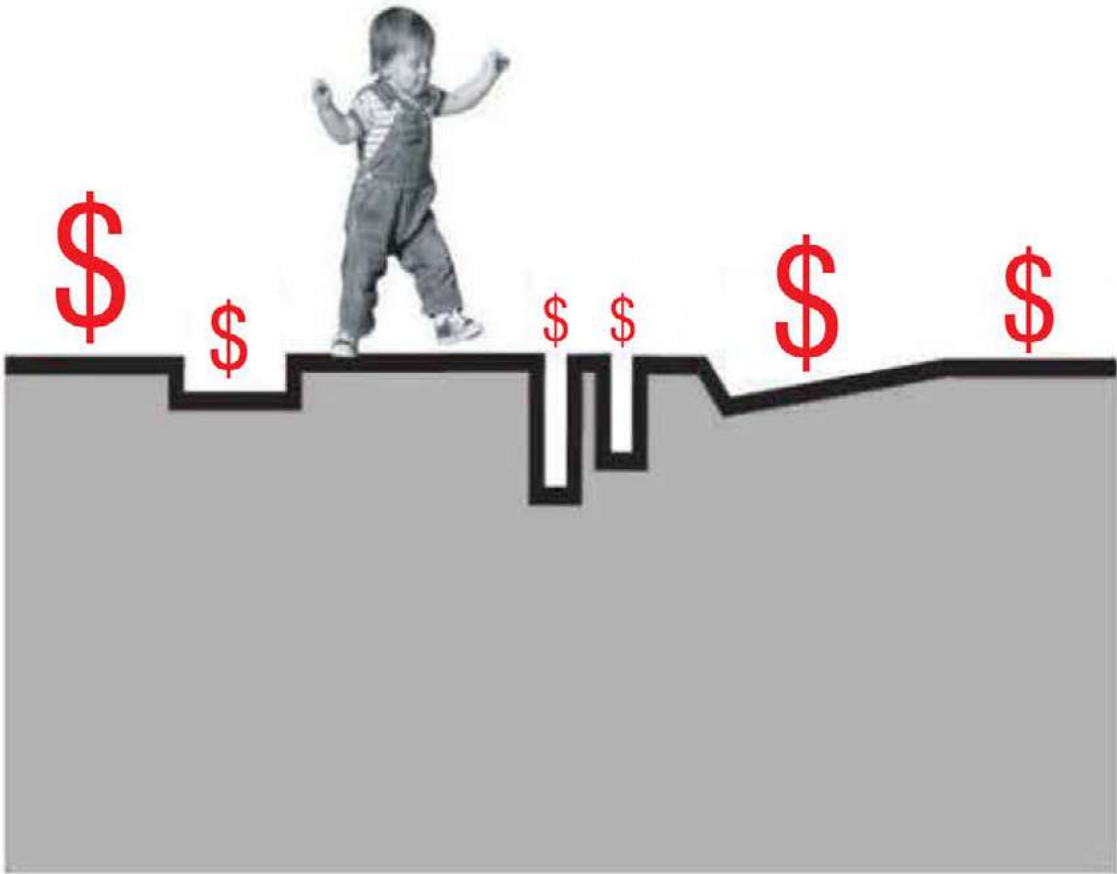
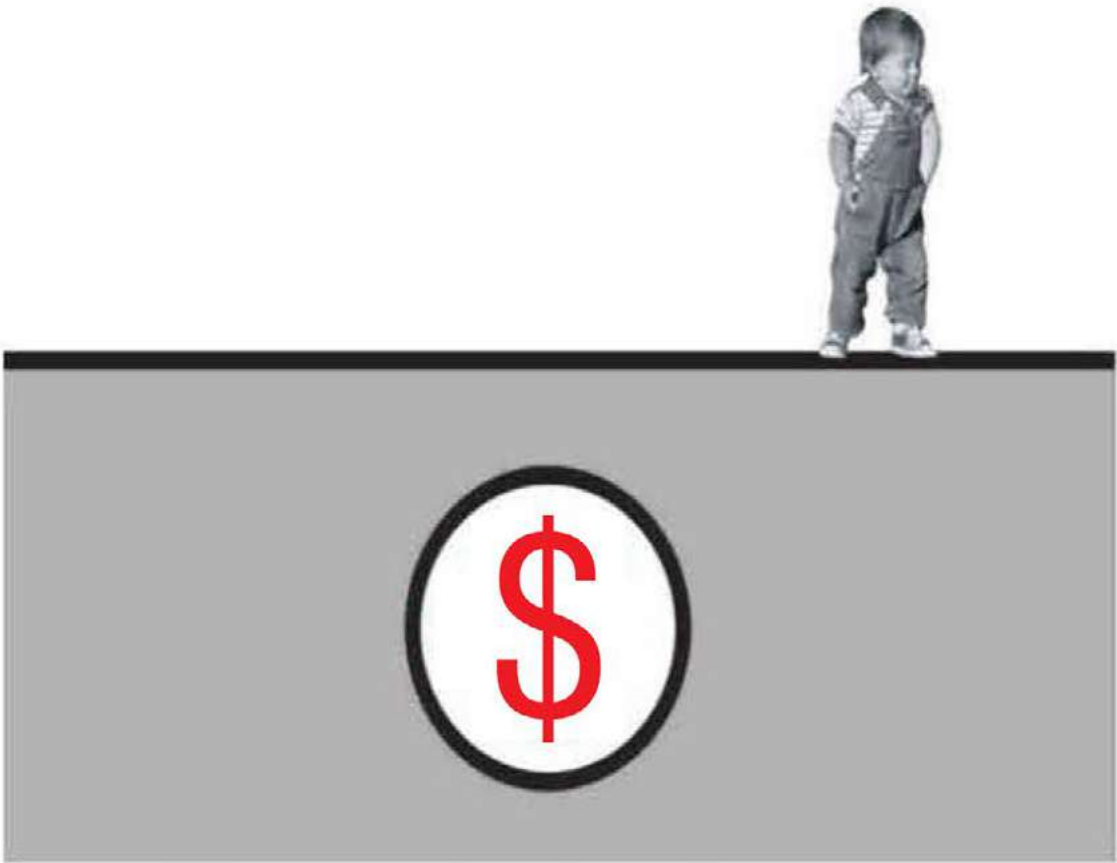


Integrated Flood Protection

Westersingel, Rotterdam



Infrastructure Investment + Amenity
Greater New Orleans Urban Water Plan



Problems Identified

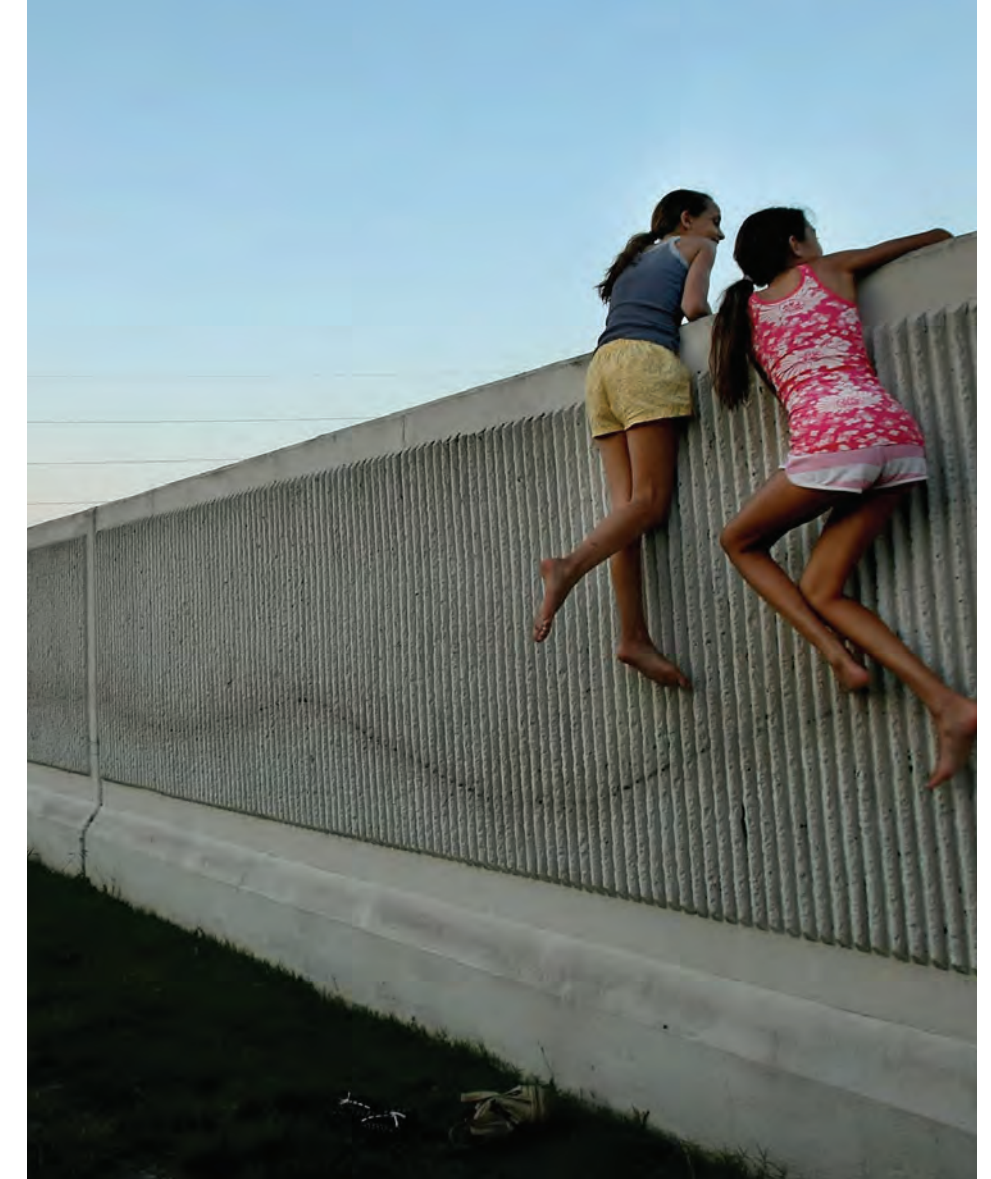
Greater New Orleans Urban Water Plan



1 Drainage systems are regularly overwhelmed by too much runoff, causing flooding.



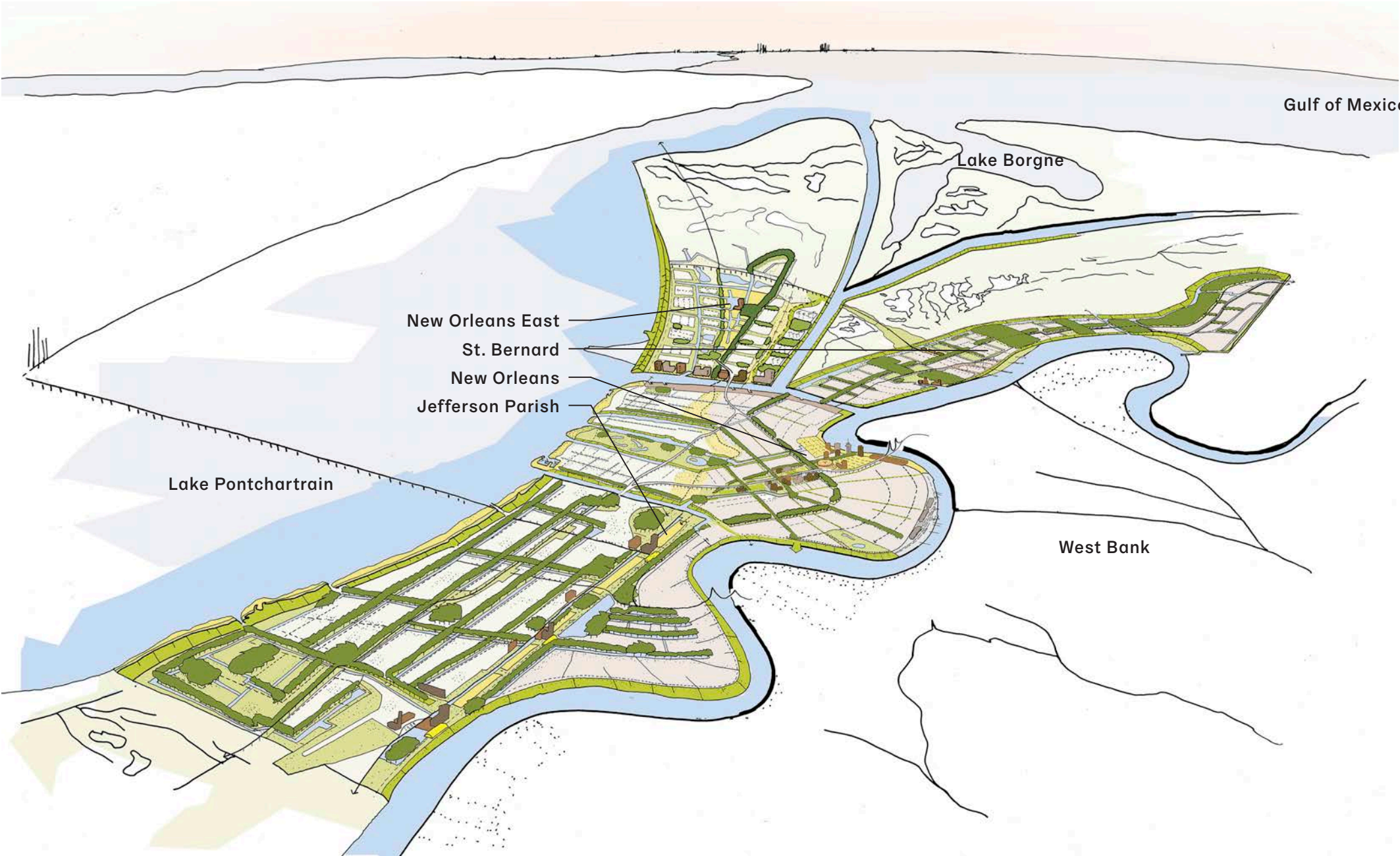
2 Excessive pumping causes the land to sink by lowering groundwater levels.



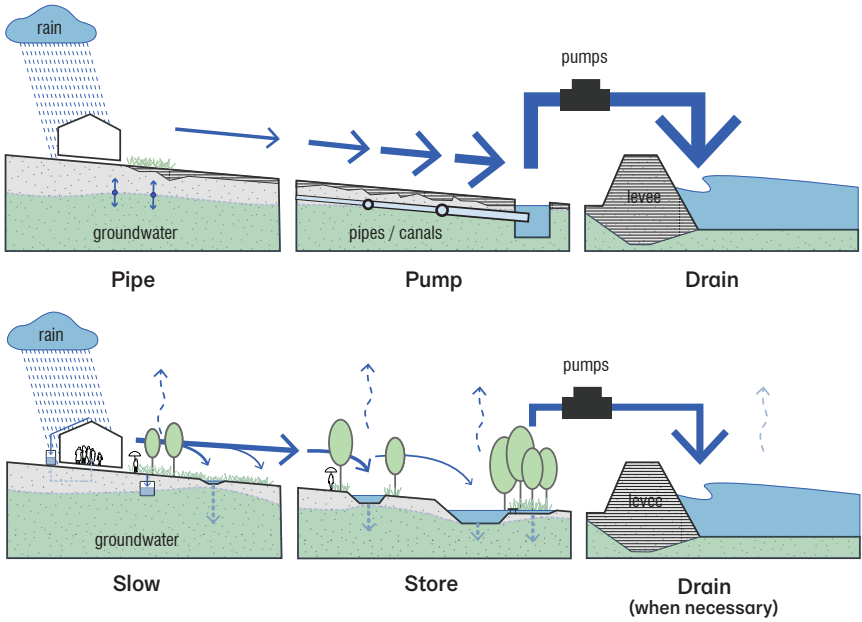
3 Critical water assets are wasted, hidden behind walls, buried underground, or pumped out of sight.

Greater New Orleans Urban Water Plan

Develop first Water Plan in the United States towards a paradigm shift in local stormwater management



Vision Plan



Paradigm Shift



Outfall Canal

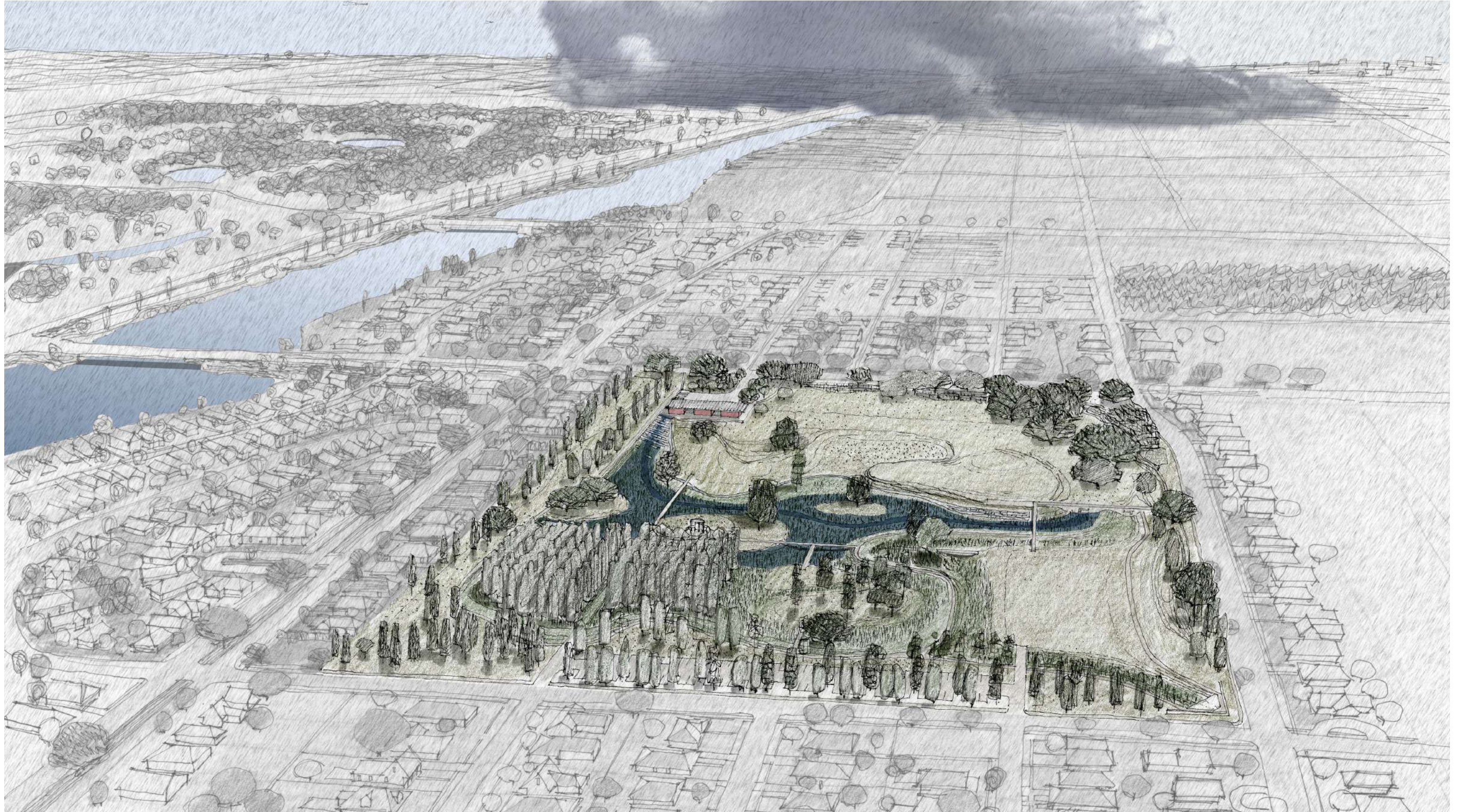
Mirabeau Water Garden

Gentilly Resilience District



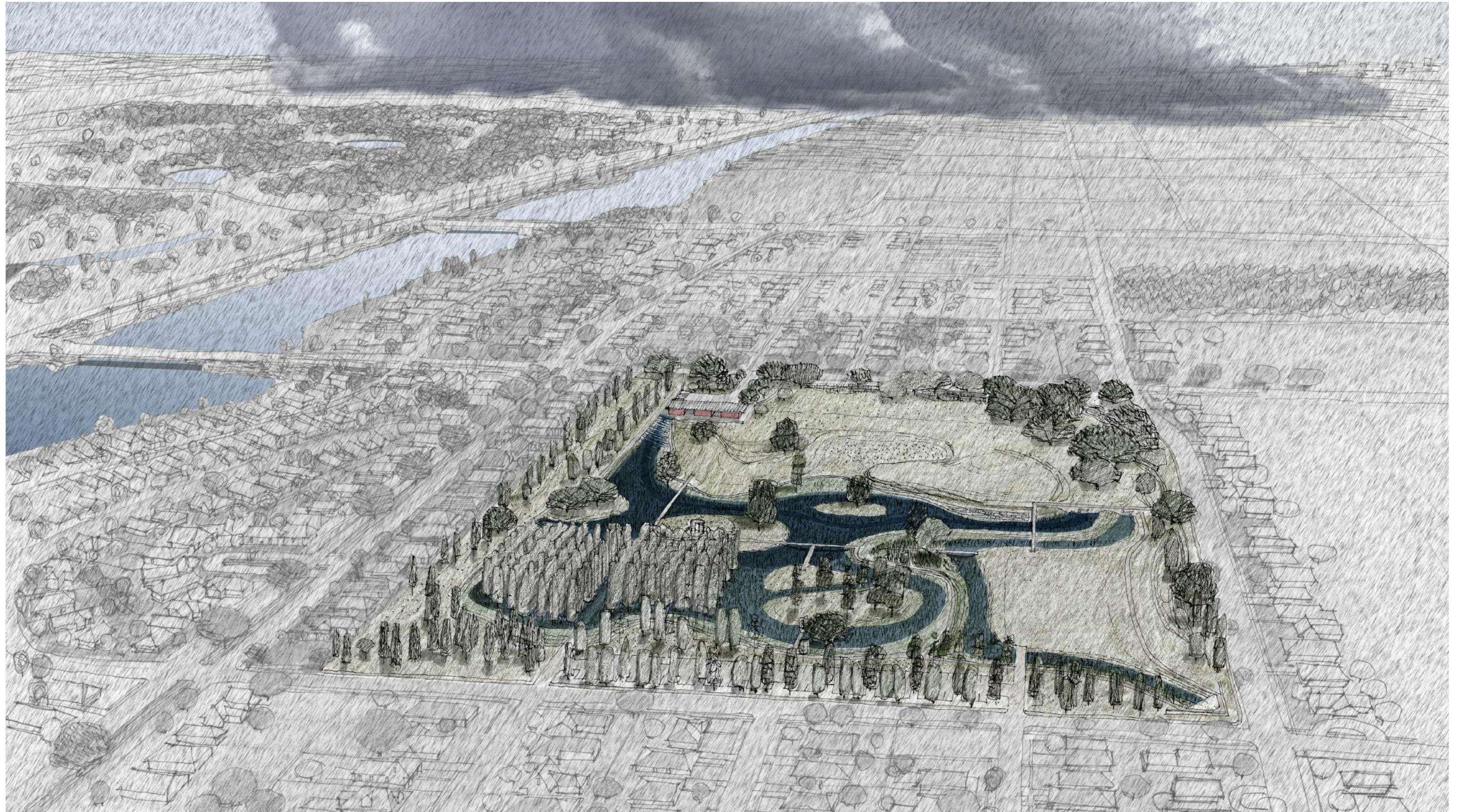
Wet - Typical Rain Storm (1-3 inches)

