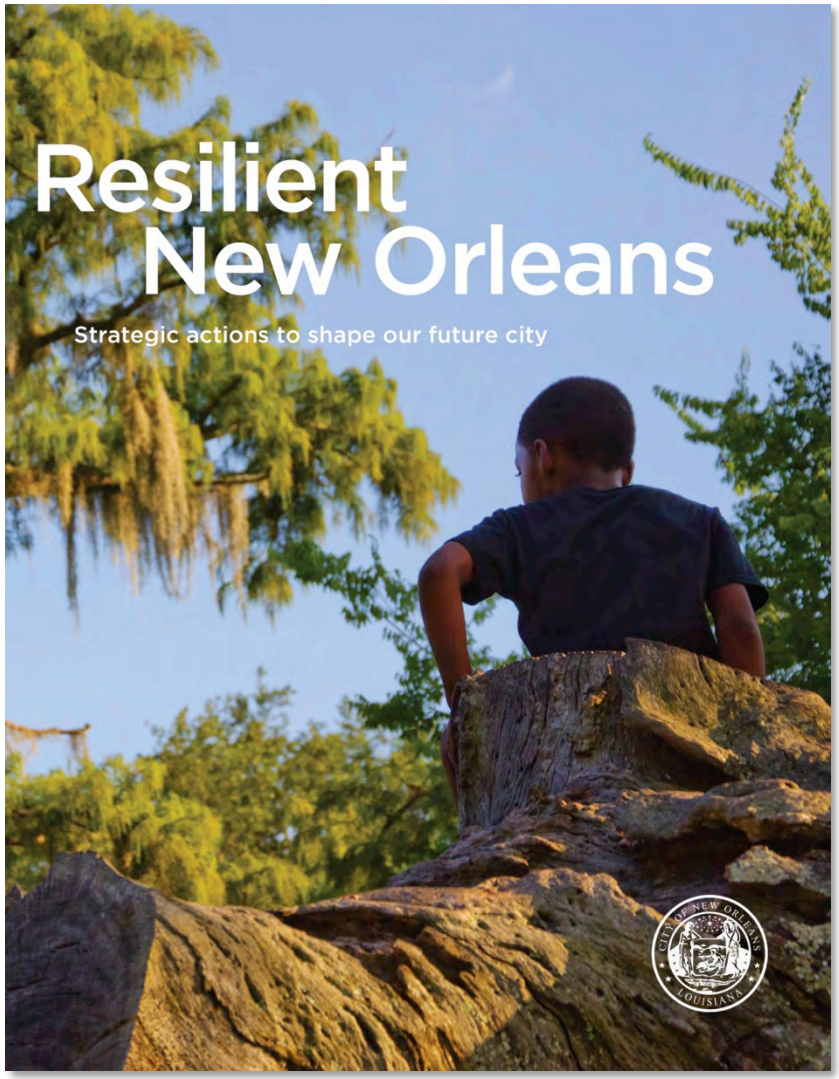
Resilience + Sustainability

CITY OF NEW ORLEANS

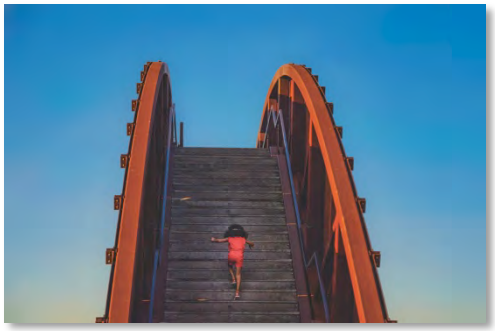
Mirabeau Water Garden Project

Saturday, August 5, 2017

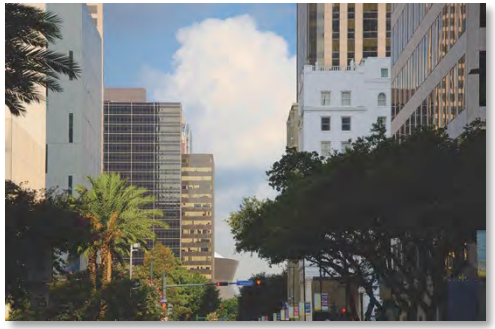
New Orleans City Resilience Strategy
Released August, 2015



Adapt to Thrive



Connect to Opportunity



Transform City Systems

Gentilly Resilience District

Projects proposed in City's application to National Disaster Resilience Competition

Parks & Playgrounds

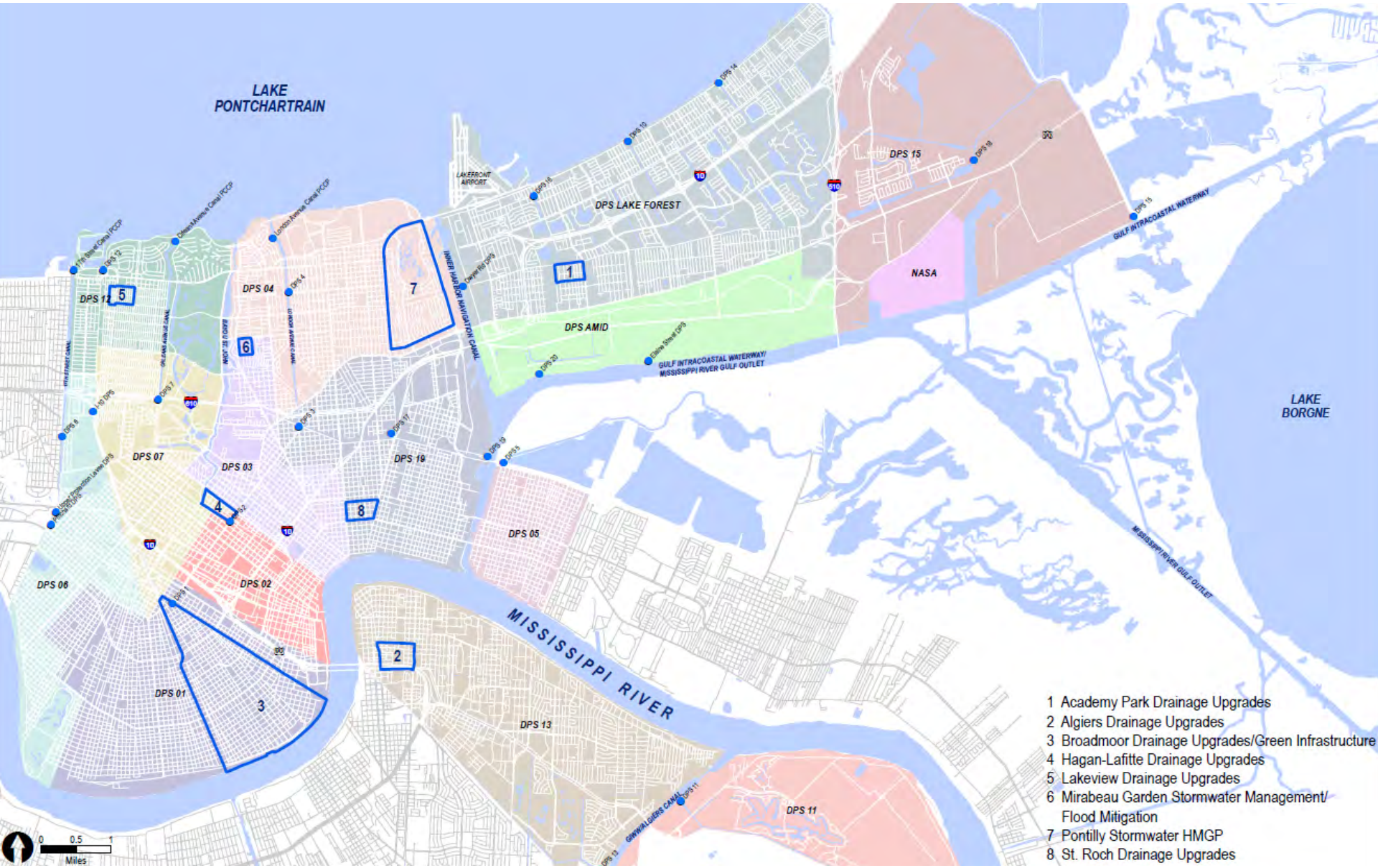
Vacant Lots

Streets & Corridors

Open Spaces

Home & Property Improvements

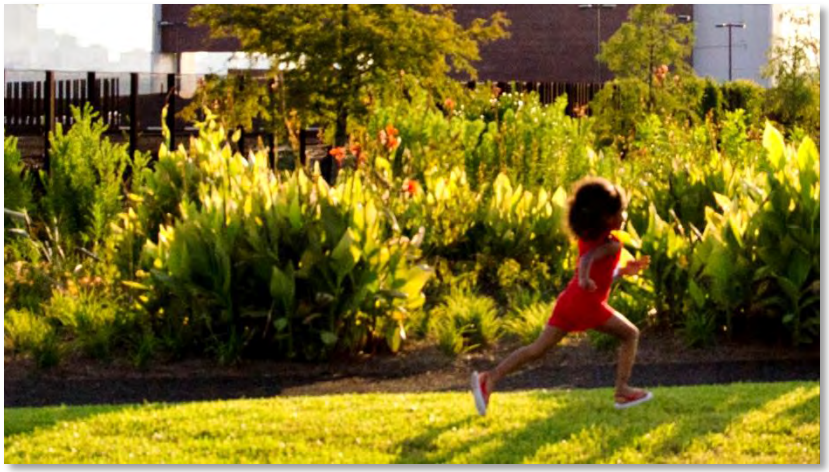
Hazard Mitigation Grant Program (HMGP) Project Locations



Benefits of the Projects

Reduced risk of flooding and subsidence

Neighborhood beautification & economic development



Recreation & health

Environmental awareness

WAGGONNER
& BALL

w Sherwood Design Engineers
& Carbo Landscape Architects

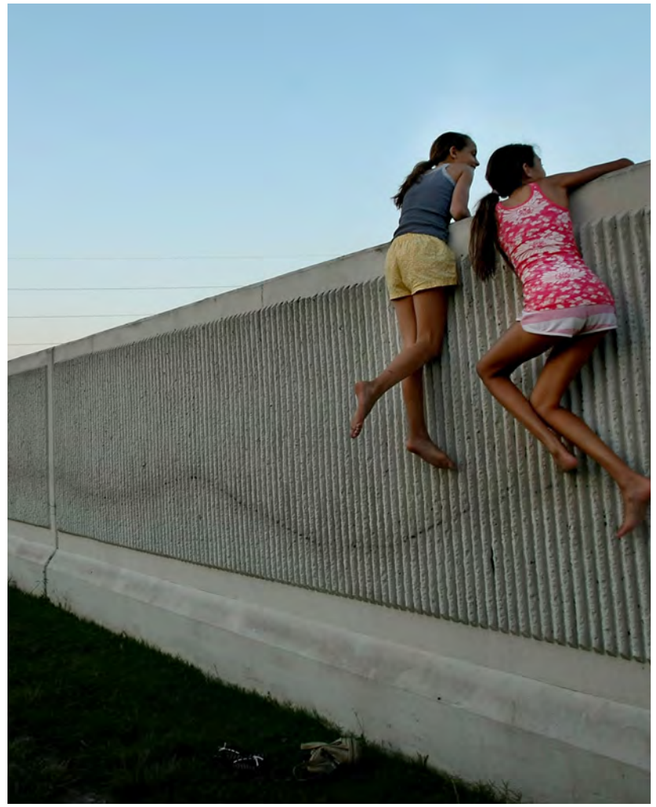
MIRABEAU WATER GARDEN

August 5, 2017

GREATER NEW ORLEANS
Problems Identified

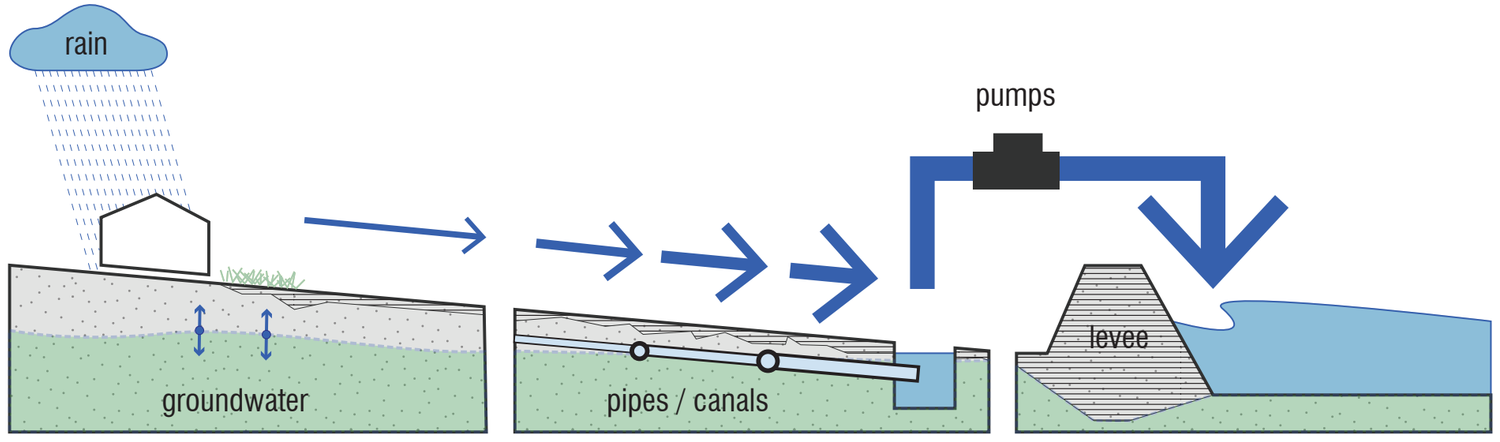
1 **Drainage systems are regularly overwhelmed by too much runoff, causing flooding.**