Mirabeau Water Garden



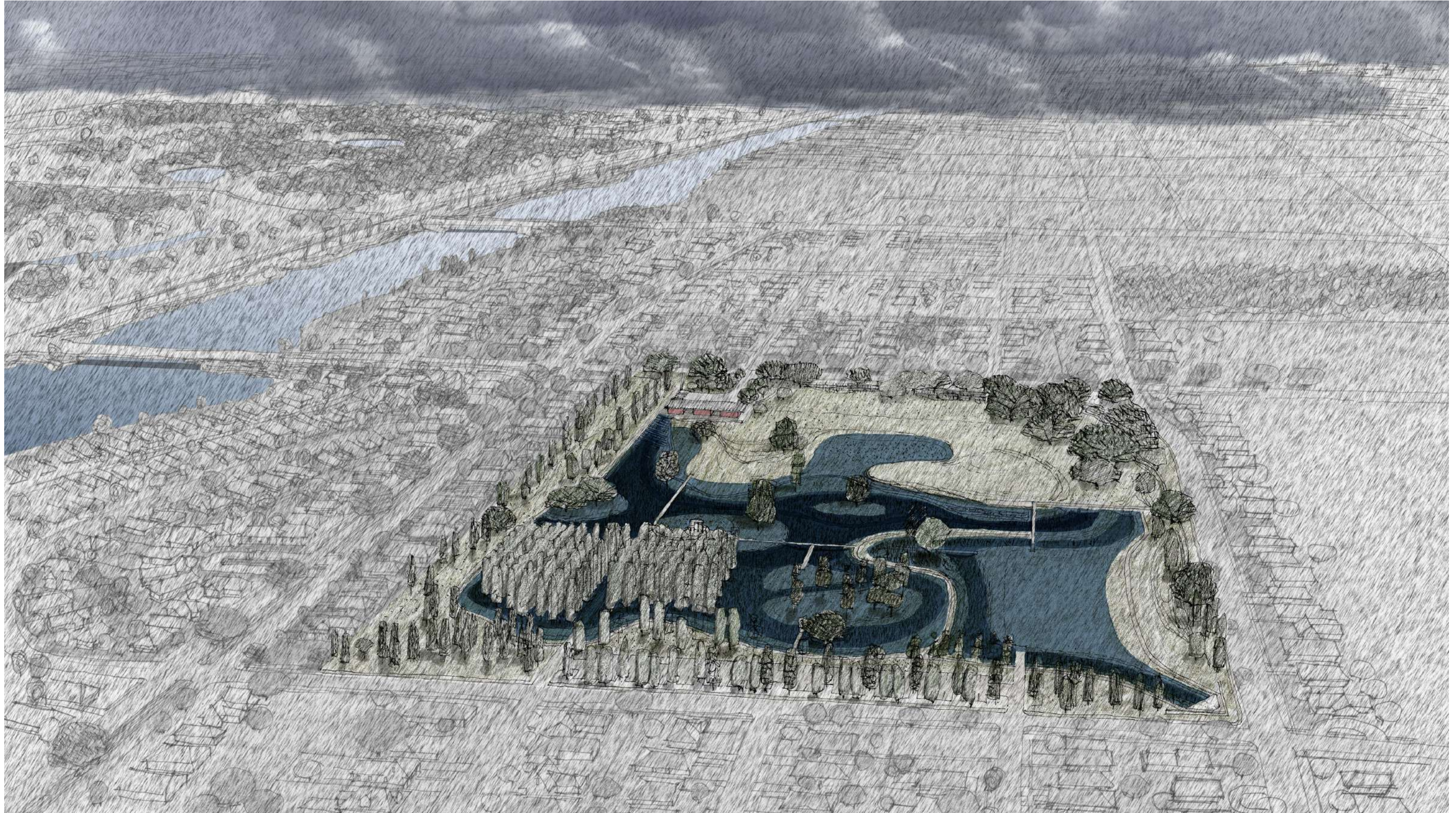
Wet - Heavy Rain Storm (2-year event)

Mirabeau Water Garden



Wet - Heavy Rain Storm (10-year event)

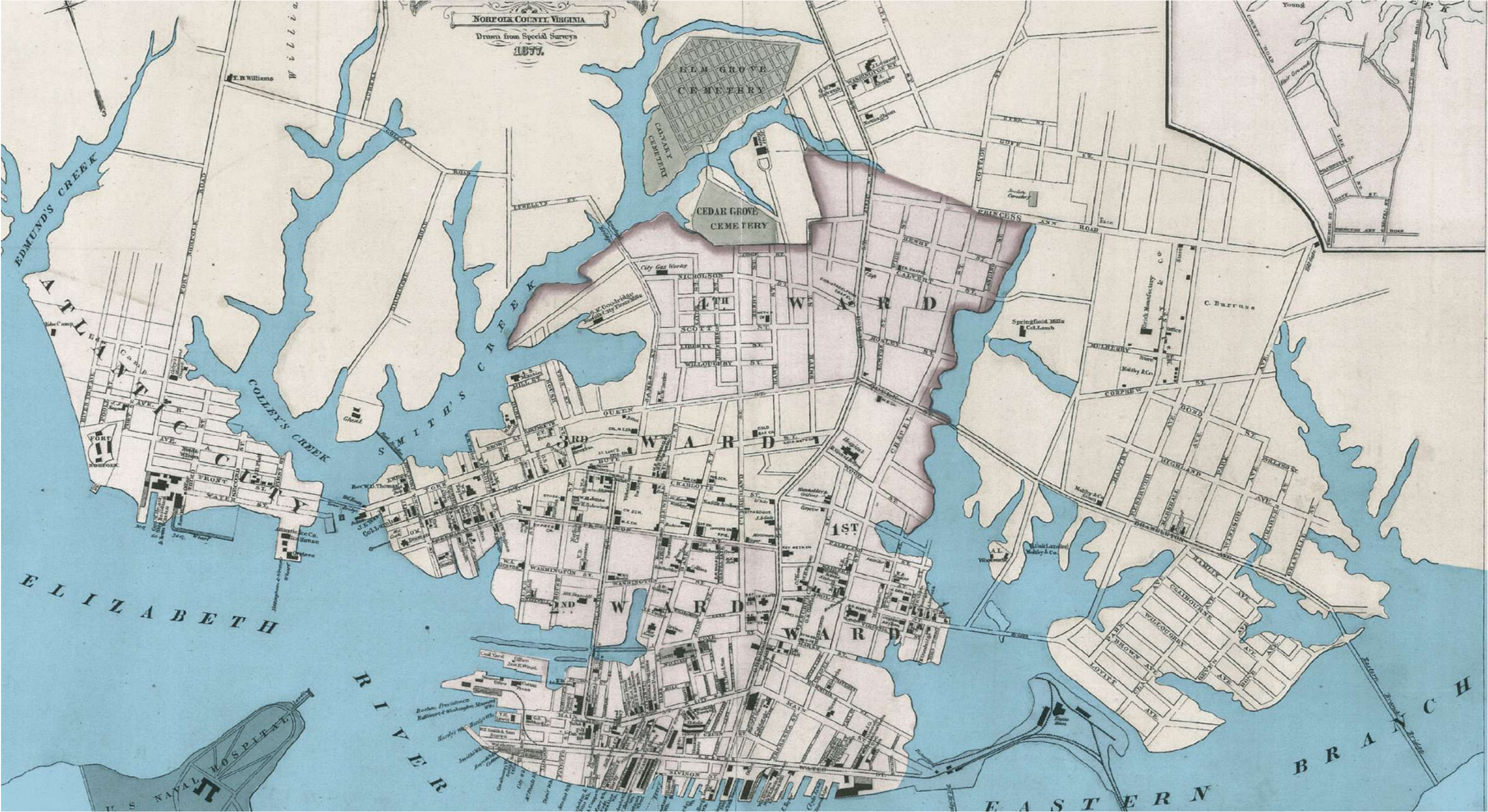
Mirabeau Water Garden



Norfolk



Norfolk 1877



Flood Risk



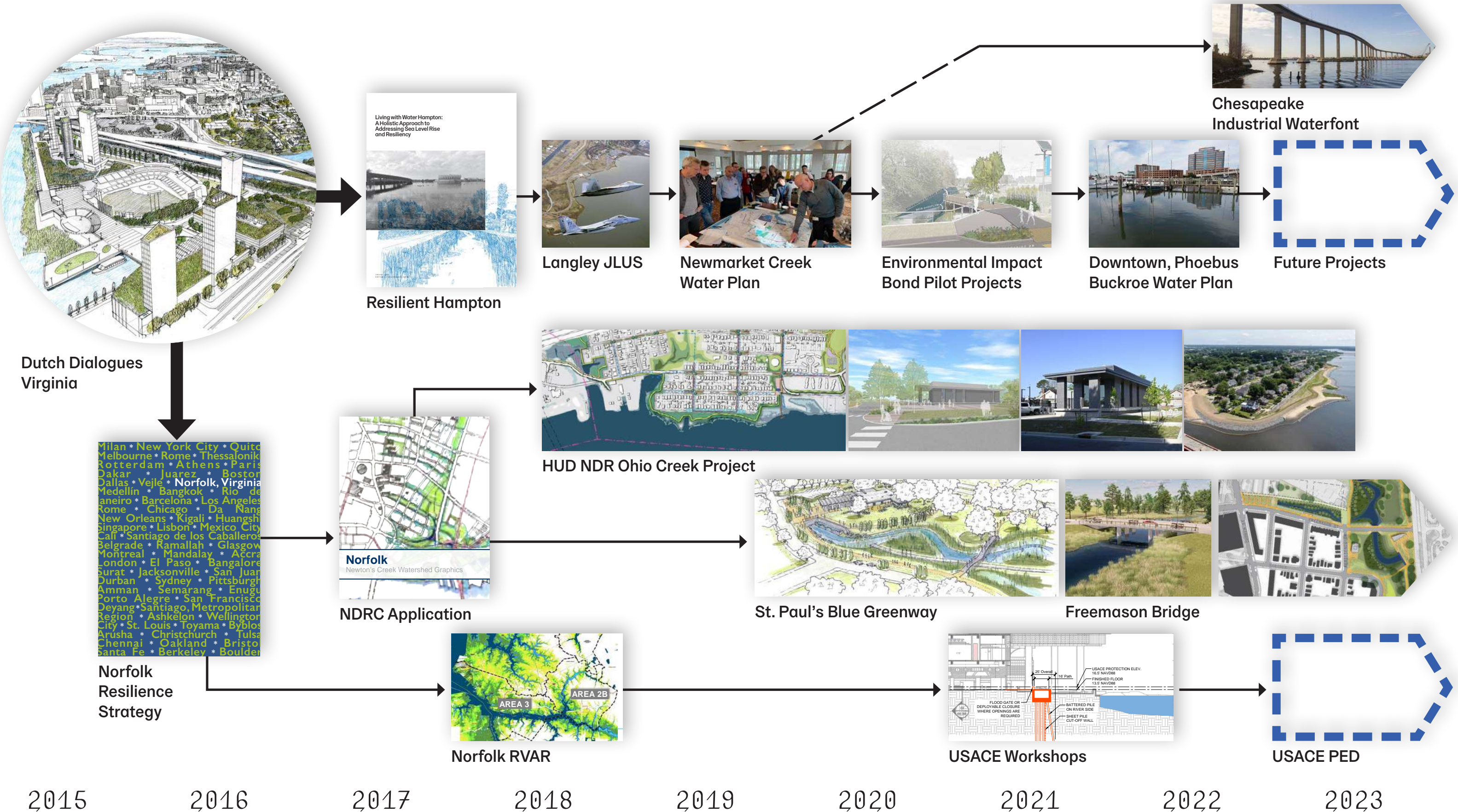
High Tide Flooding on East Water Street

September 20th 2024



Catalyst for Hampton Roads Resilience

Dutch Dialogues Virginia → Resilient Hampton, Norfolk Resilience, to Chesapeake



Norfolk Ohio Creek Watershed Resilience

Enhancing resiliency and quality of life for a coastal urban community through nature-based design



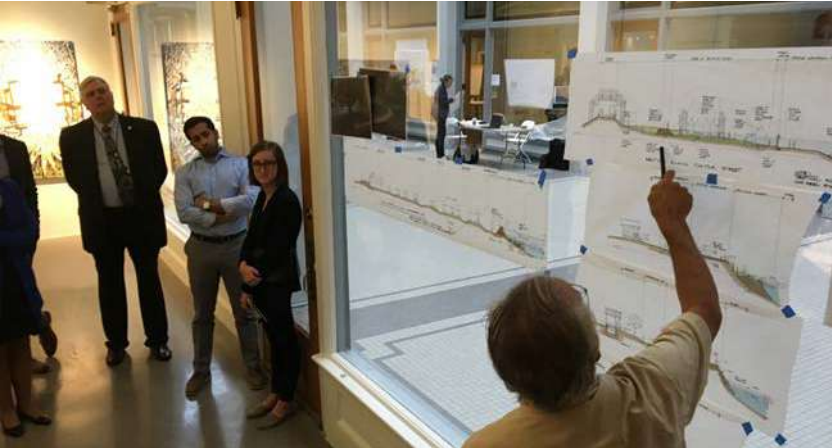
Proposed projects identified through a workshop-centered process that began with the Dutch Dialogues Virginia

Norfolk Ohio Creek Watershed Resilience

Enhancing resiliency and quality of life for a coastal urban community through nature-based design



Public fishing pier improves waterfront access in coordination with strengthened edge protection from sea level rise and storm surge



Design vision developed through charrettes

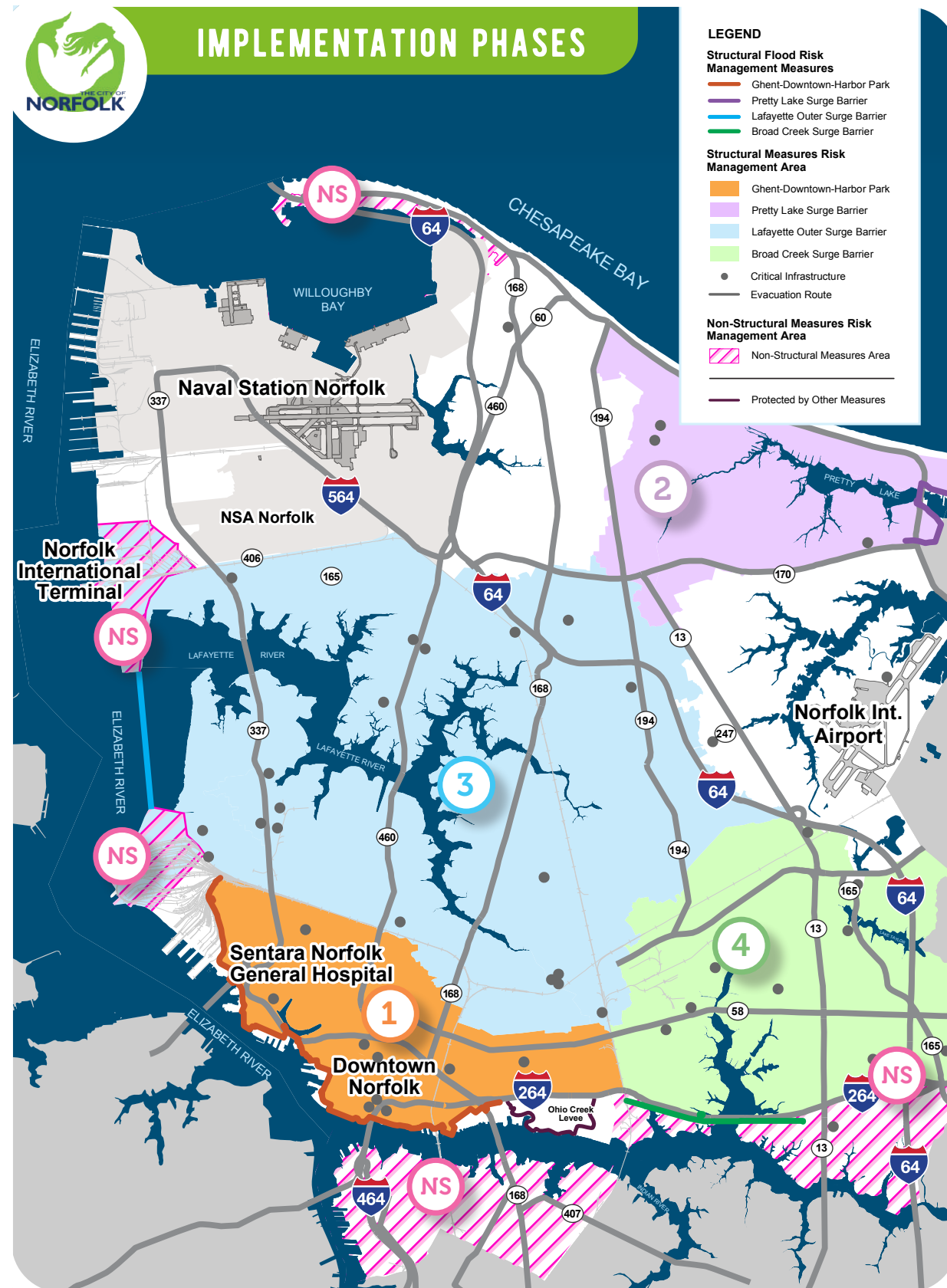


Aerial photo of living shoreline and berm under-construction



Pump station is a resilience hub that serves as a gateway to the new public fishing pier

The City wide project is divided into 5 implementation phases



A series of property-specific flood mitigation projects: home elevations, basement fills, floodproofing, etc.