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

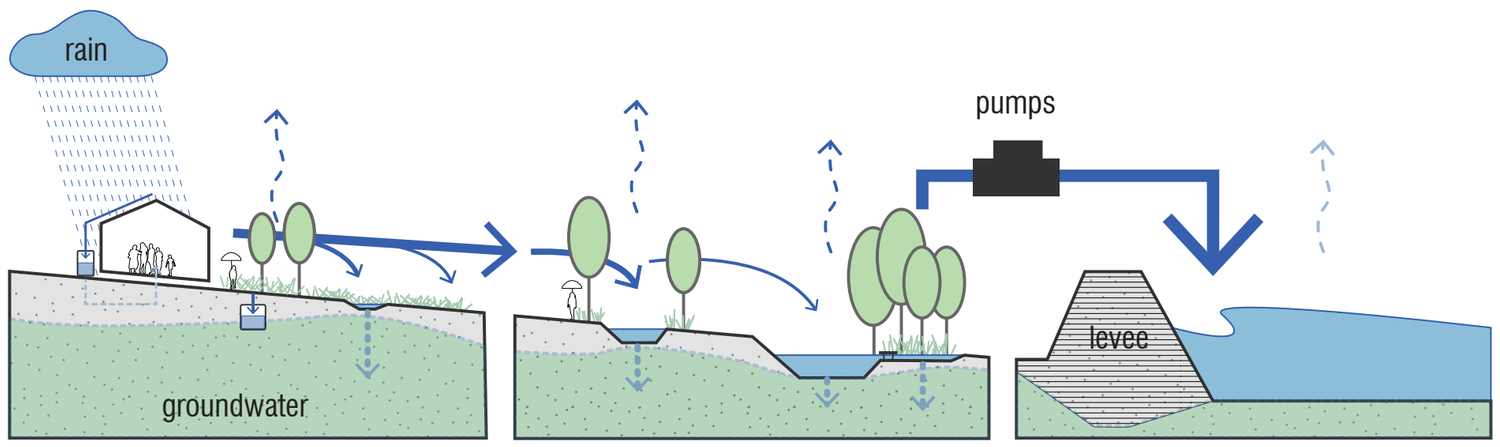


3 **Critical water assets are wasted, hidden behind walls, buried underground, or pumped out of sight.**

GREATER NEW ORLEANS
Paradigm Shift



PIPE **PUMP** **DRAIN**



SLOW **STORE** **DRAIN**
(when necessary)