Phase	Location	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032			
1A	Berkley Bridge to Chesterfield Heights															
1A PS	Harbor Park and Newtown Creek															
1B	Town Point Park/Waterside															
1C	Ghent to Town Point Park															
1D	Downtown Floodwall															
2	Pretty Lake Surge Barrier															
3	Lafayette Outer Surge Barrier															
4	Broad Creek Surge Barrier															
NS	Multiple Areas in the City															

Structural Projects

Lessening the impact of a hazard by modifying the hazard itself through construction



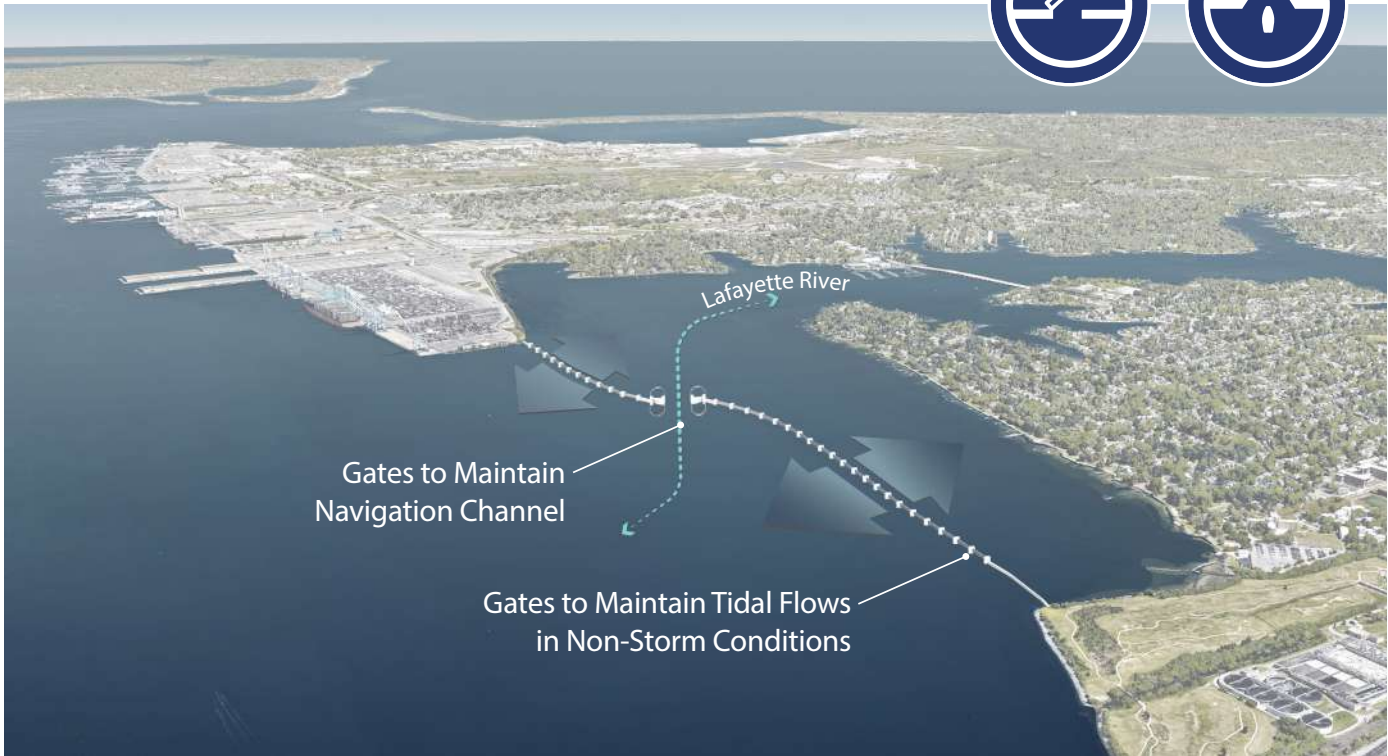
Ohio Creek Watershed Project Coastal Protection Alignment

Ohio Creek Watershed Project Pump Station



Waterside Drive Phase 1

Lafayette Storm Surge Barrier Phase 3

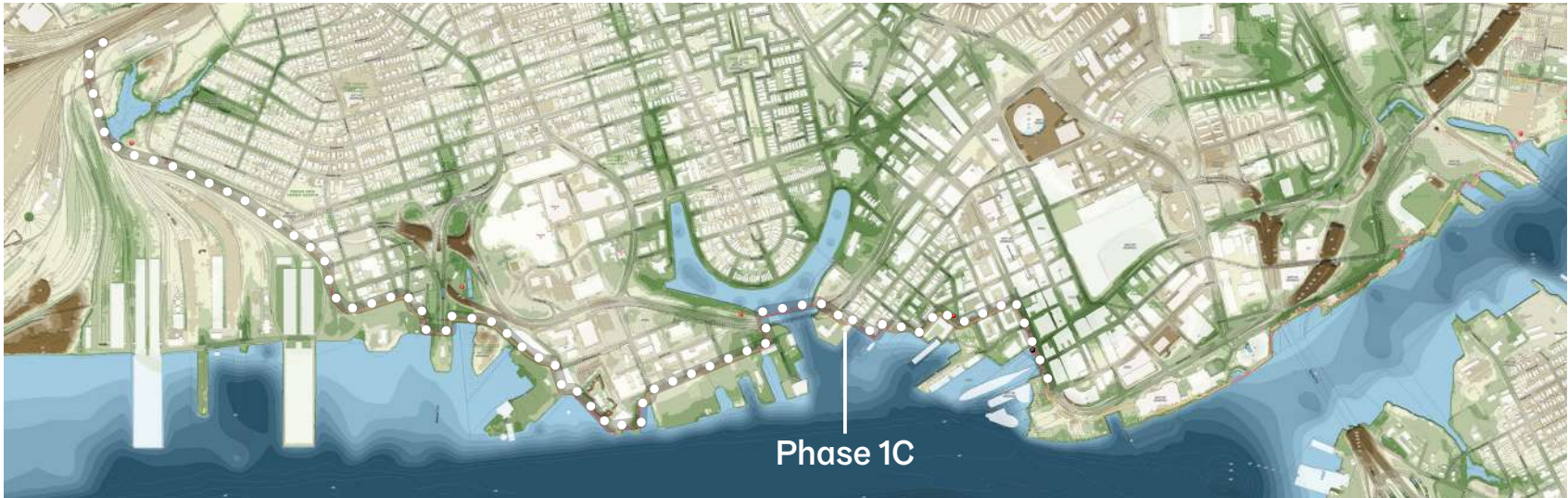
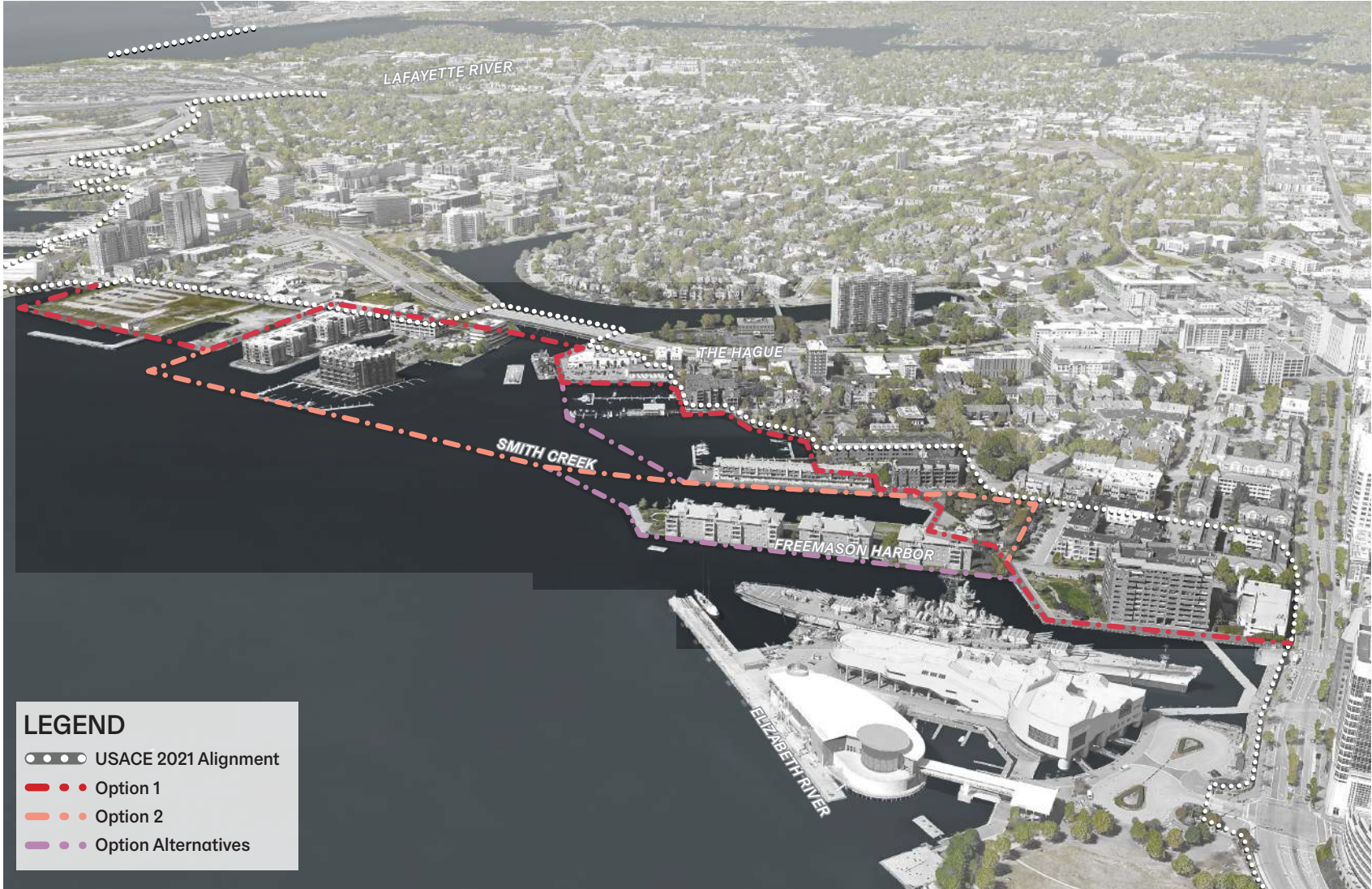


Phase 1C

1

Downtown

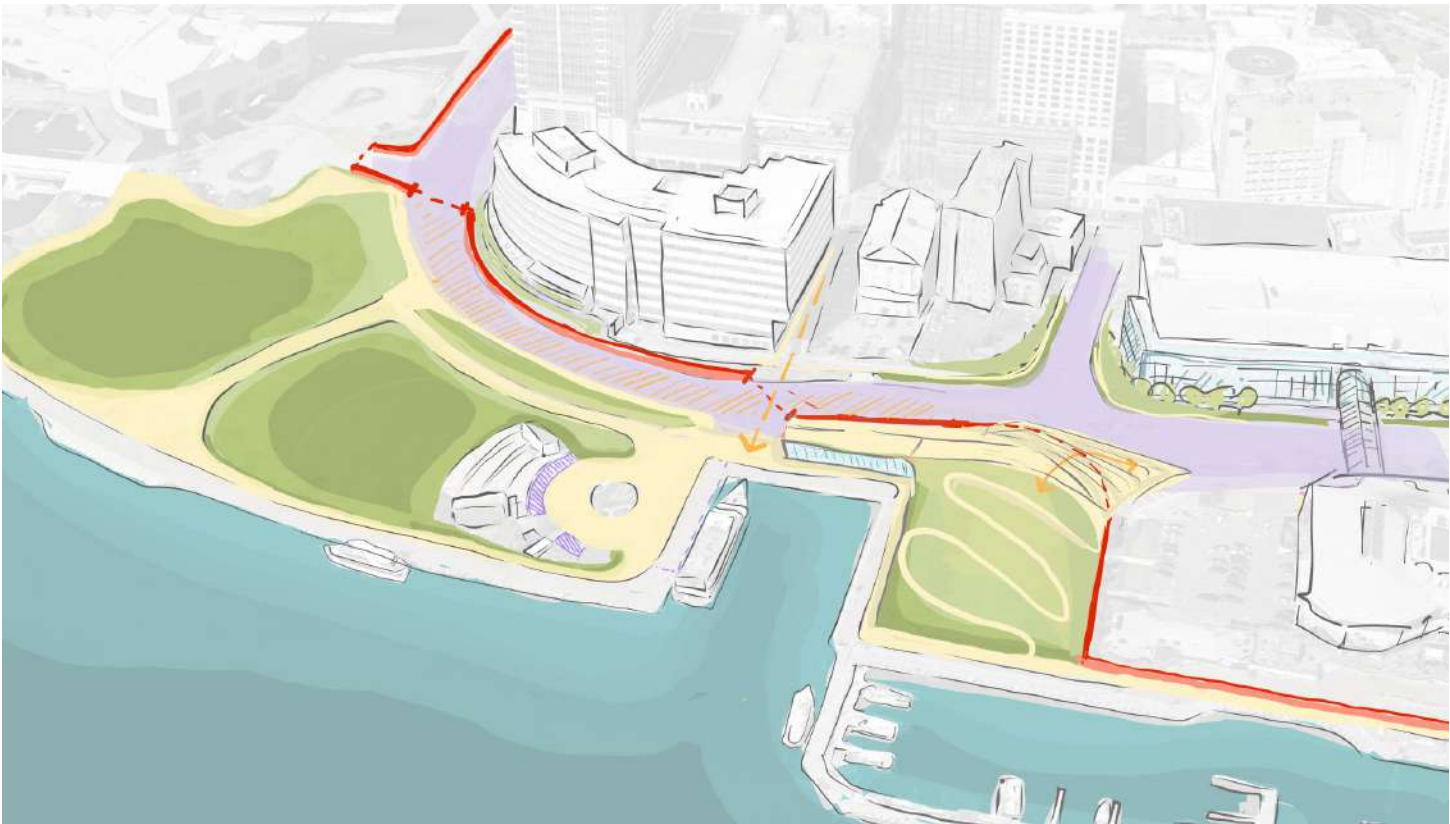
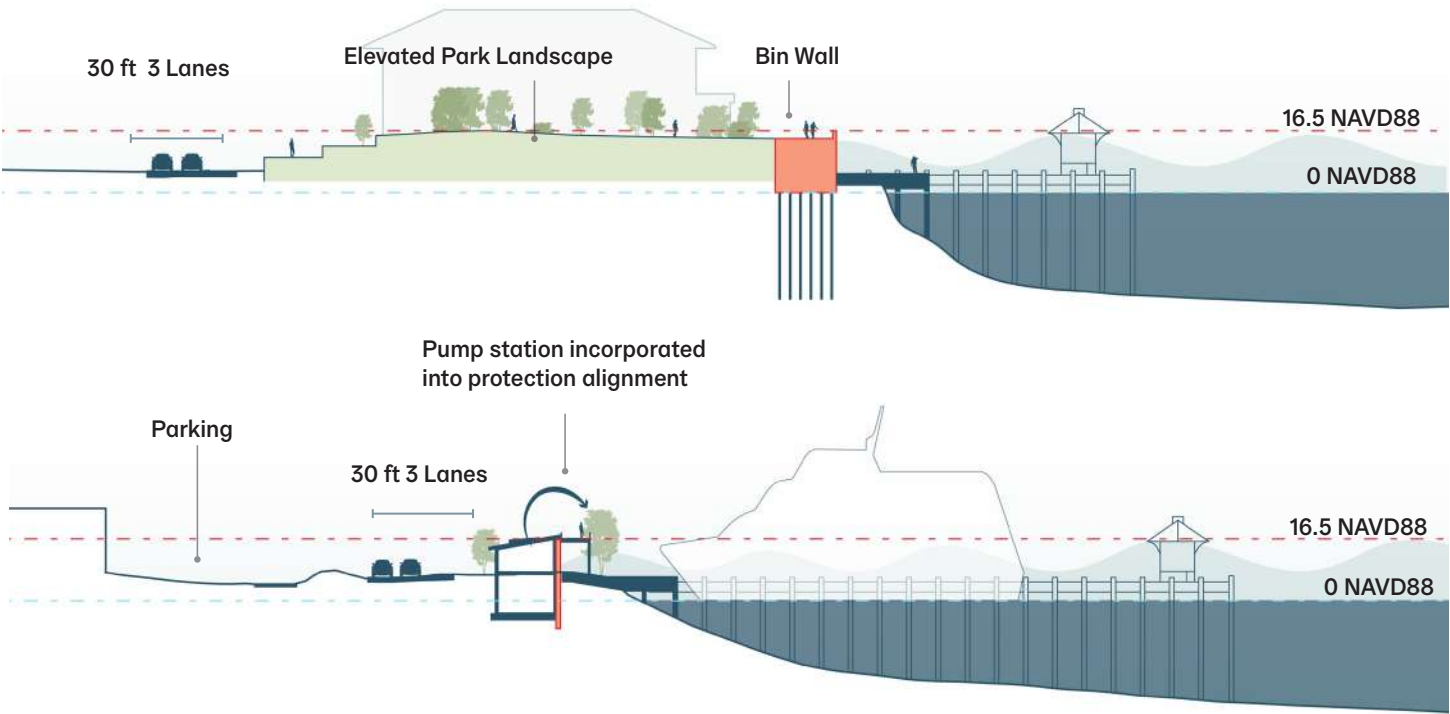
February 2024 Strategy Workshop



Phase 1A

1 Downtown

October 2023 Waterside Drive Workshop

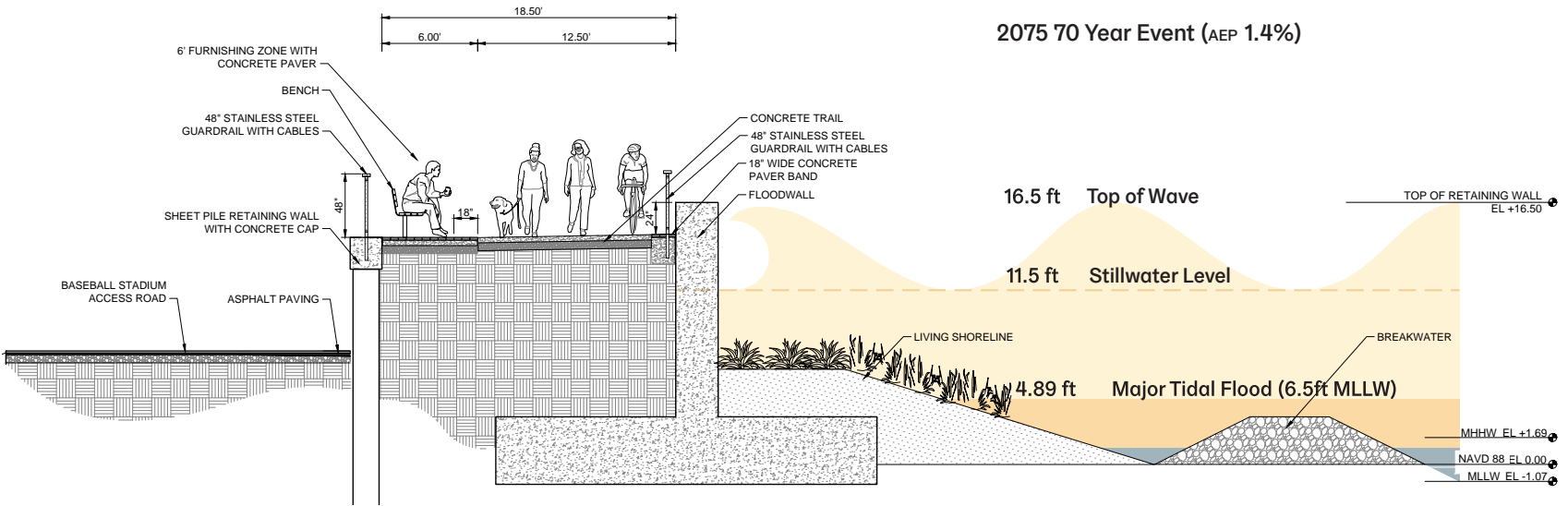


Norfolk Coastal Storm Risk Management Program

Assisting the City of Norfolk implement US Army Corps of Engineers flood risk reduction projects



Ferry landing access at Harbor Park



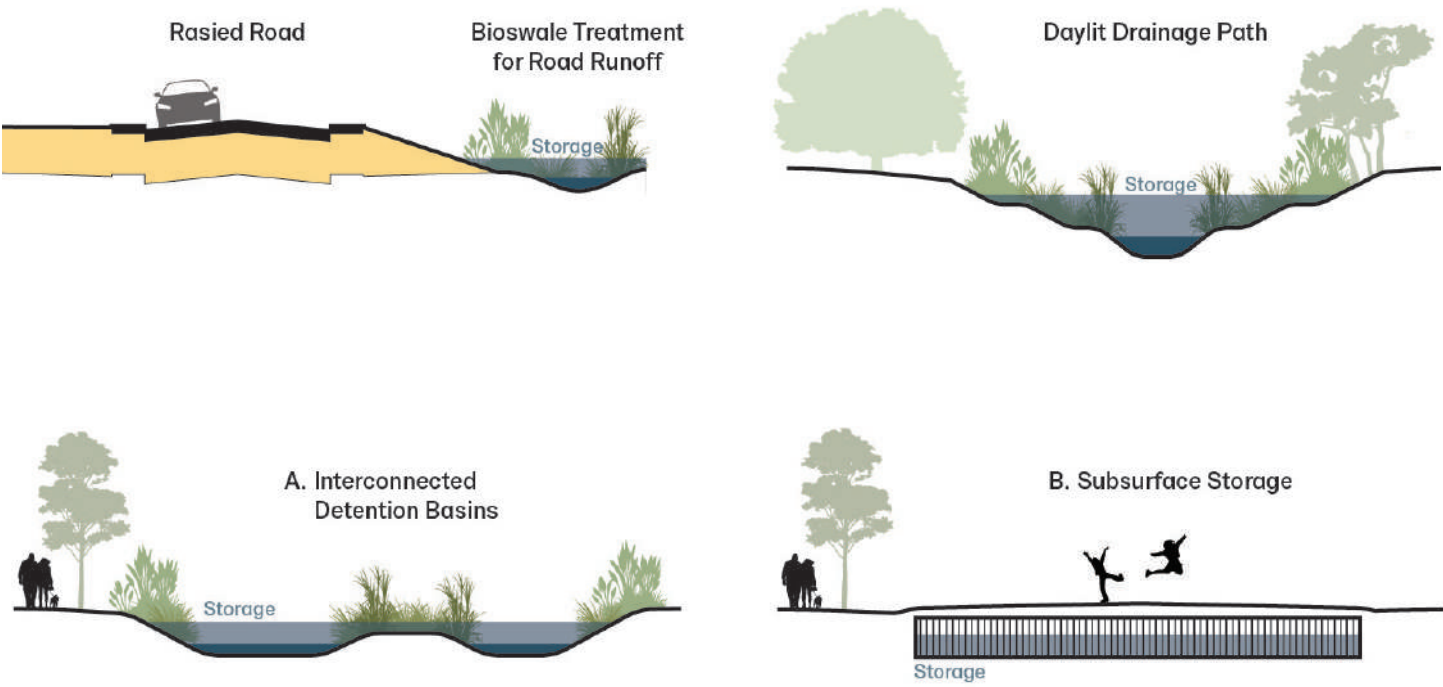
Typical profile with trail, floodwall, and living shoreline



Elizabeth River Trail on top of floodwall alignment at Harbor Park

Natural & Nature-Based Features

Flood mitigation solutions that mimic natural processes



St. Paul's Blue Greenway



Ohio Creek Watershed Project Living Shoreline

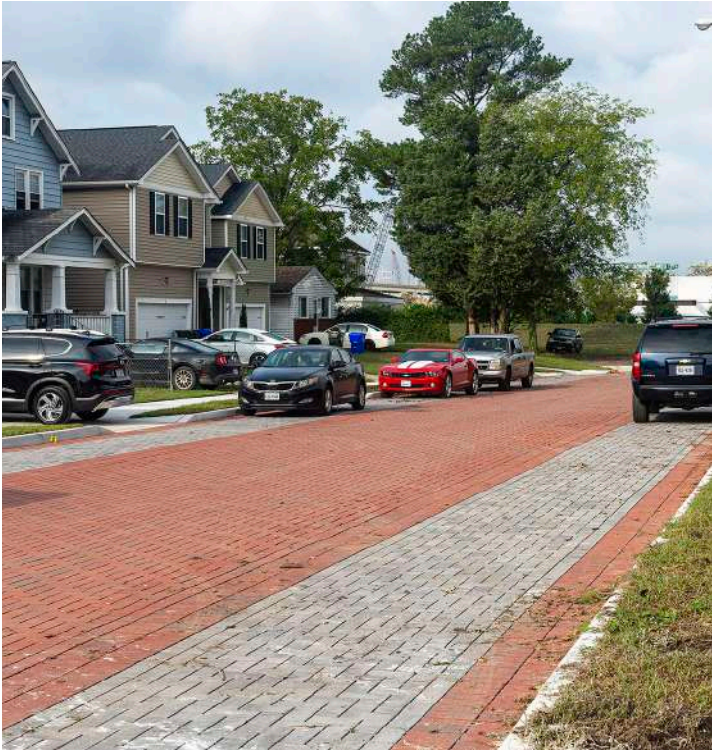


Stormwater

Managing water within the CSRM alignment



Ohio Creek Watershed Project Permeable Parking Surfaces and Pump Station



St. Paul's Blue Greenway



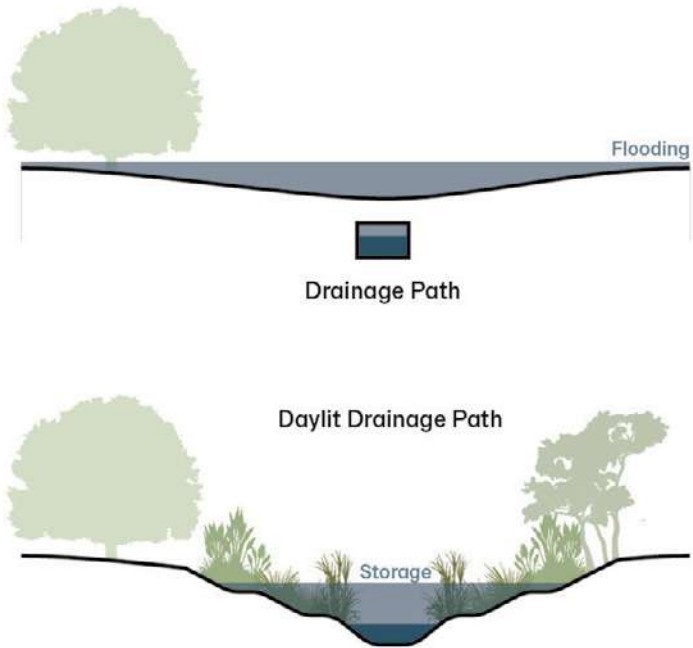
Newton's Creek Daylighting

Blue/Greenway

The Blue/Greenway is designed to mitigate flooding by replicating former natural conditions. Although now filled and long forgotten, it is possible to hypothesize the historic character of the creek based upon nearby precedents.