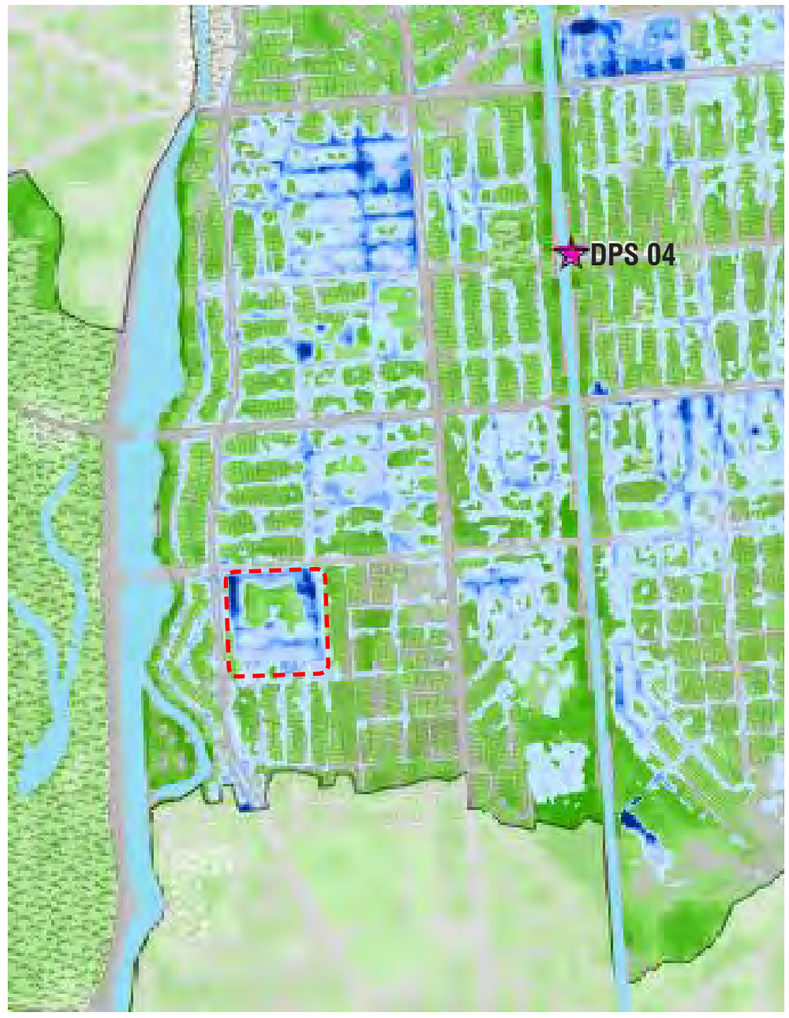
PROBLEM

Existing Flooding - DPS 04 Service Area

2-Year Storm

5-Year Storm

10-Year Storm

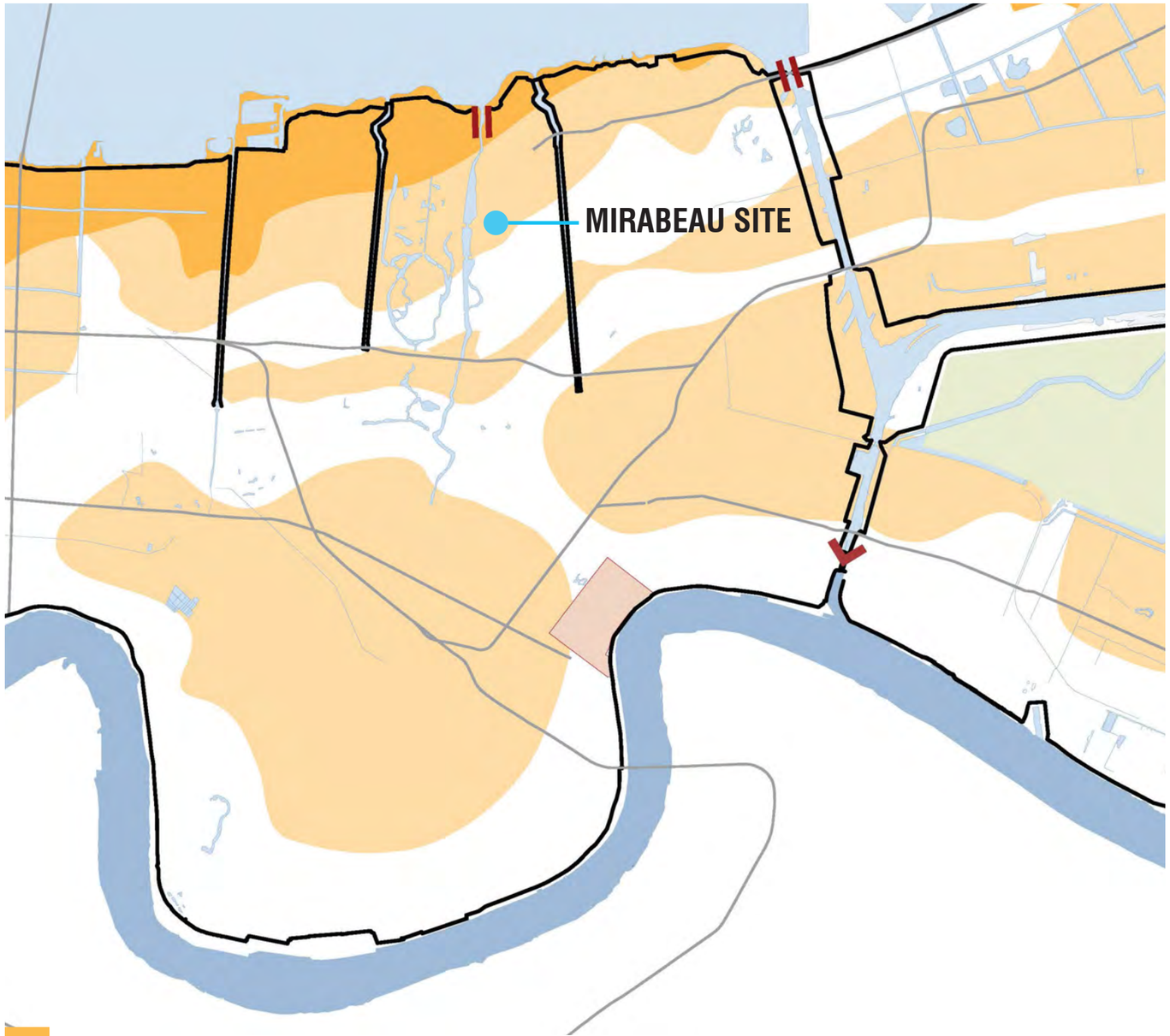


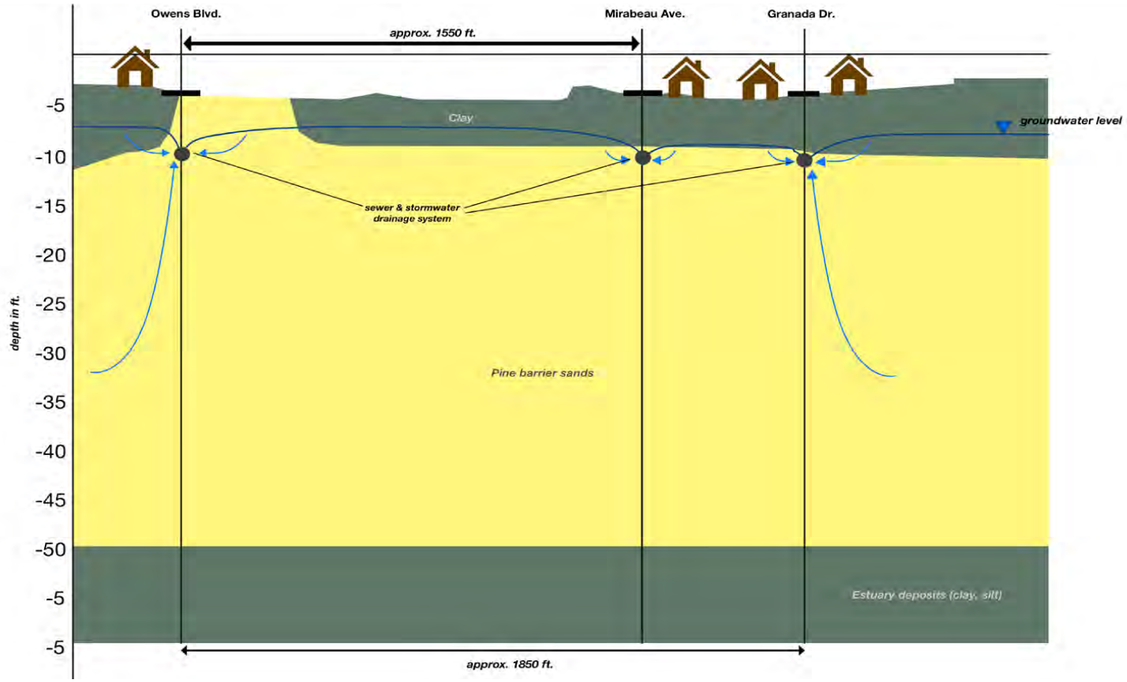
Depth (Ft)