Broad Creek located west of Downtown Norfolk in the River Oaks neighborhood.





View Looking South from North Plaza and Weir



View Looking North from South Pedestrian Bridge and Weir

Non-Structural Projects

Focused on reducing property damage



The Elevating Homes Pattern Book

1 Identify your Flood Zone & Elevation.

- Refer to NorfolkAIR & FIRM Maps
- Determine the BFE & DFE and Freeboard levels for your district
- Set your target elevation

2 Identify your Needs.

- Evaluate Style & Structure.
- Additional site needs - parking, storage, etc.
- Maintain connection to the street and sidewalk levels

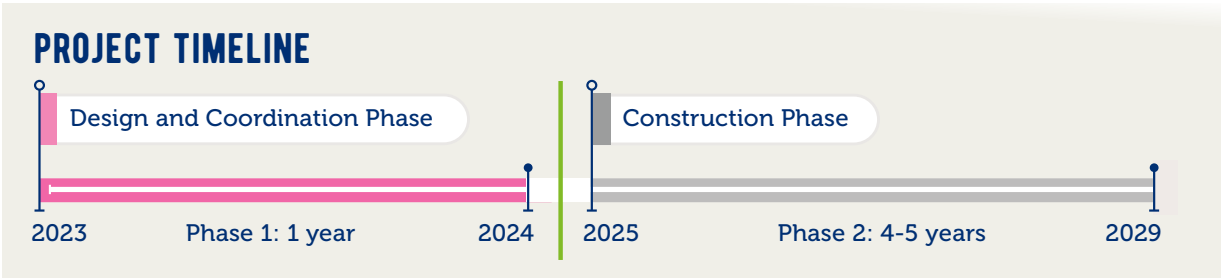
3 Identify your Character District.

- Refer to NorfolkAIR.
- Traditional District
- Downtown District
- Suburban District
- Coastal District

4 Use the Kit of Parts.

- Select your new foundation type.
- Select new access paths and strategies.
- Determine if your existing structure requires any infill or detail changes due to elevation.
- Determine if you are retrofitting porches and/or accessory structures.
- Select site treatment, improvements, and landscape patterns.

5 Assemble Parts to Create a Whole.

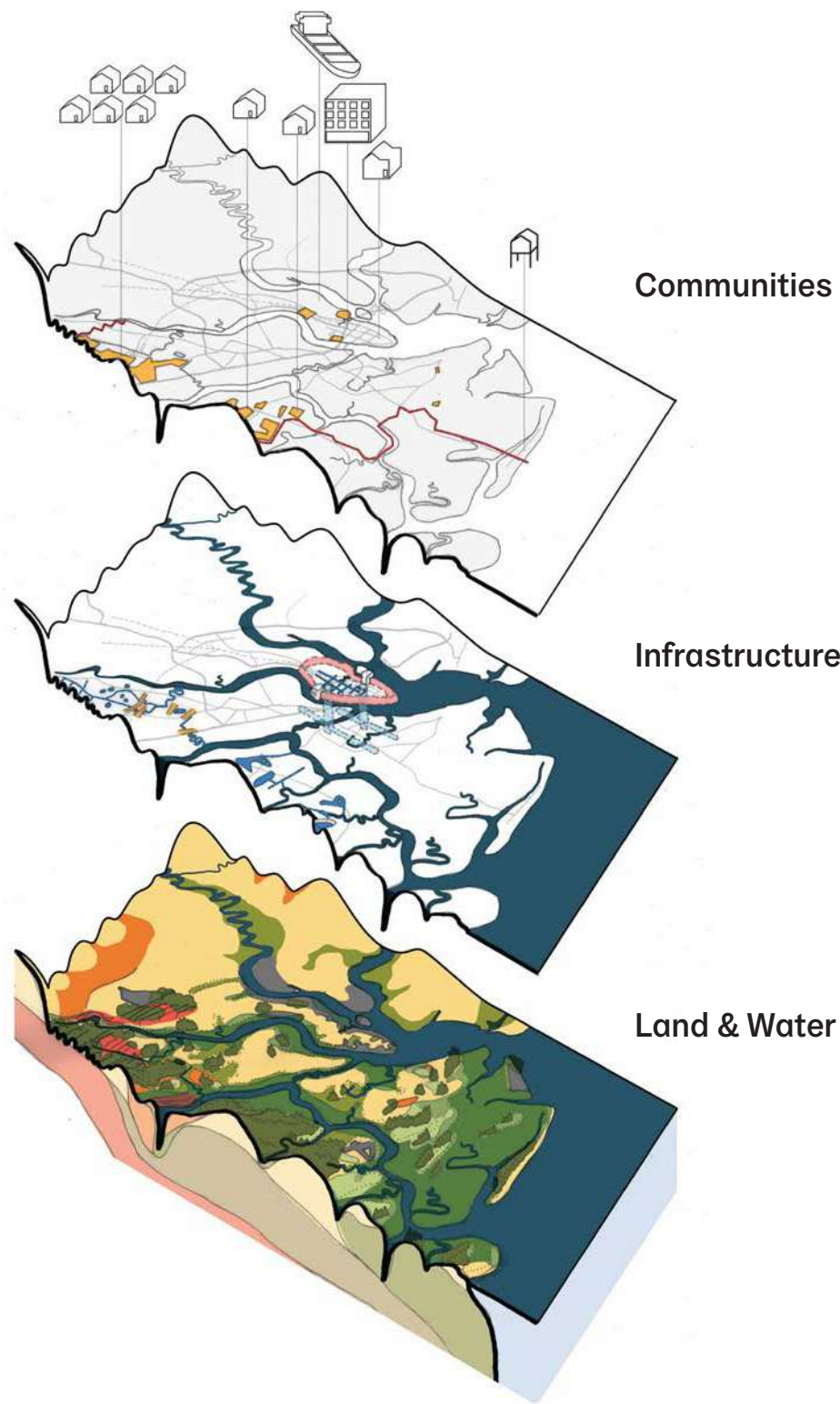


Charleston

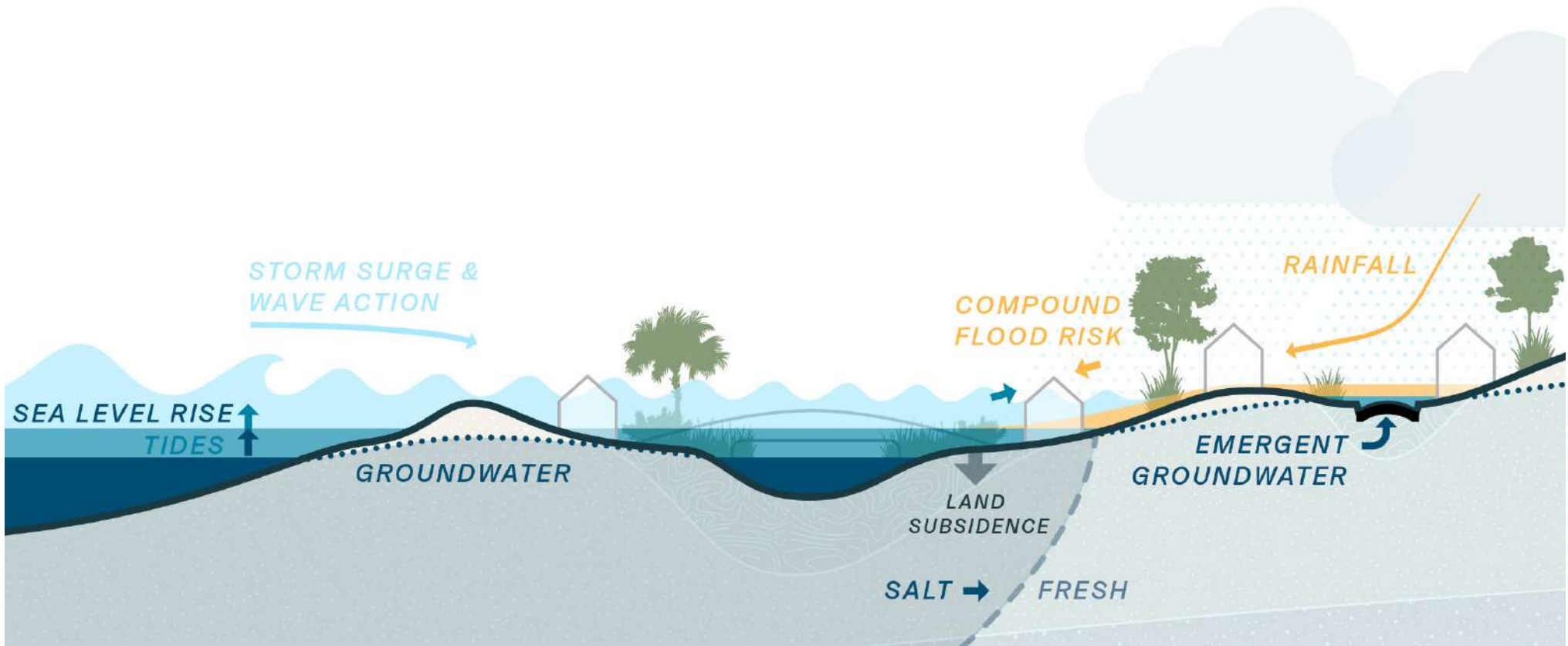


Charleston Water Plan

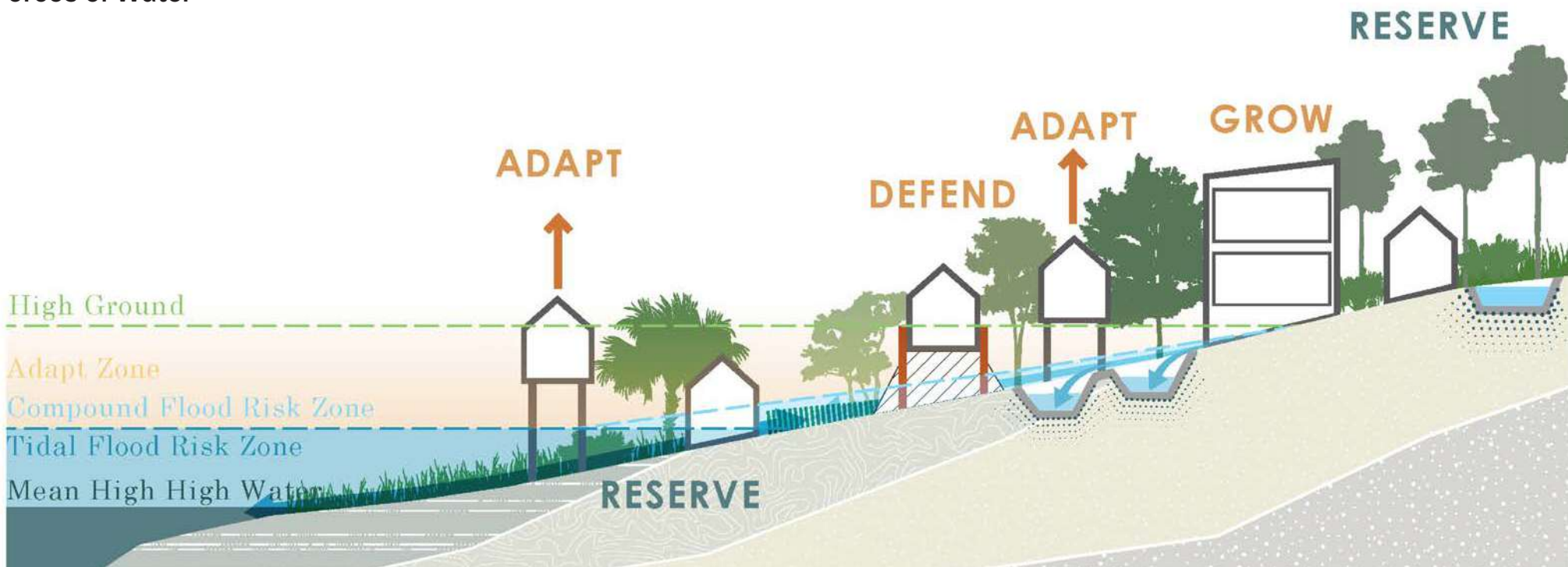
A Foundational Strategy for Managing Flood Risks and Embracing Water’s Place in the City’s Future



Layered Planning



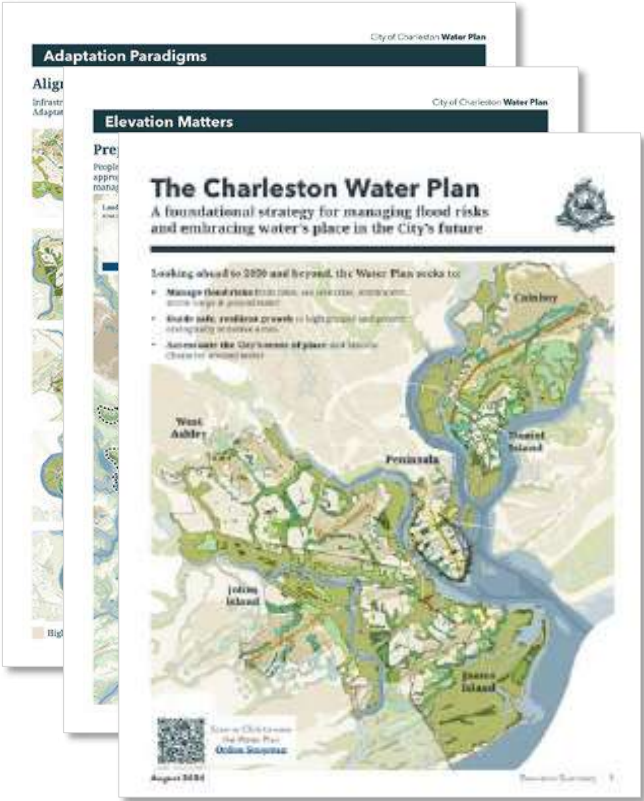
Forces of Water



Elevation-based Planning

Charleston Water Plan

A Foundational Strategy for Managing Flood Risks and Embracing Water’s Place in the City’s Future



The Charleston Water Plan outlines strategies & projects to manage future flood risks, ensuring the City’s long-term resilience and sustainability through proactive & inclusive measures.

[illegible]

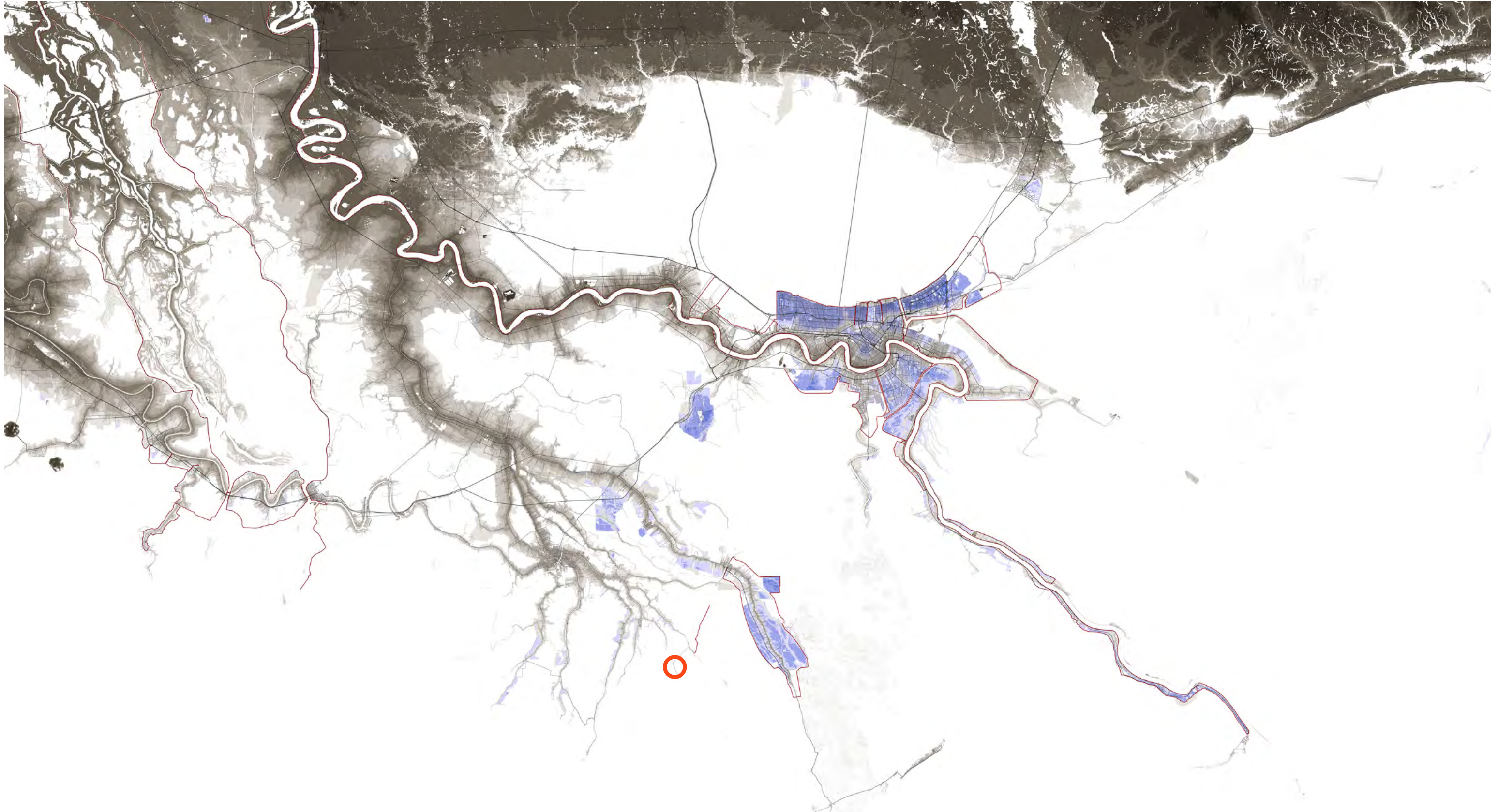
Coastal Condition

Louisiana



Louisiana: High + Low Landscape

Water and wetlands removed. Areas below sea level are shown in purple.