- < 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

PROBLEM
District & Neighborhood Issues Identified

Subsidence






Subsidence-damaged House on Mirabeau Avenue

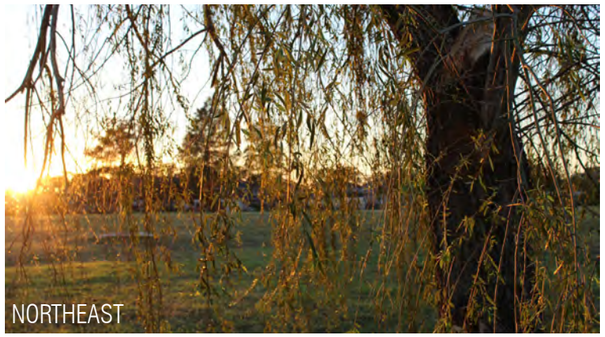

Subsidence-caused Street Damage on Owens Boulevard

MIRABEAU SITE
Existing Conditions


Mirabeau Avenue


NORTHWEST


Oak Grove


NORTHEAST

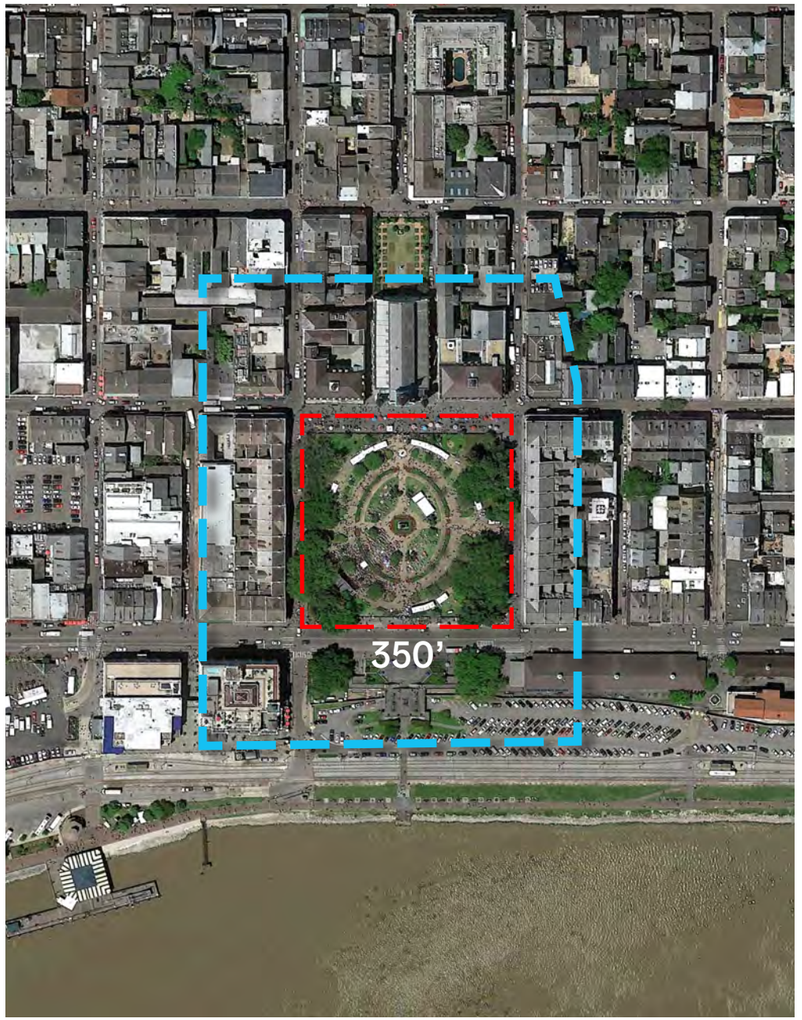

SOUTHWEST


SOUTHEAST

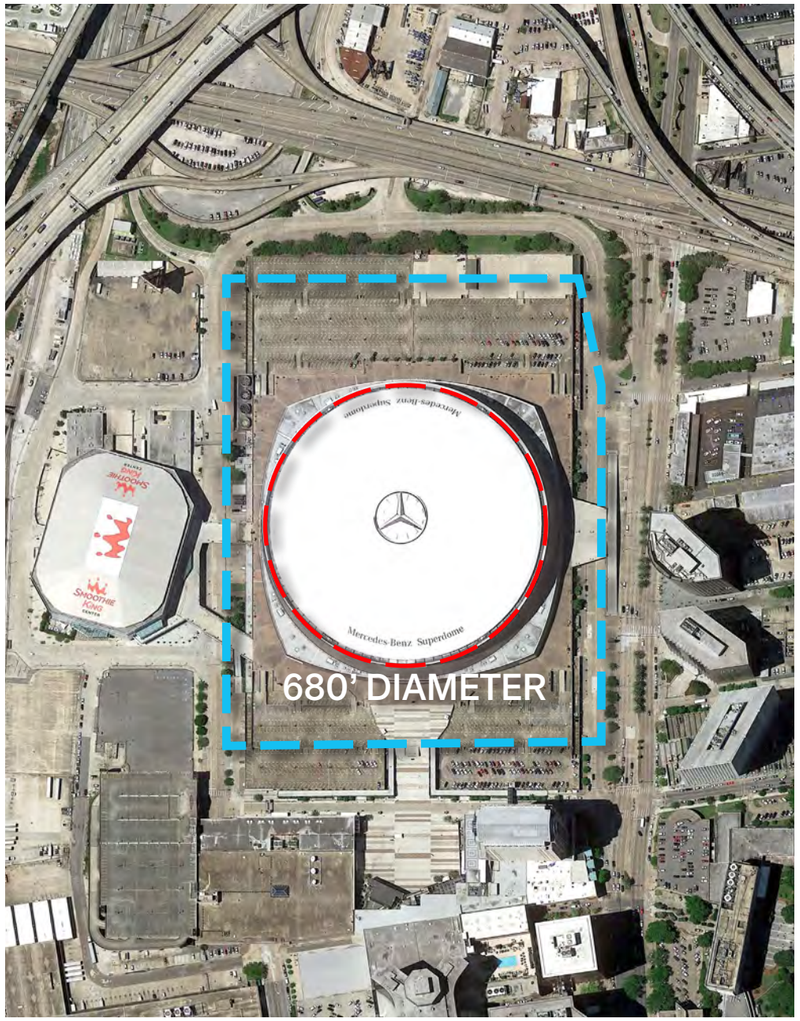
MIRABEAU SIZE COMPARISONS

Relative Scales

MIRABEAU



JACKSON SQUARE

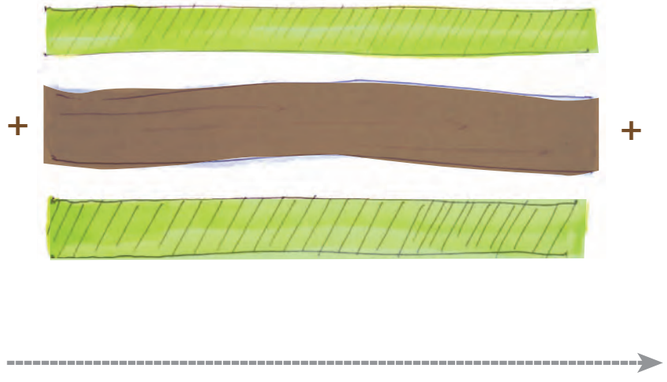


SUPERDOME

MIRABEAU OBJECTIVES
HMGP & NDR Funding

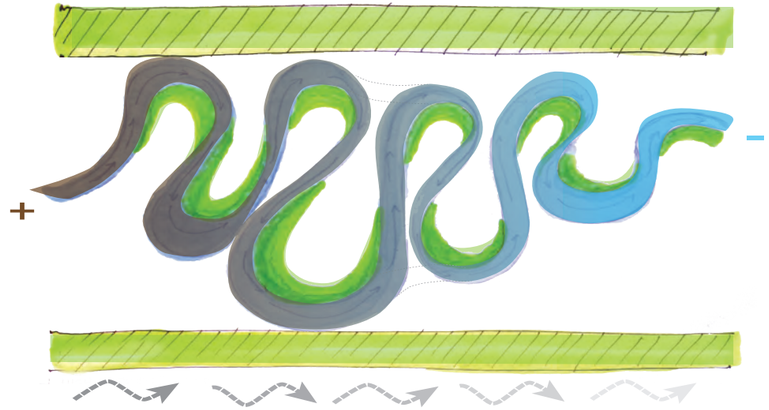
HAZARD MITIGATION GRANT PROGRAM

- Reduce localized street flooding
- Reduce flooding damages to private and public structures
- Reduce traffic delays due to roadway flooding
- Meet min. Benefit Cost Ratio of 1:1