DATA SOURCE: USGS / MAP CREDIT: WAGGONER & BALL ARCHITECTURE/ENVIRONMENT

Lines of Defense

Mississippi Delta



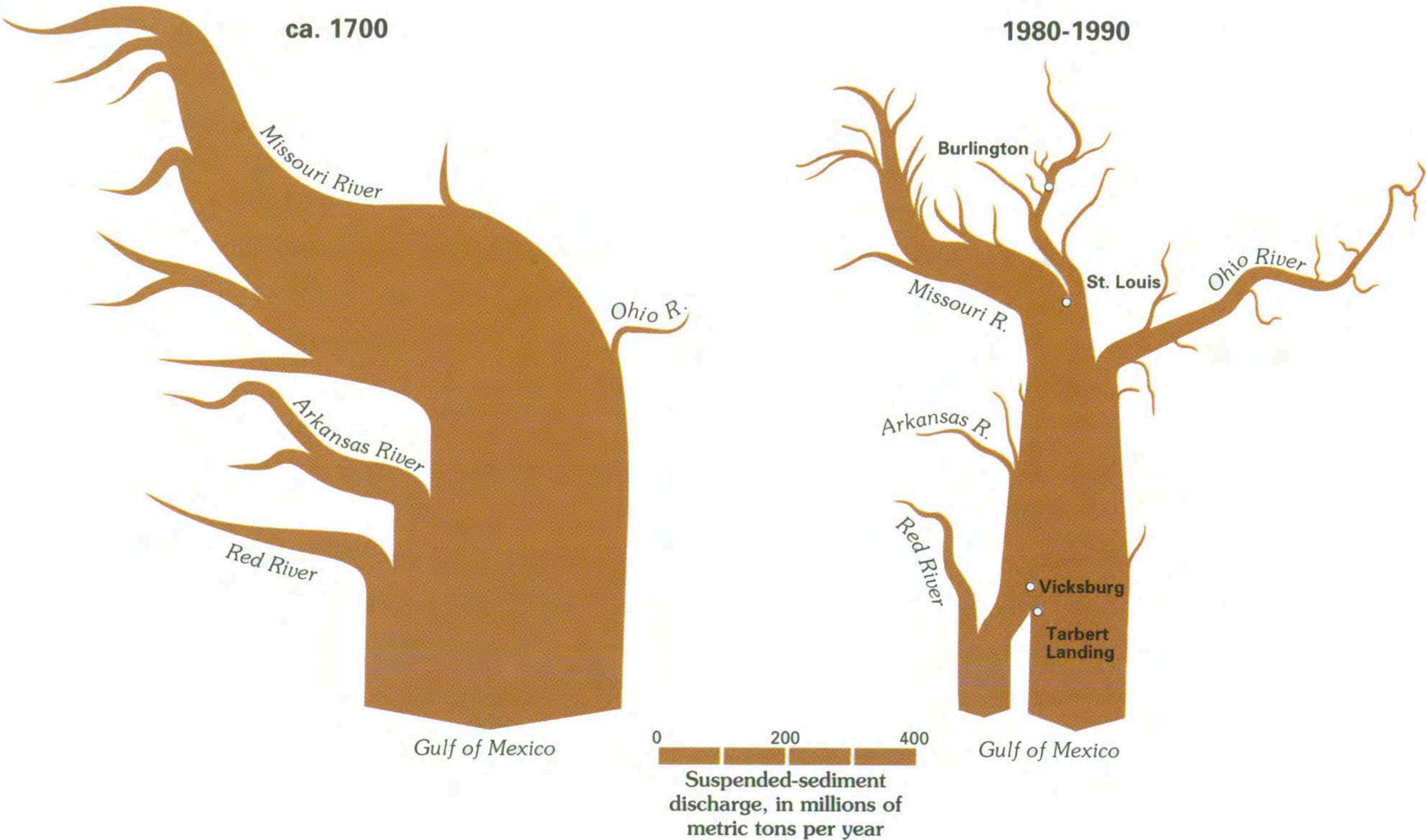
Lines of Defense

Mississippi Delta



Sediment Discharge

Missouri River and Mississippi River



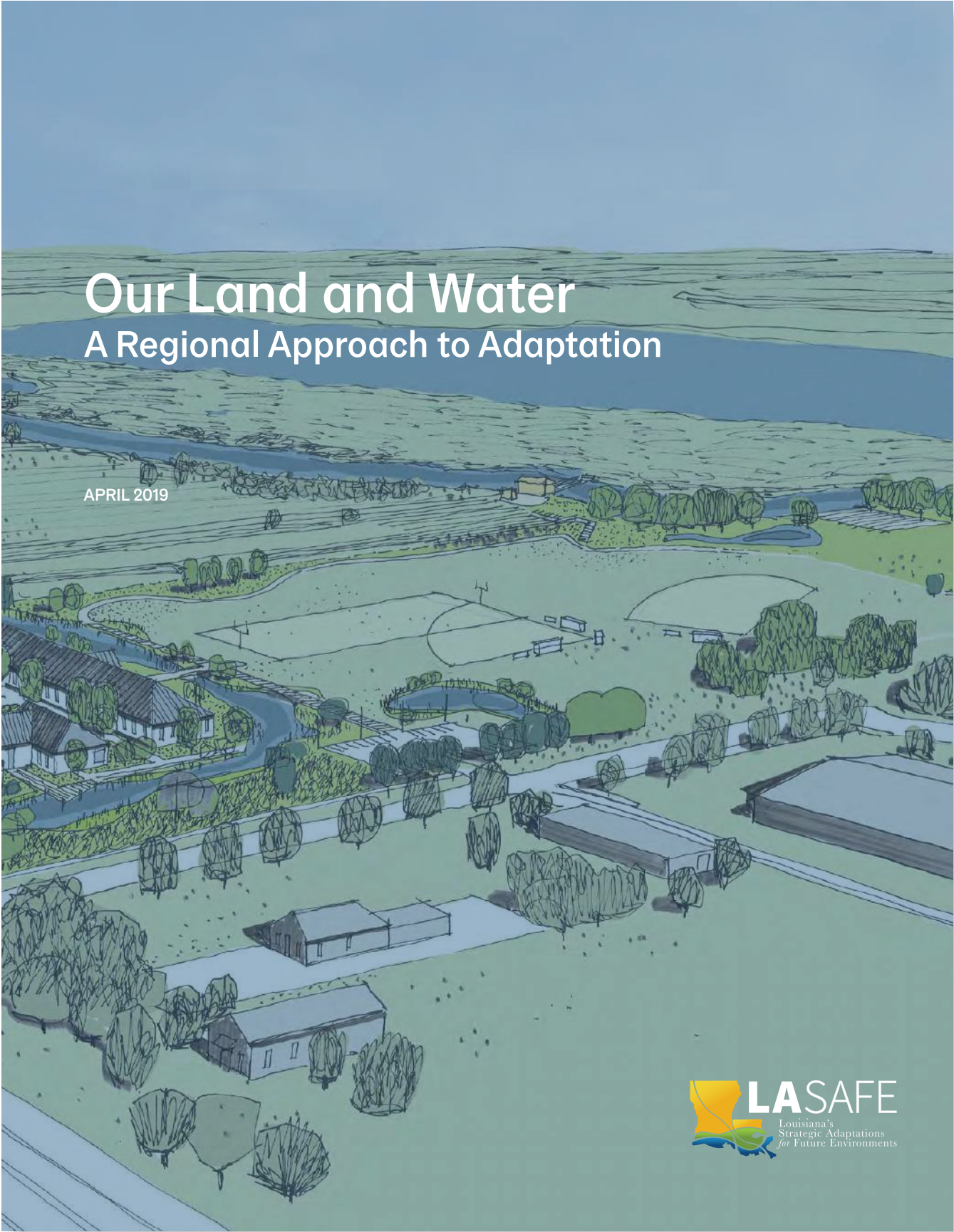
source: U.S. Geological Survey

Wetland Loss

Louisiana



source: Monique Verdín





Goal 1: Manage Flooding and Subsidence



Goal 2: Direct Growth to Low Risk Areas



Goal 3: Improve Mobility throughout the Parish and Region



Goal 4: Strengthen and Diversify Local Economies



Goal 5: Protect and Promote Historic and Cultural Assets

Coastal Condition, 1820

LA SAFE



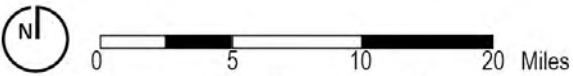
Sources: David Rumsey Map Collection
US Census TIGER/Line 2010, USGS National Hydrography Dataset, NOAA, Atlas: The Louisiana Statewide GIS, Esri, TomTom, Tele Atlas North America, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coastal Condition, 1960

LA SAFE



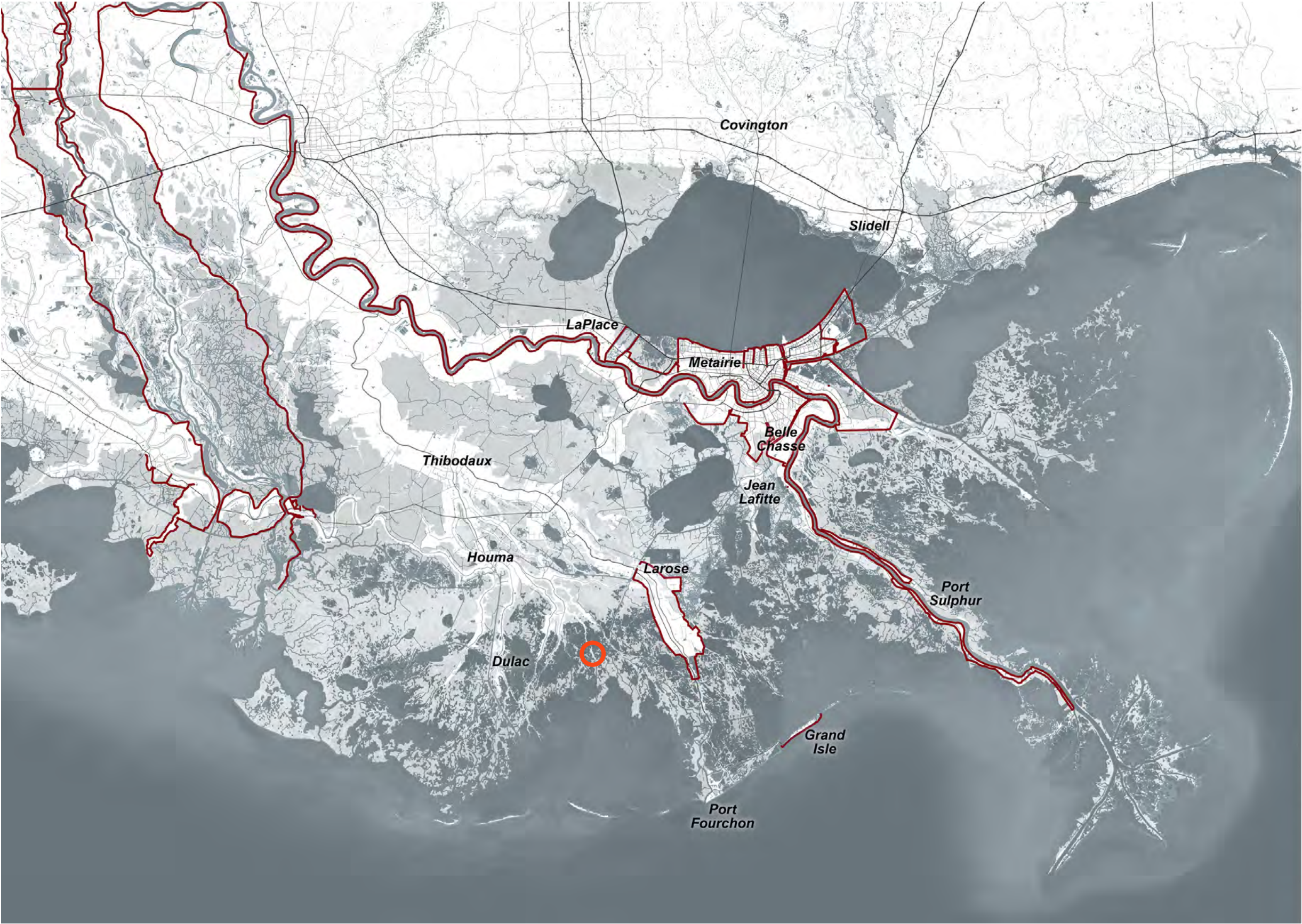
- Water
- Wetlands
- Levees



Sources: CPRA Coastal Master Plan 2017 and USGS
US Census TIGER/Line 2010, USGS National Hydrography Dataset, NOAA,
Atlas: The Louisiana Statewide GIS, Esri, TomTom, Tele Atlas North America,
DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,
AeroGRID, IGN, and the GIS User Community

Coastal Condition, 2017

LA SAFE



- Water
- Wetlands
- Levees



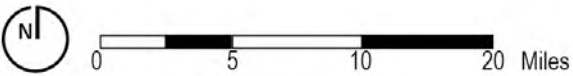
Sources: CPRA Coastal Master Plan 2017 and USGS
US Census TIGER/Line 2010, USGS National Hydrography Dataset, NOAA,
Atlas: The Louisiana Statewide GIS, Esri, TomTom, Tele Atlas North America,
DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,
AeroGRID, IGN, and the GIS User Community

Coastal Condition, 2067 (No Action)

LA SAFE



- Water
- Wetlands
- Wetlands Created
- Levees



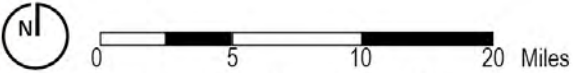
Sources:
US Census TIGER/Line 2010, USGS National Hydrography Dataset, NOAA, Atlas: The Louisiana Statewide GIS, Esri, TomTom, Tele Atlas North America, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coastal Condition, 2067 (With Action)

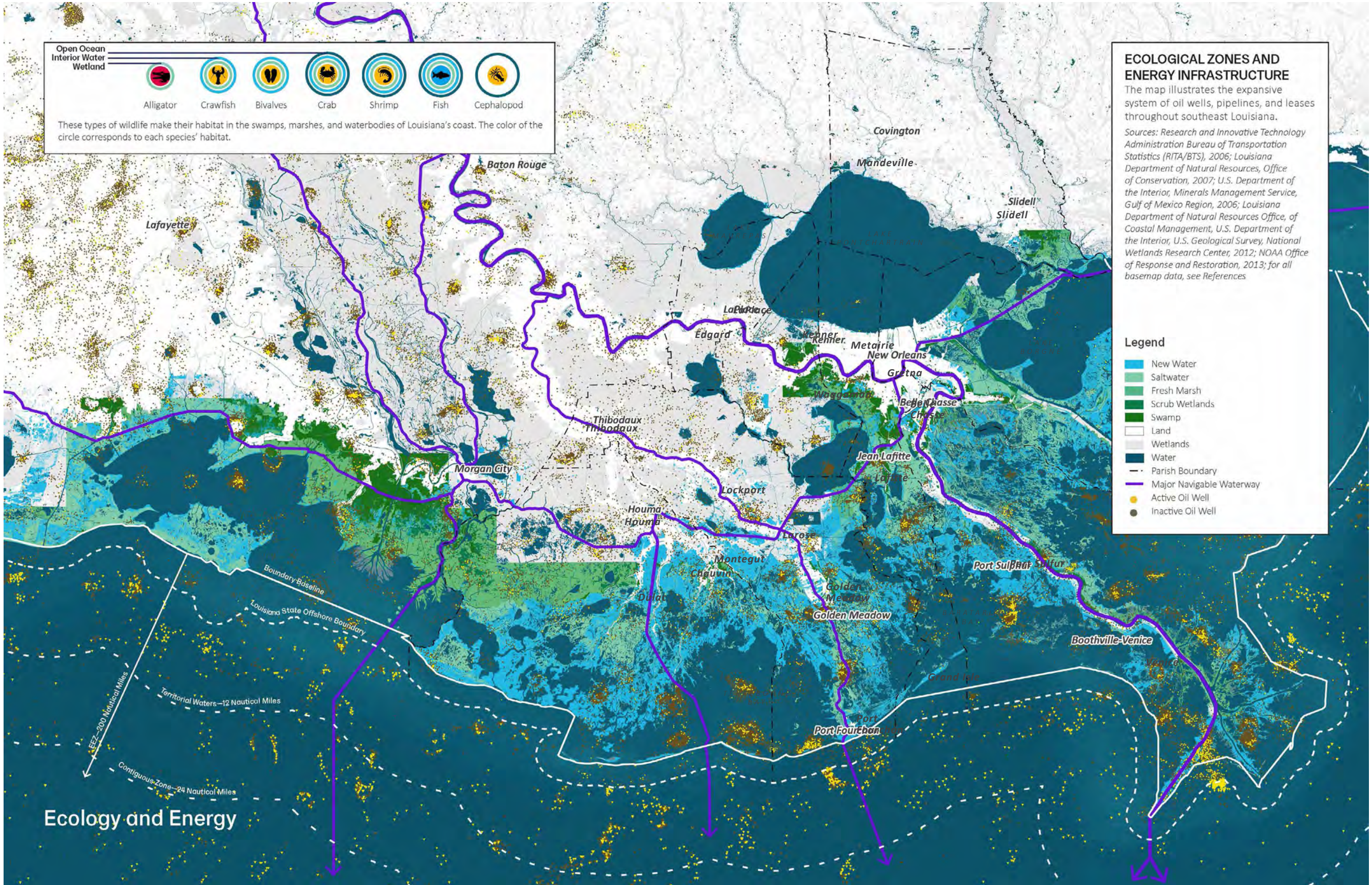
LA SAFE



- Water
- Wetlands
- Wetlands Sustained
- Wetlands Created
- Levees
- CPRA Proposed Levees



Sources: CPRA Coastal Master Plan 2017 and USGS
US Census TIGER/Line 2010, USGS National Hydrography Dataset, NOAA,
Atlas: The Louisiana Statewide GIS, Esri, TomTom, Tele Atlas North America,
DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,
AeroGRID, IGN, and the GIS User Community



Low Risk

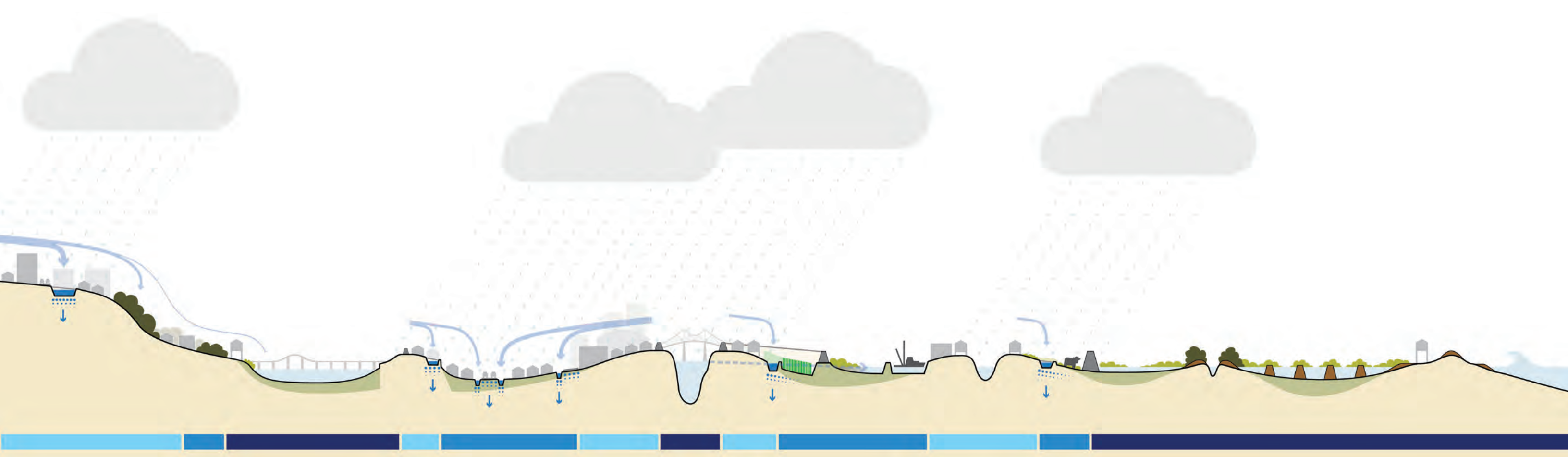
Minimal storm surge flood risk projected and outside the current 100-year floodplain

Moderate Risk

>0 – 6' projected storm surge flood depths or within the current 100-year floodplain

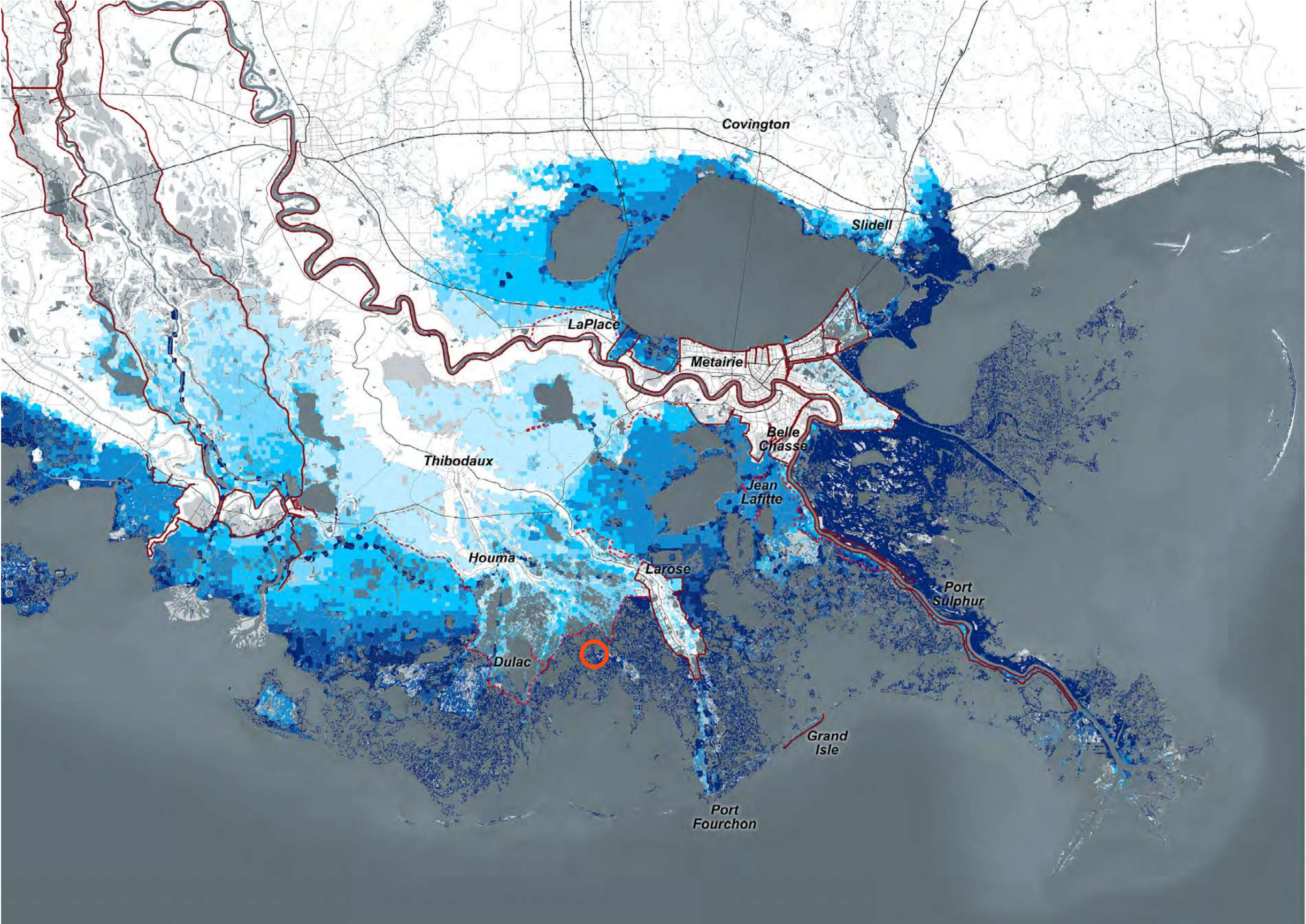
High Risk

>6' projected storm surge flood depths

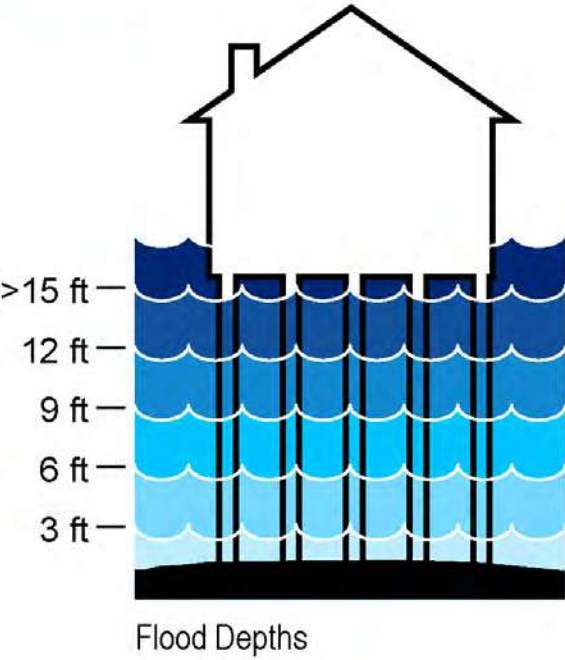


Flood Risk, 2067 (With Action)