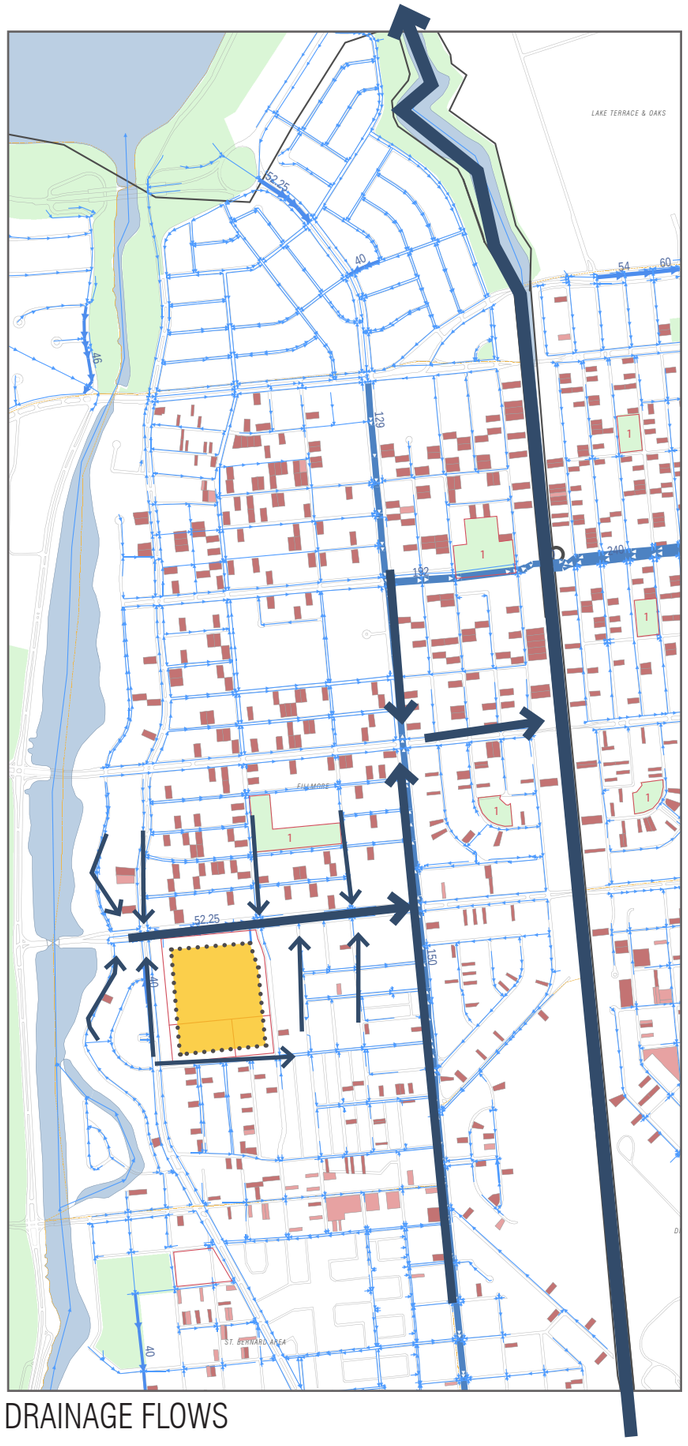


HUD NATIONAL DISASTER RESILIENCE

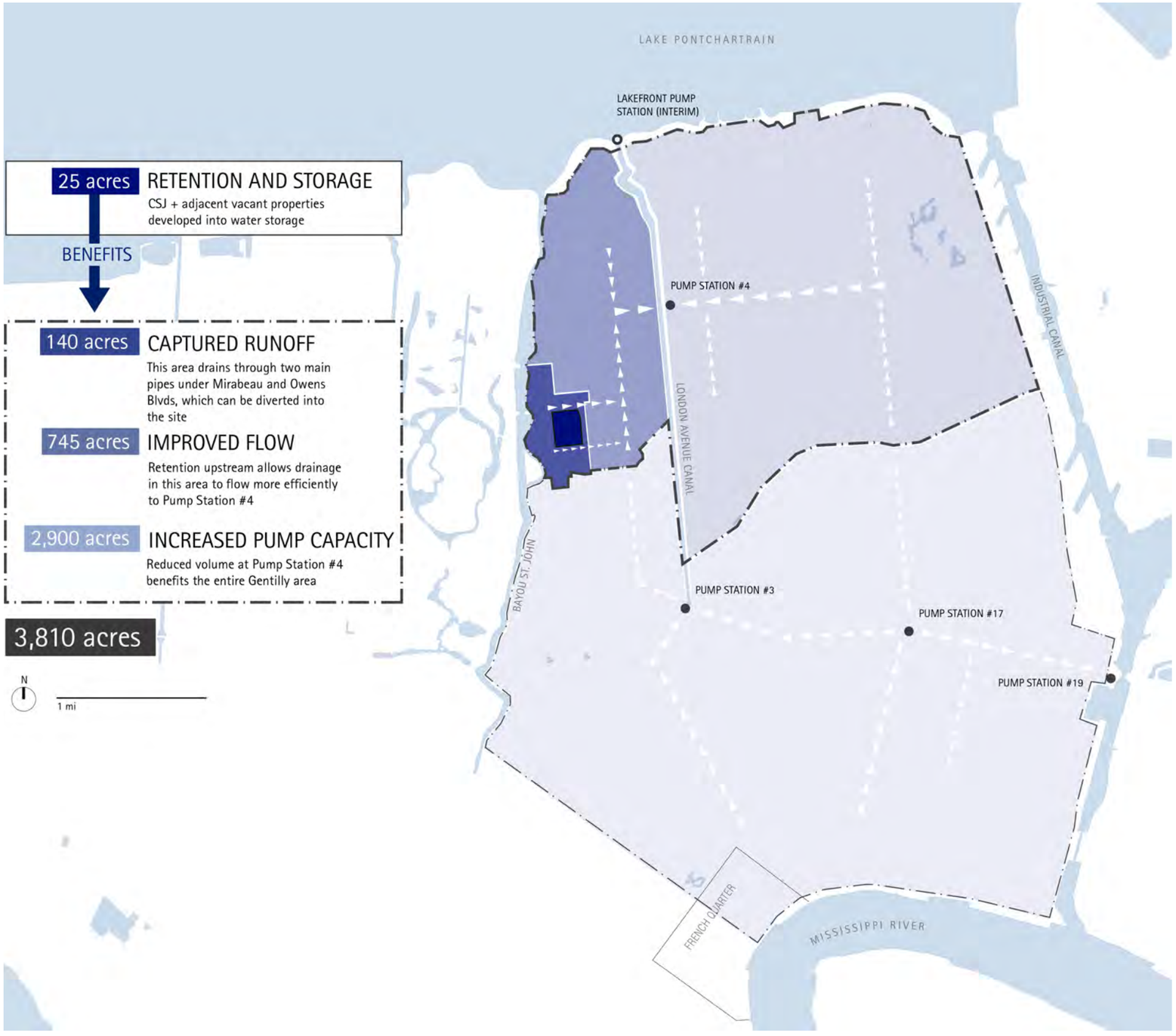
- Reduce localized street flooding
- Control subsidence
- Improve water quality
- Add aesthetic value to the neighborhood
- Improve quality of life for residents
- Provide replicable model