LA SAFE



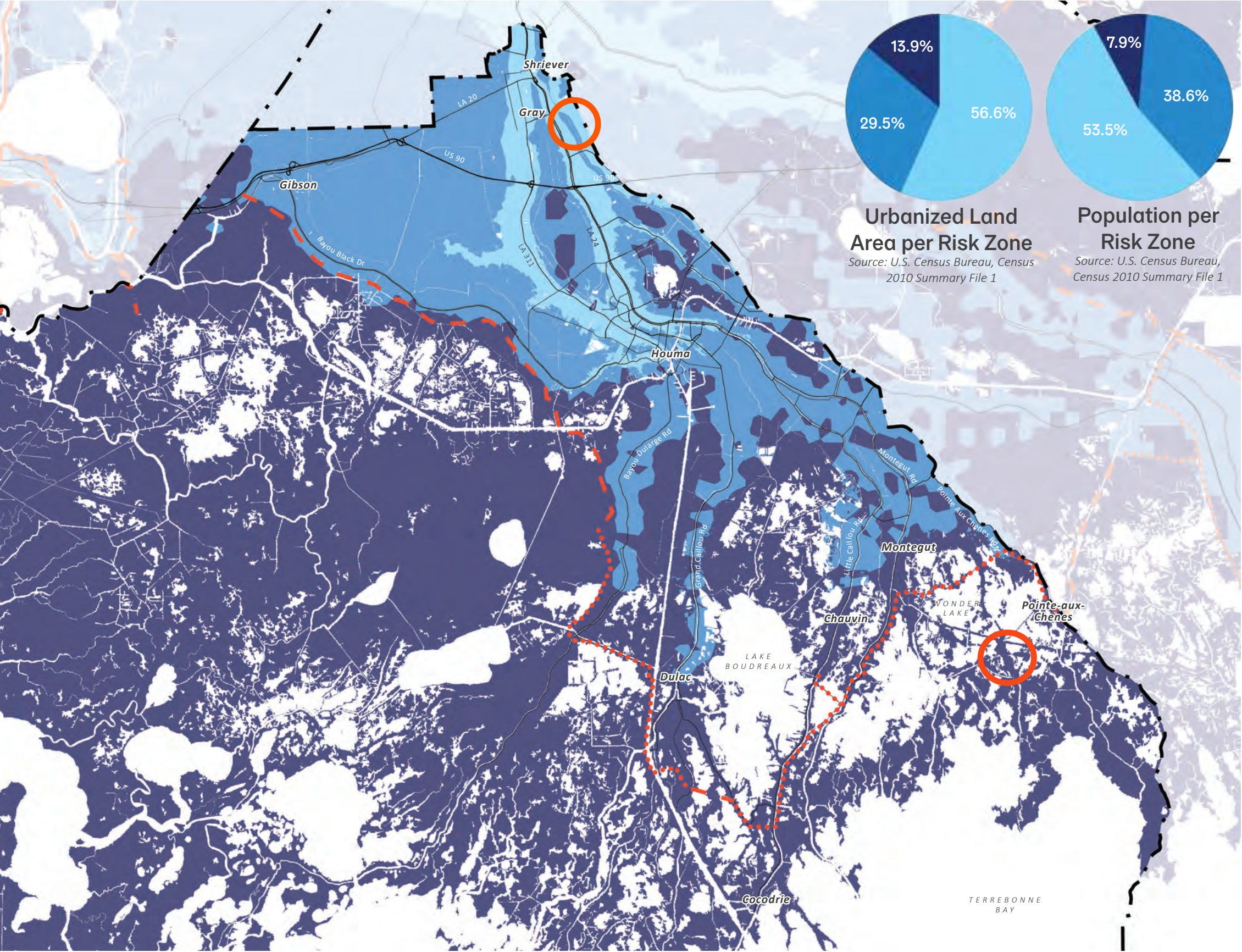
- Water
- Wetlands
- Levees
- CPRA Proposed Levees



Sources: CPRA Coastal Master Plan 2017 and USGS
US Census TIGER/Line 2010, USGS National Hydrography Dataset, NOAA,
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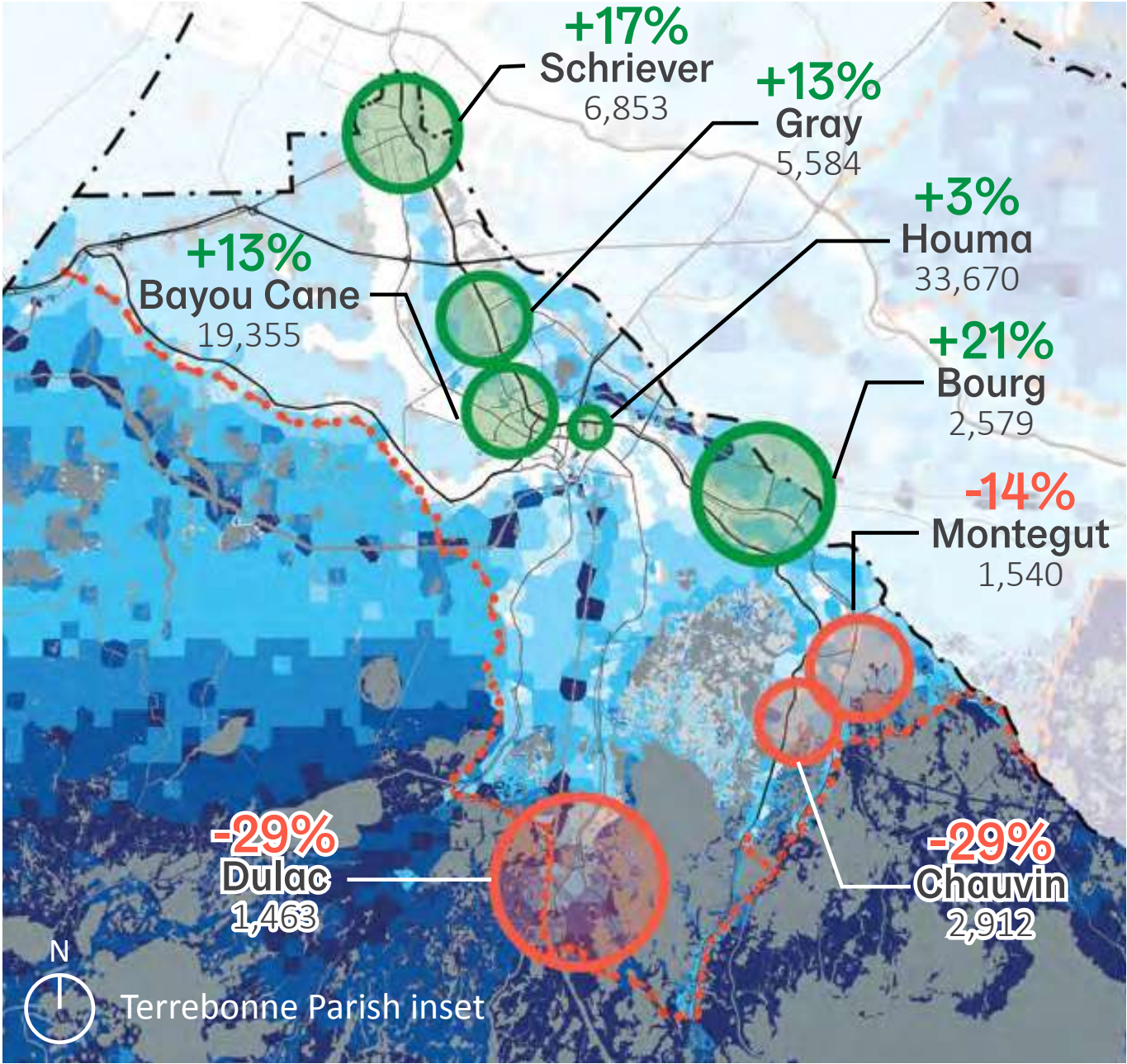
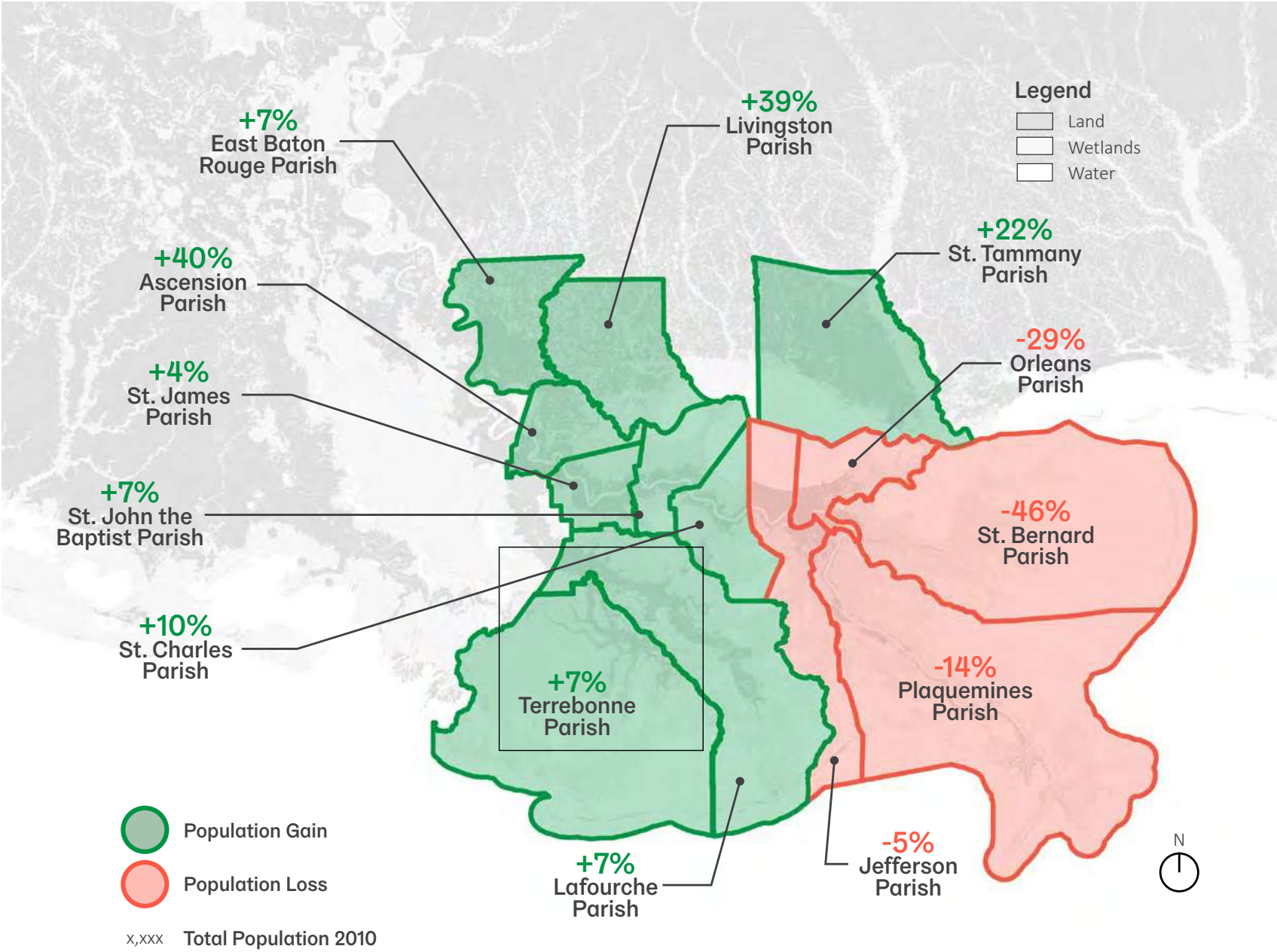
Combined Flood Risk Zones

LA SAFE - Terrebonne Parish



Shifting Populations 2000-2010

LA SAFE



An aerial photograph of a coastal area, likely in Louisiana, showing extensive flooding. A road runs diagonally across the frame, with some buildings and trees visible along its path. The surrounding land is mostly submerged in water, with some patches of vegetation still visible. The sky is overcast with dark clouds. A large red rectangular overlay is positioned in the upper left corner, containing the text 'LASAFE Community Resettlement' in white.

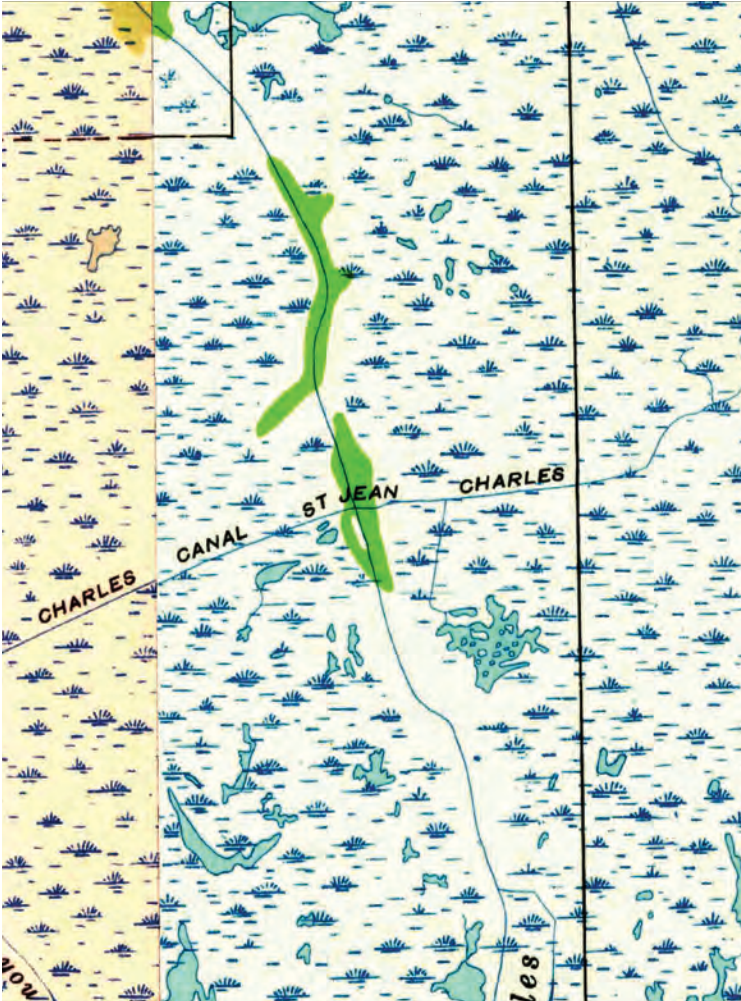
LASAFE Community Resettlement



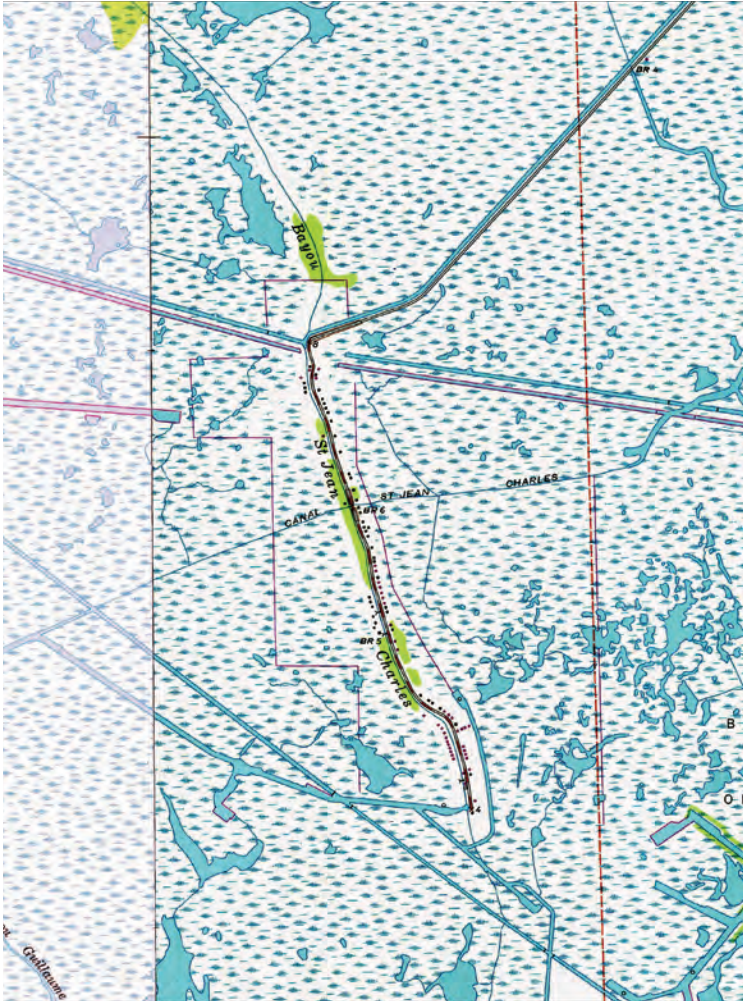
Historic Landscape



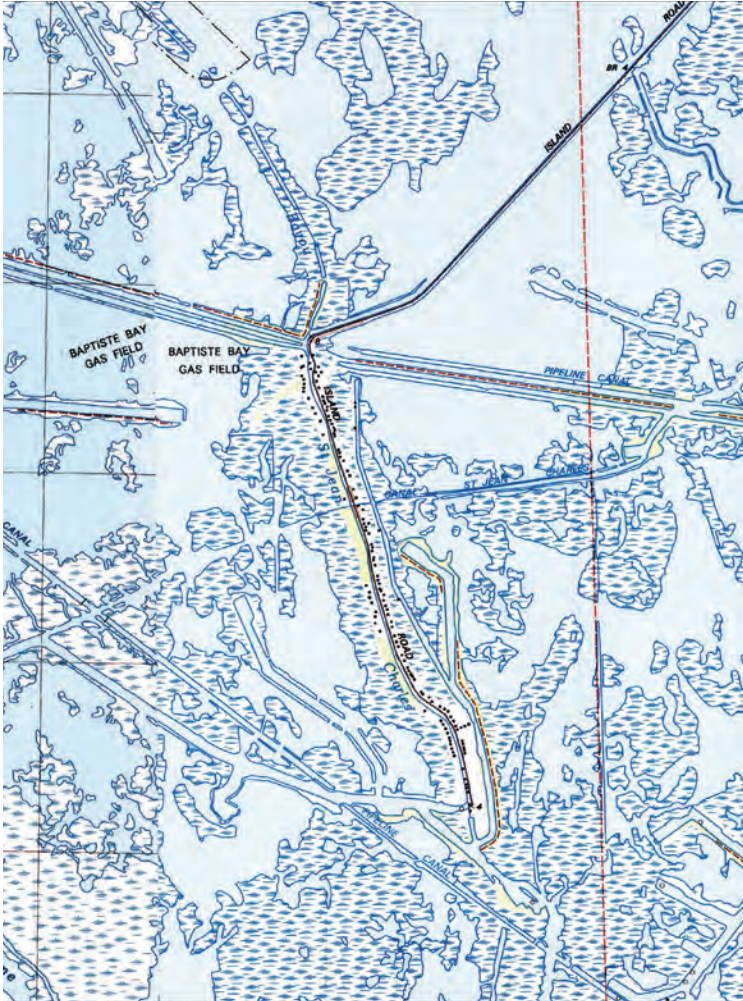
Wetland Loss



1939



1979



1998



2018

Island Road



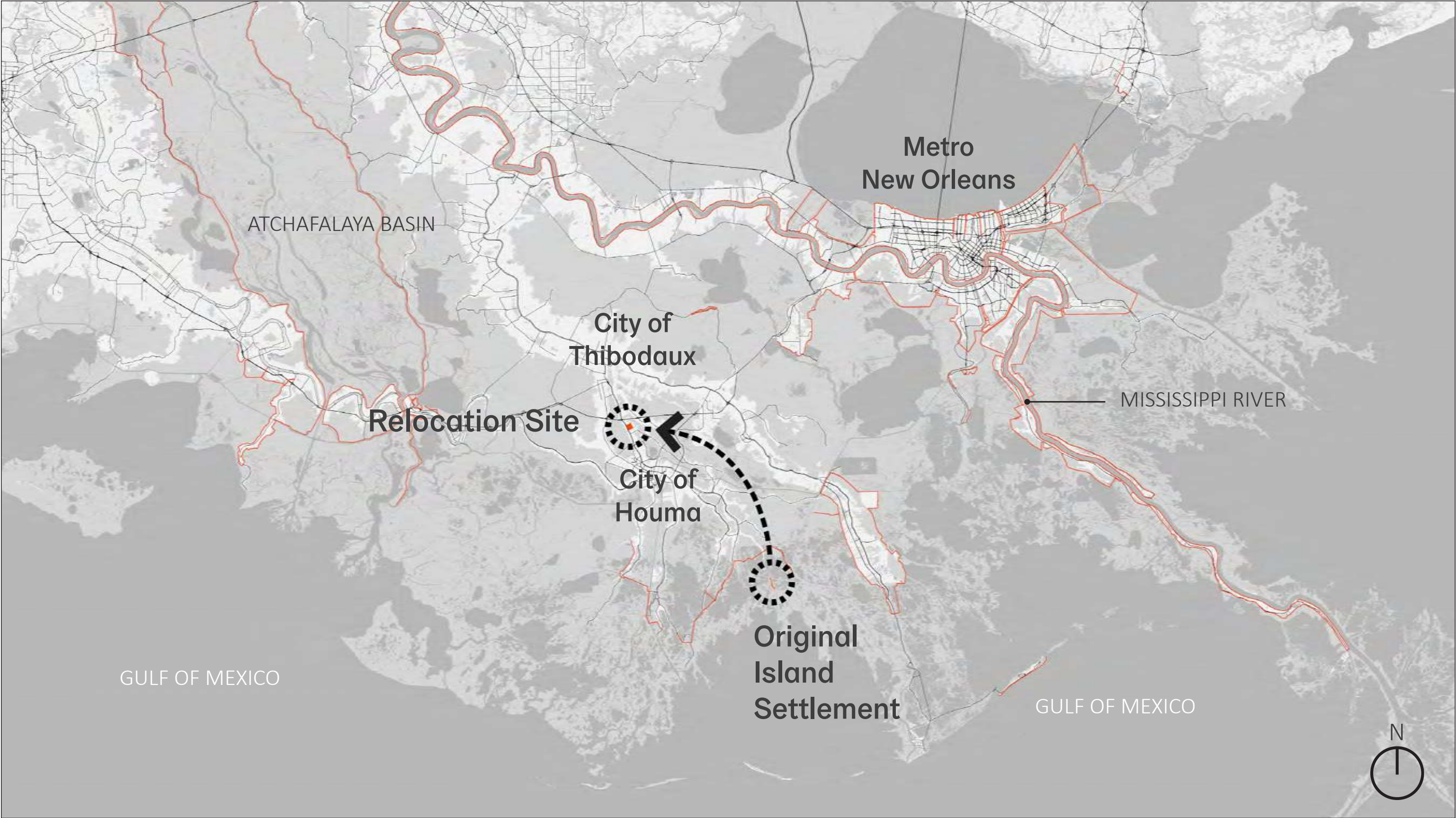
source: OLIN

Housing



Housing









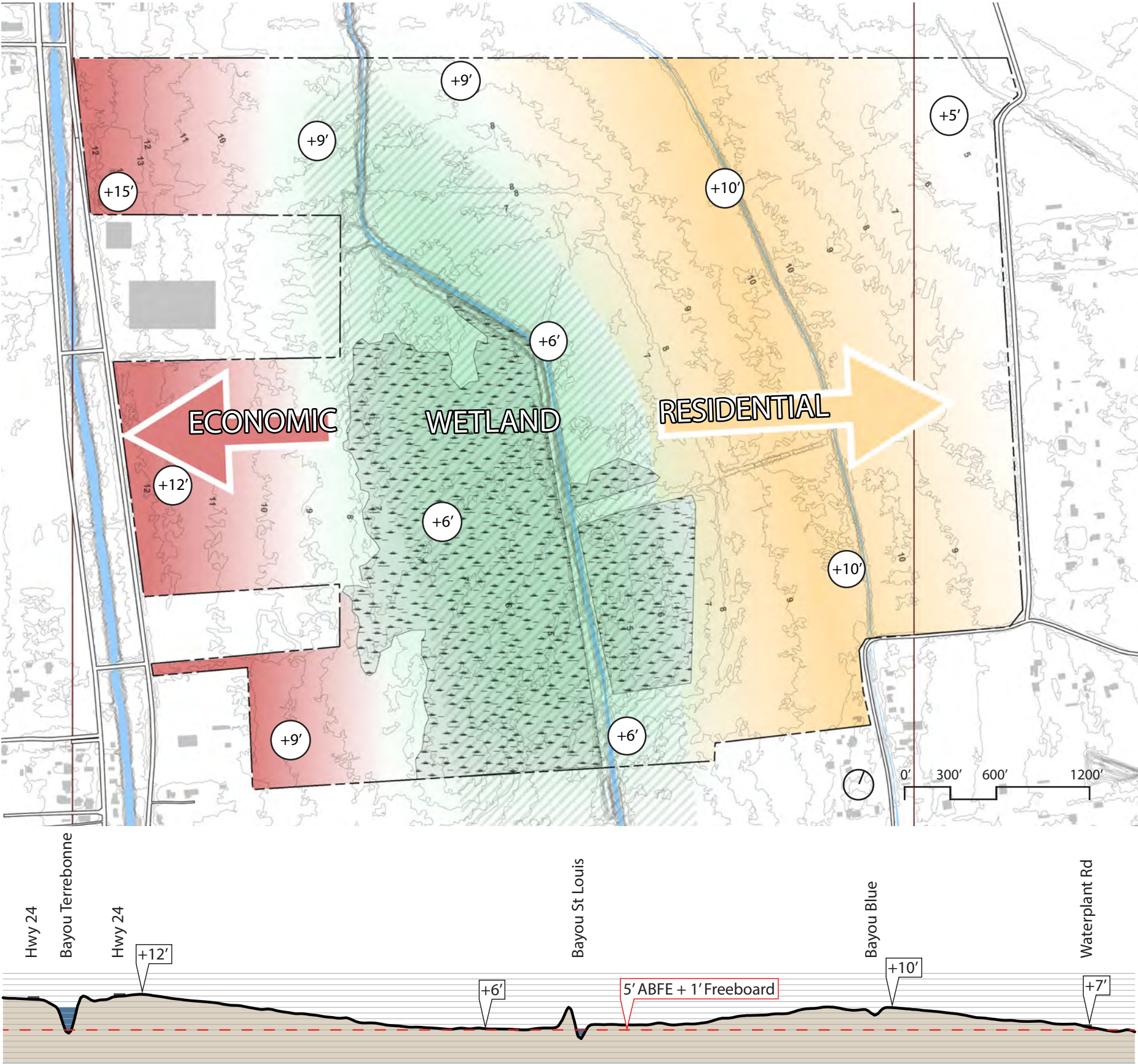




Community Workshops

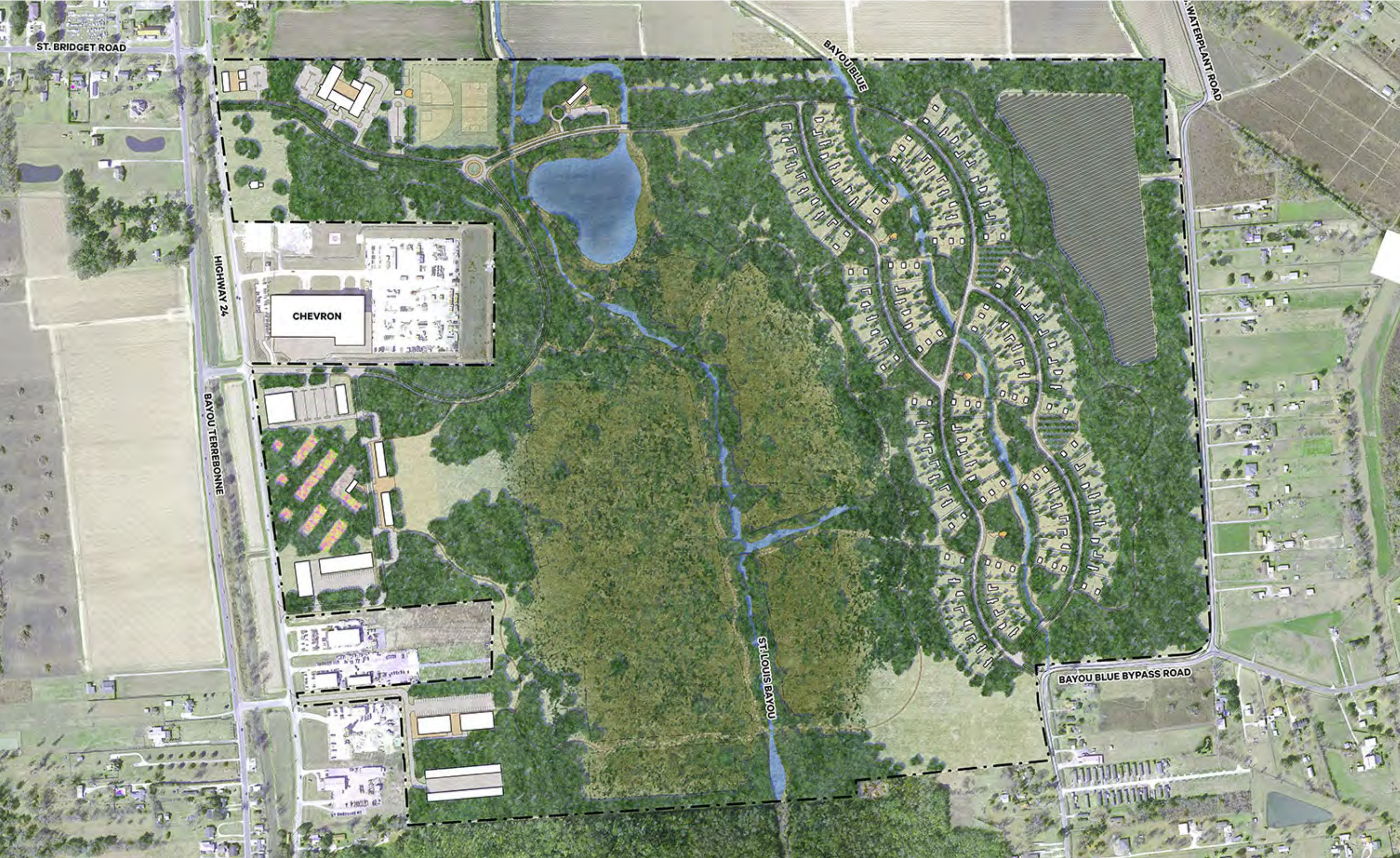


Site Approach

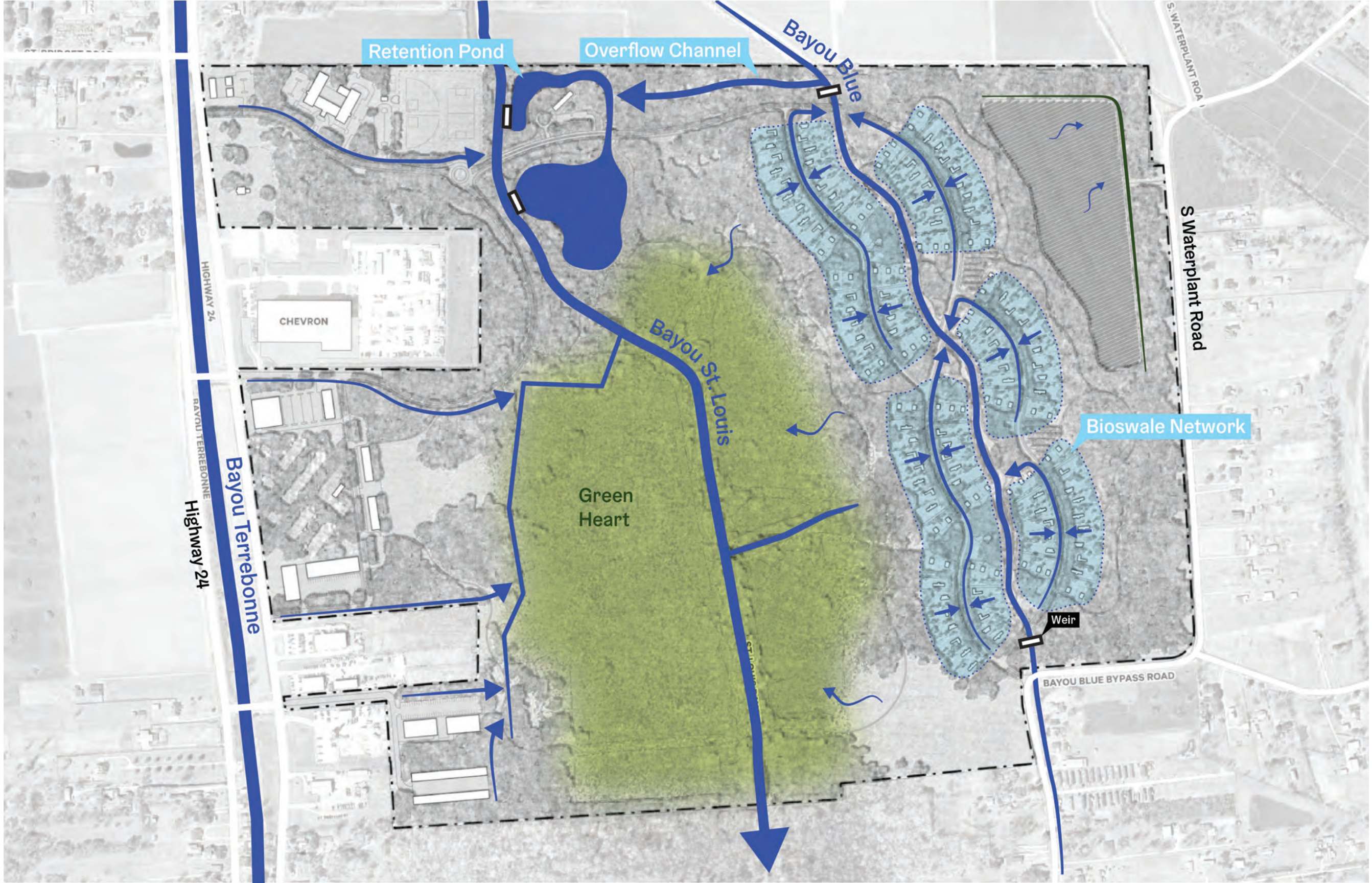


WETLAND PLANTS WILL BE A NATURAL BUFFER BETWEEN ECONOMIC AND RESIDENTIAL AREAS.

New Isle Plan



New Isle Hydrology



Commercial Buildings







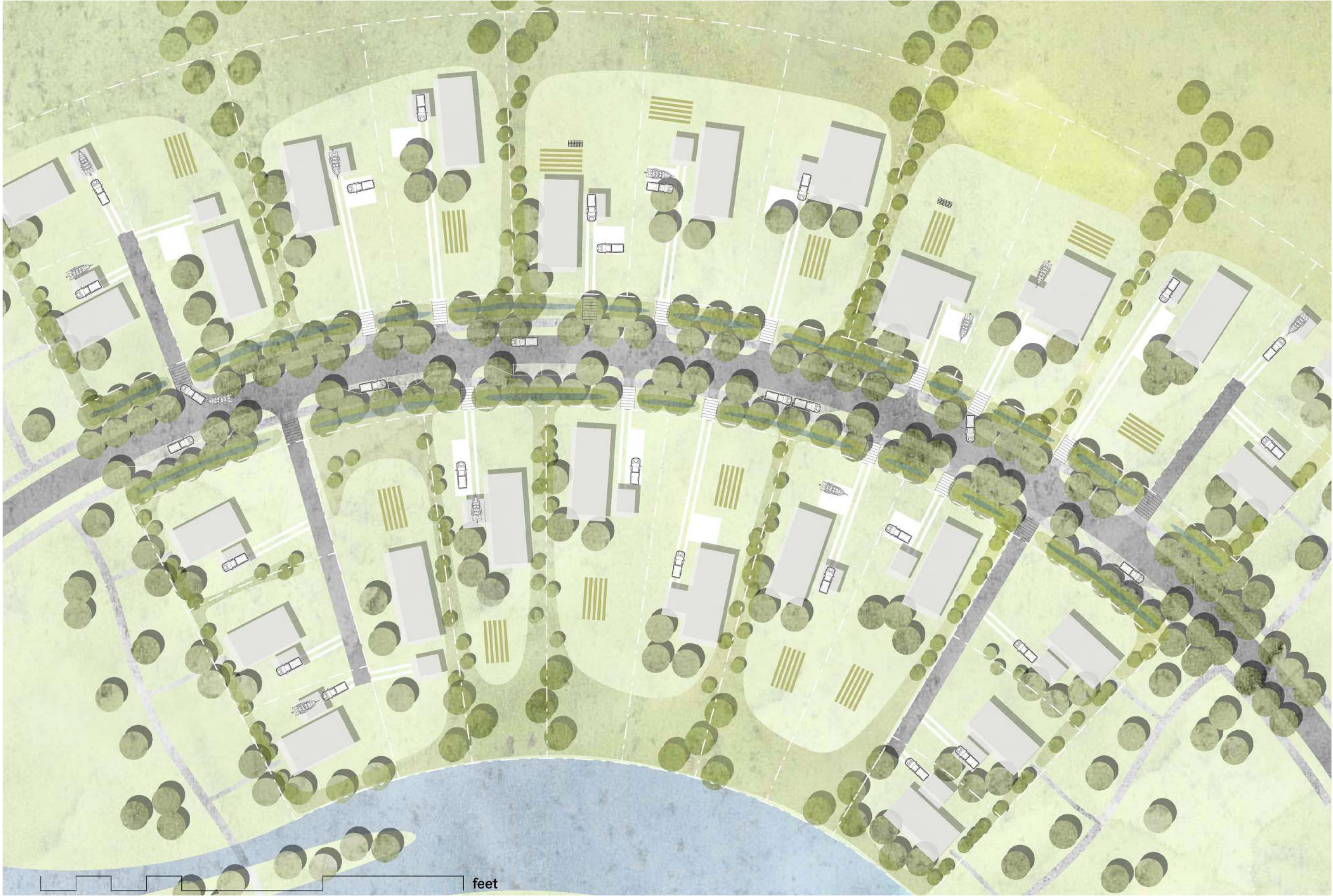




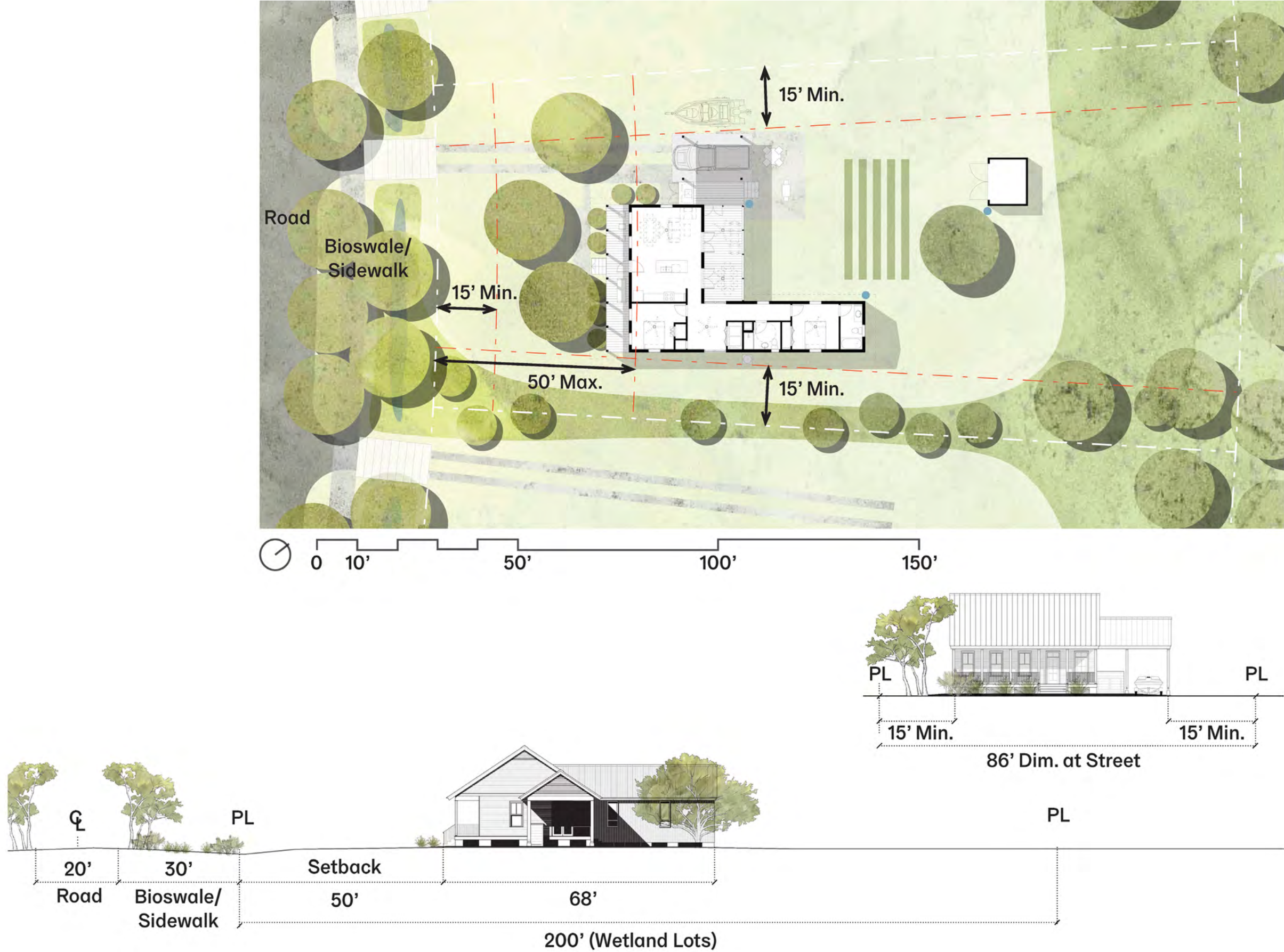




Residential Petal Plan





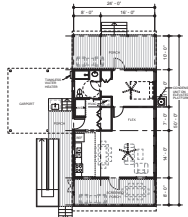
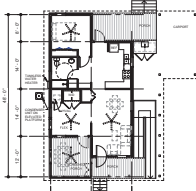
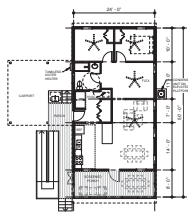
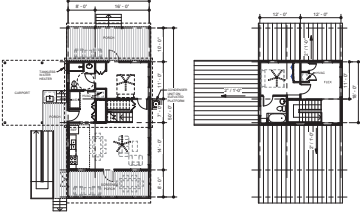
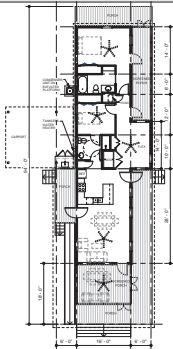
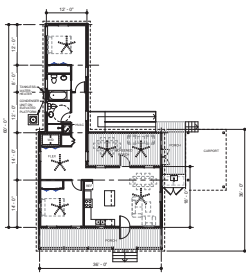
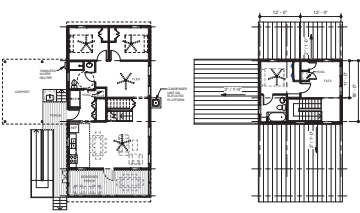
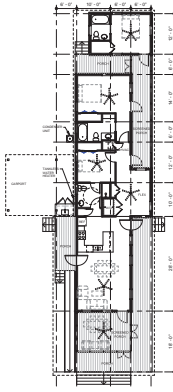
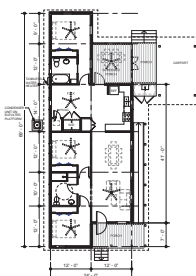
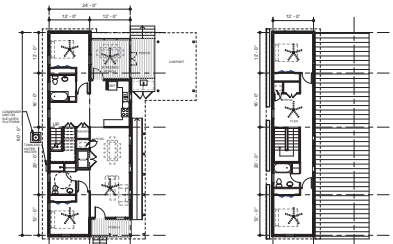
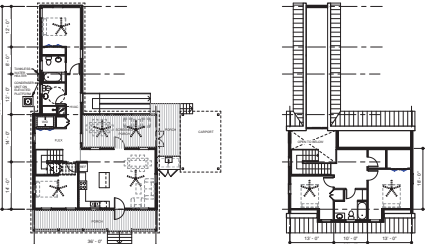