MIRABEAU IMPACT AREA
Drainage Analysis



DRAINAGE FLOWS



DRAINAGE IMPACT

ECOLOGY
Tree Inventory, Evaluation, and Excavation

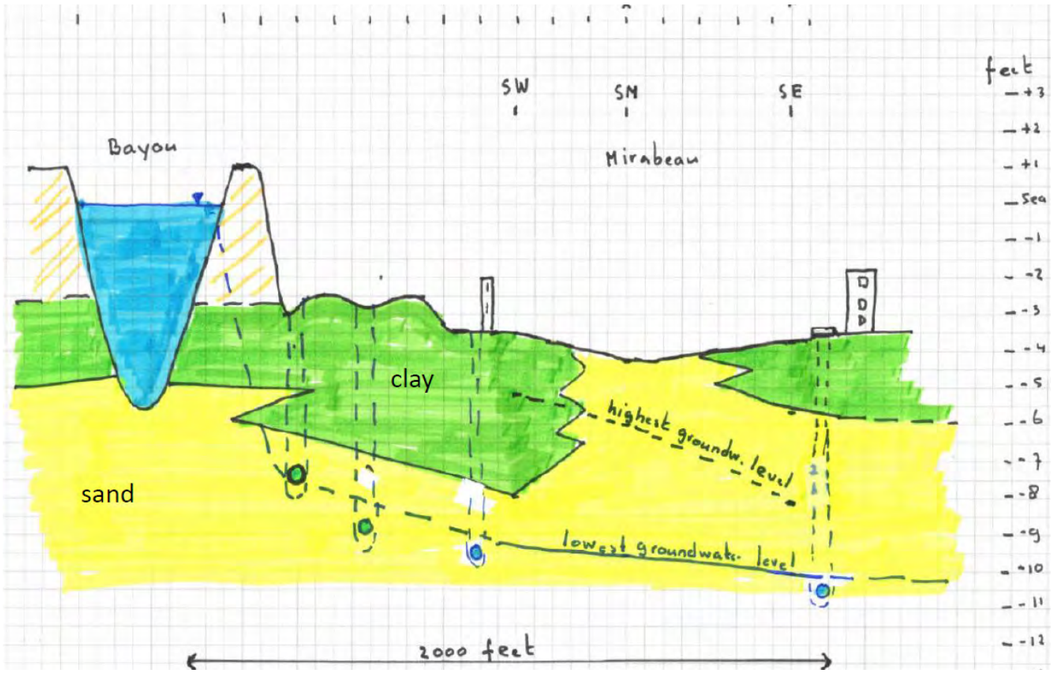
- Live Oak Trees (19”-32” line of ten)
- Live Oak Trees (22”-70” grove of eight)
- Elm Tree
- Lemon Tree
- Cypress Trees
- Pecan Tree
- Golden Rain Tree
- Pine Trees
- Live Oak Trees (21”-32” line of three)
- Pine Trees
- Sweet Gum
- Extents of Excavation
- Pine Trees
- Maple Tree

LEGEND

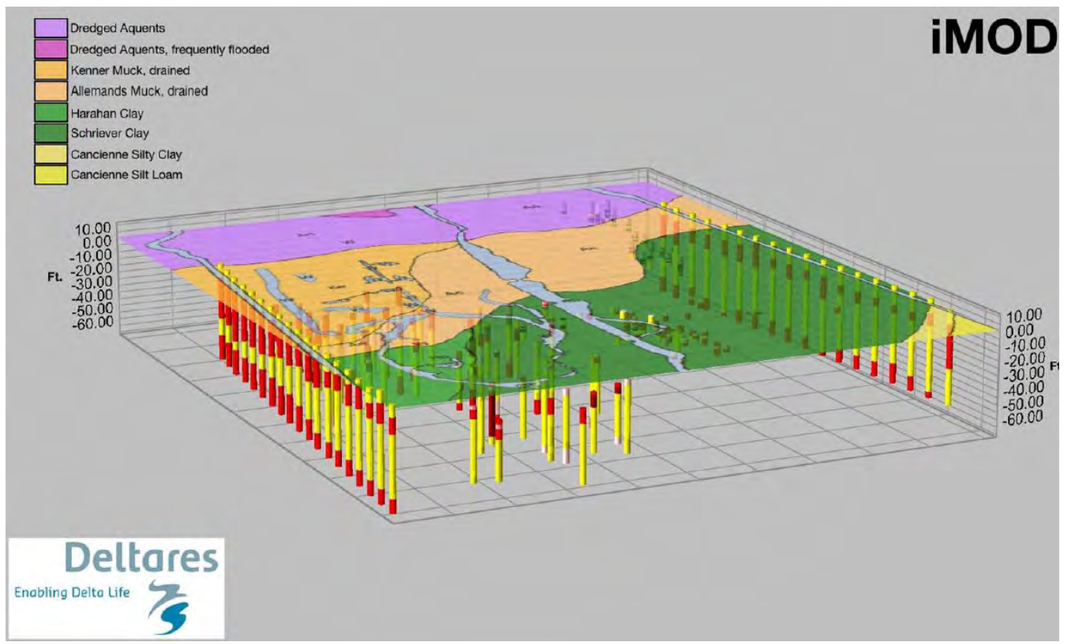
- X — Trees to be removed
- Selective Removal within undisturbed zone
- Approximate Limits of Basin Excavation

GEOHYDROLOGY
Soils and Groundwater Analysis

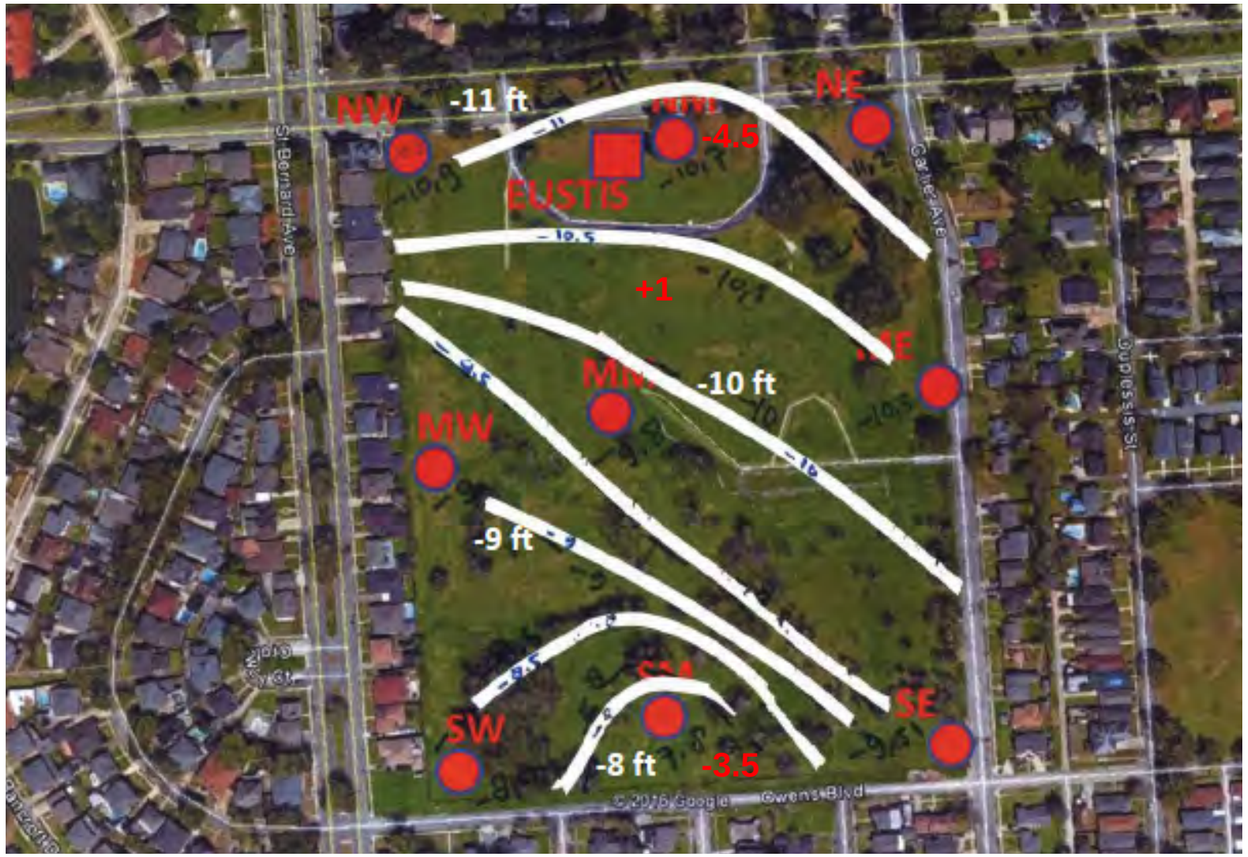
W-E TRANSECT SECTION AT OWEN STREET (SOUTH)