Residential Lot Design



Housing Matrix



Types Size				
1-Bed	 818 SF		 898 SF	
2-Bed	 1067 SF	 1st Floor 2nd Floor 1294 SF	 1271 SF	 1216 SF
3-Bed		 1st Floor 2nd Floor 1552 SF	 1514 SF	 1401 SF
4-Bed			 1st Floor 2nd Floor 2018 SF	 1st Floor 2nd Floor 1891 SF



Porches



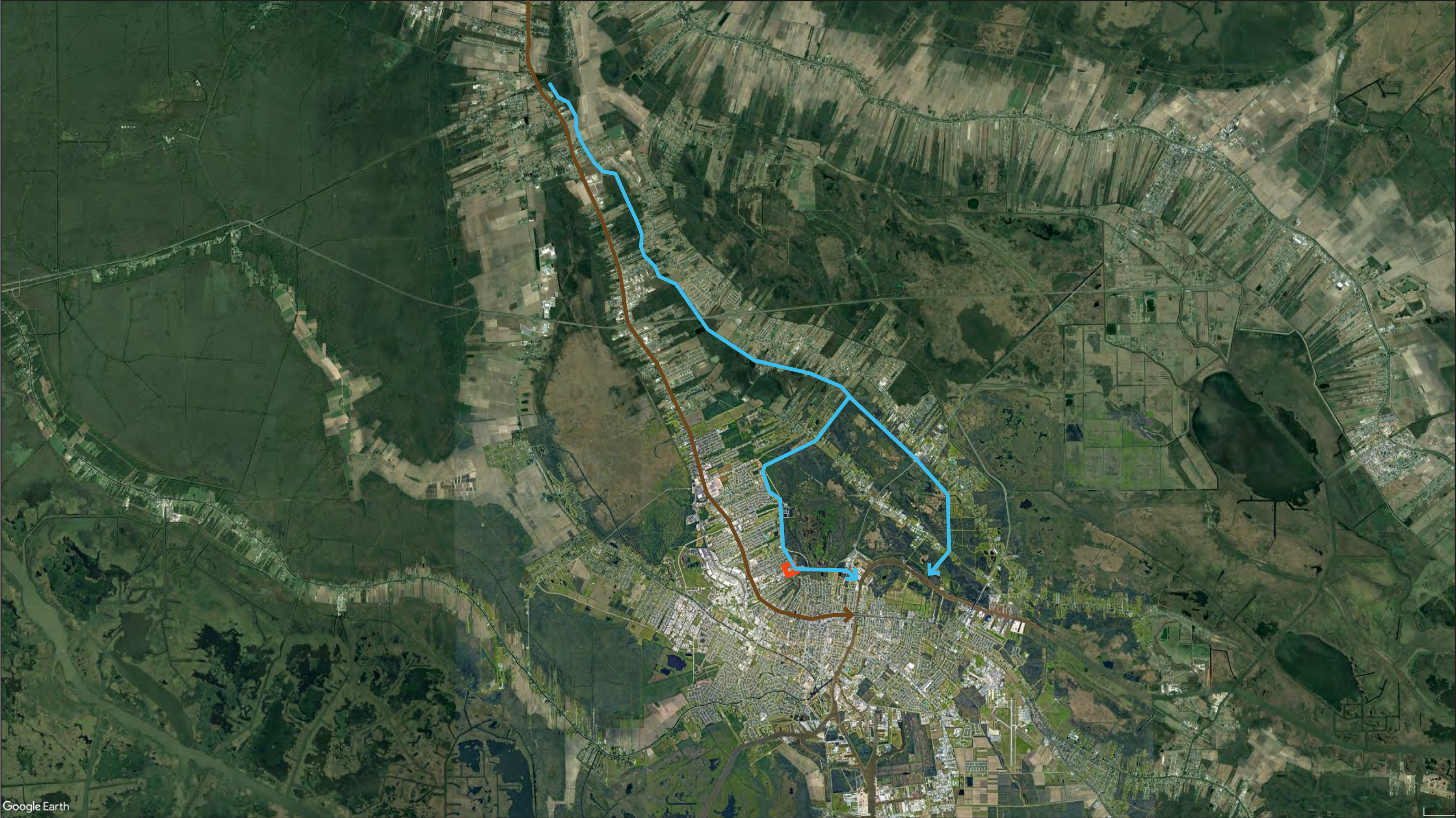






Residential Street







Existing Conditions



Existing Conditions



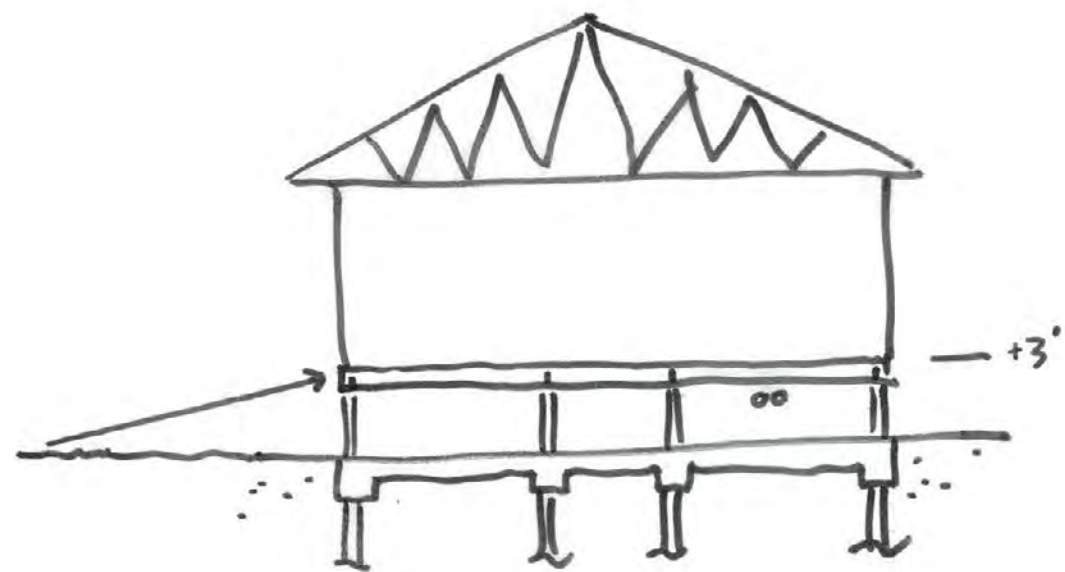
Existing Conditions



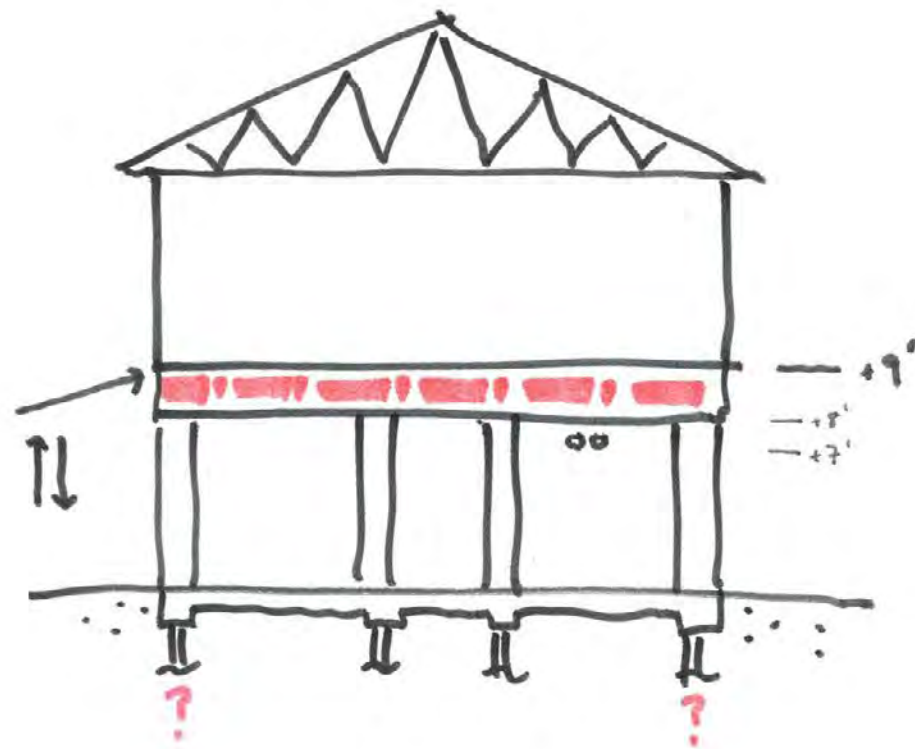
Existing Conditions



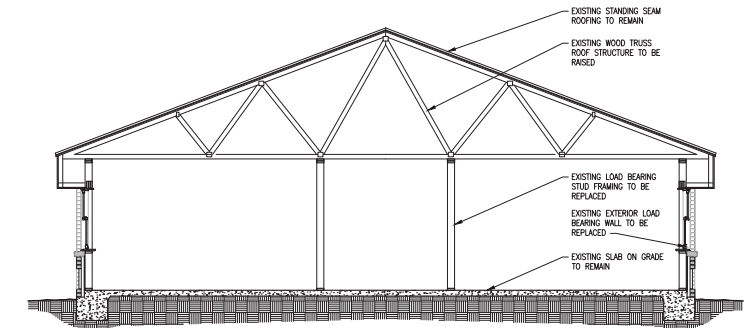
United Houma Nation Tribal Headquarters



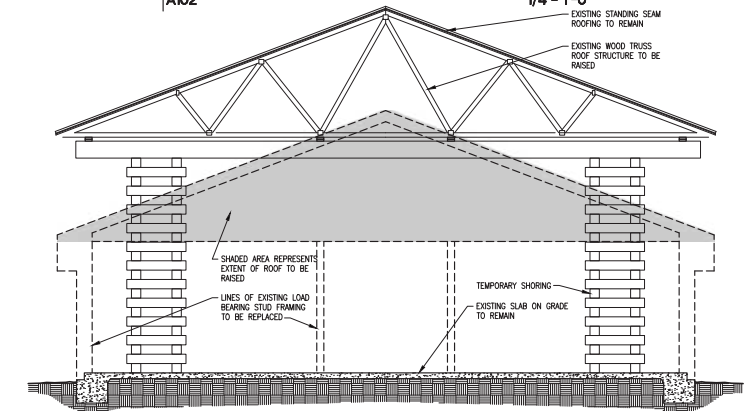
- Residential construction
- Wide range of contractors
- Structure aligns with existing foundation
- Accessible by ramp (~ 50' ramp)



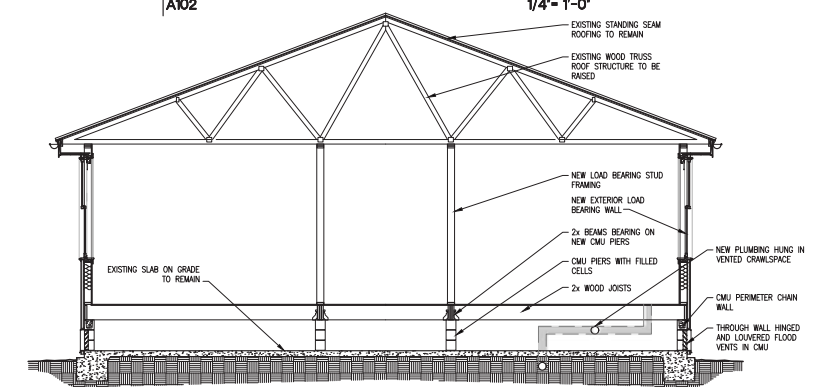
- Fire separated construction
- Commercial / Specialty contractors
- Foundation bearing points TBD
- Requires elevators / lifts (~ 200' ramp)



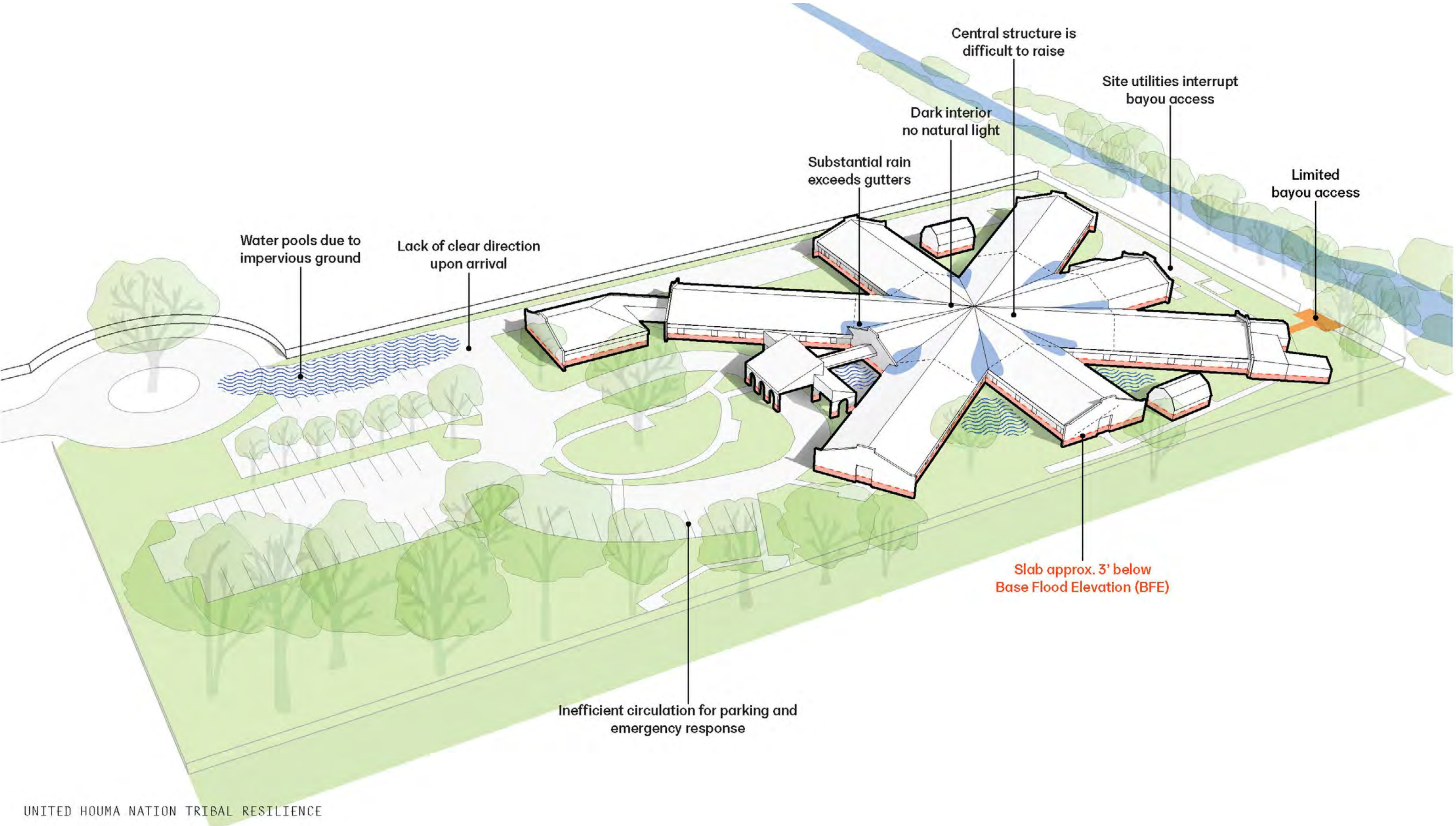
2 SECTION - EXISTING CONDITION
1/4" = 1'-0"



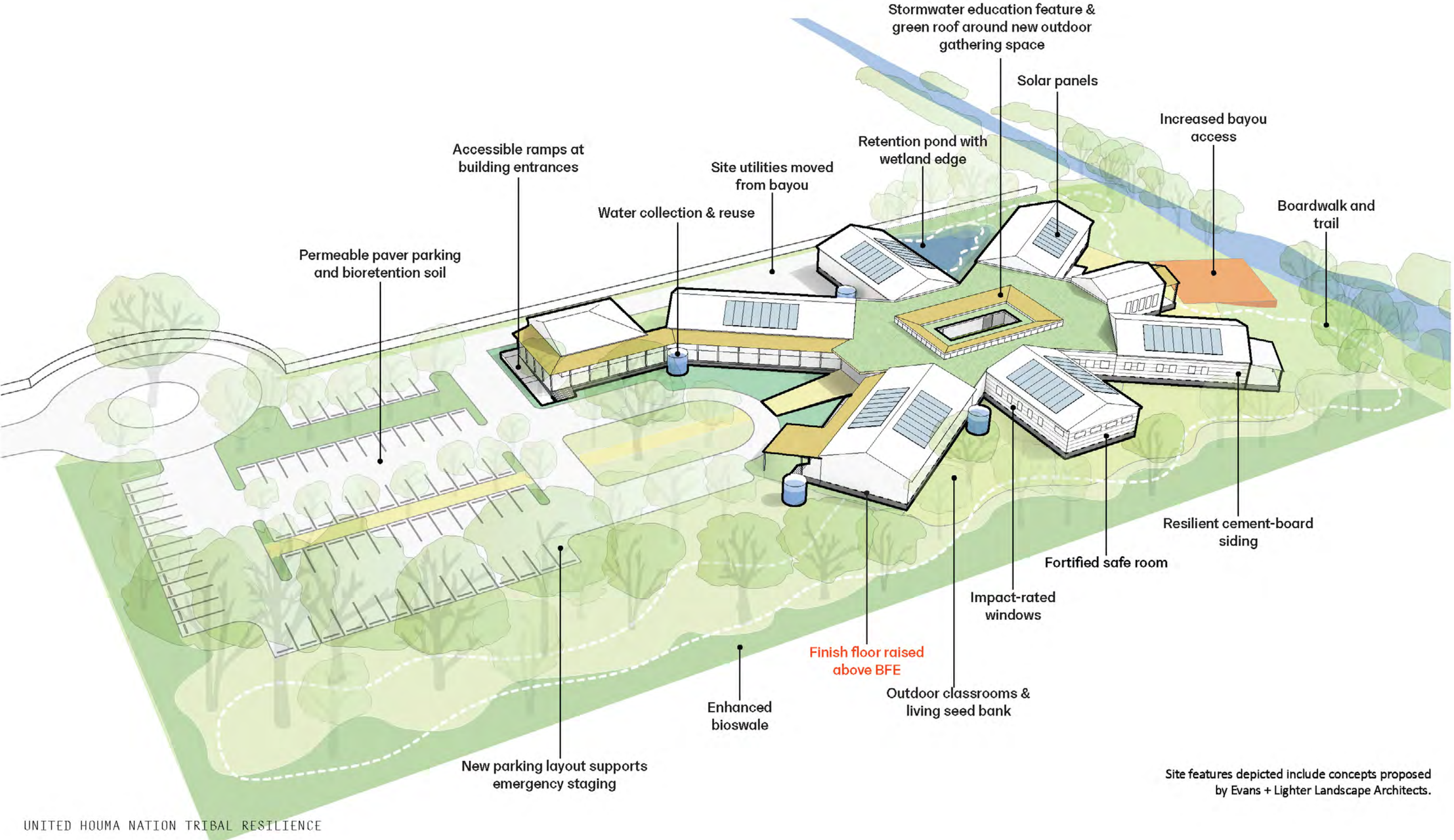
3 SECTION - TEMPORARY SHORING
1/4" = 1'-0"



United Houma Nation Tribal Headquarters



United Houma Nation Tribal Headquarters



Point of Contact

Rami Diaz
Waggonner & Ball
ramiro@wbae.com
504.524.5408