3D MODEL - SOILS & SUBSURFACE

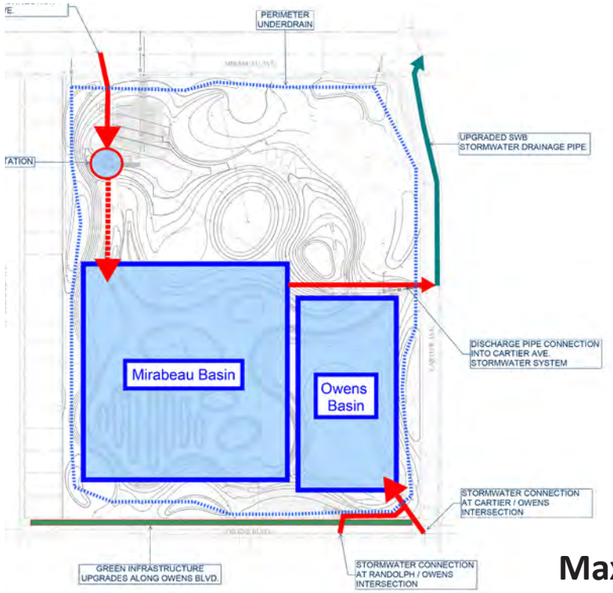


GROUNDWATER MONITORING NETWORK & WATER LEVEL CONTOURS IN FEET BELOW SEA LEVEL



HYDRAULICS
Engineering Analysis

Max. Capacity:
8.5M Gallons
Stormwater gets
pumped into pond

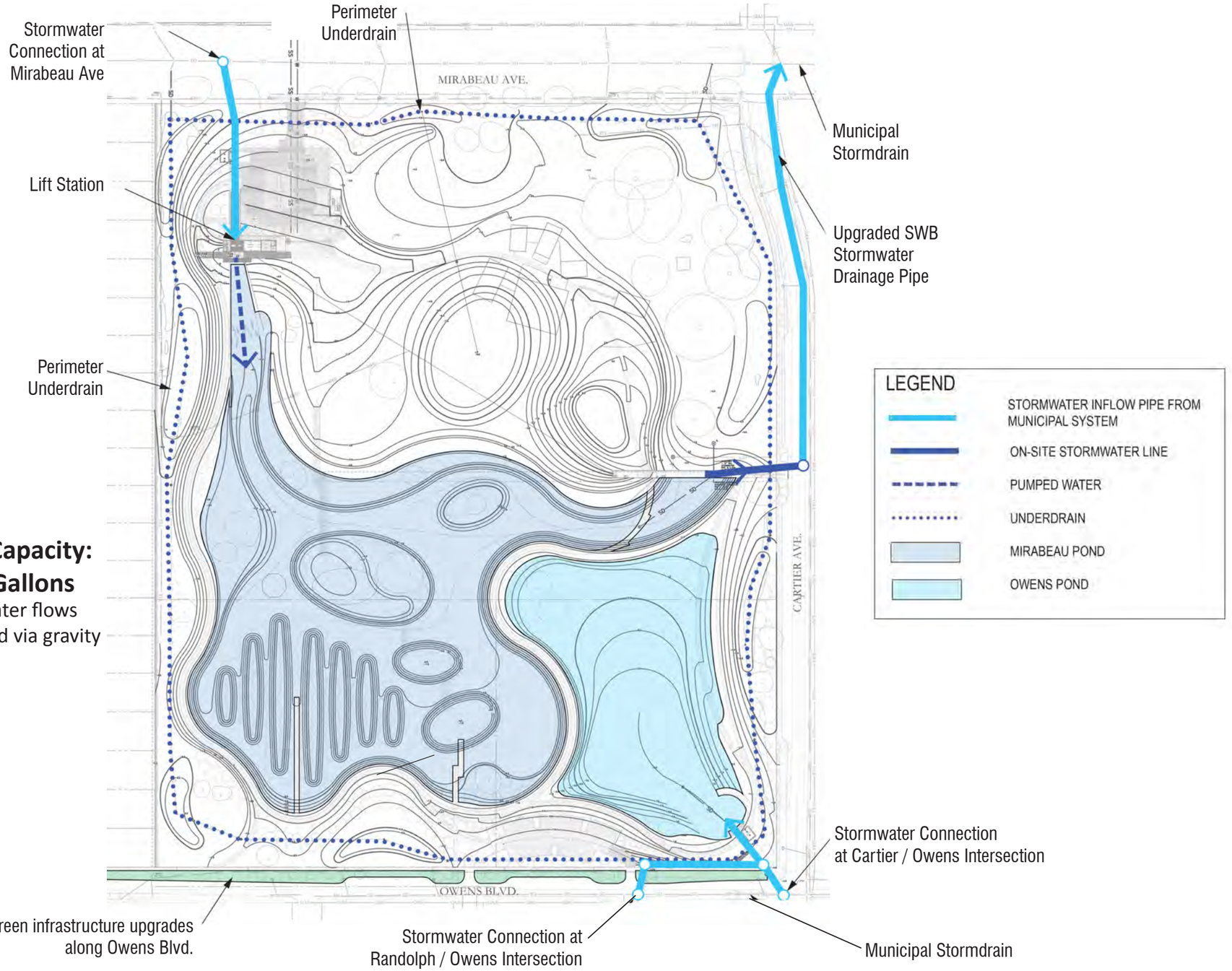


Mirabeau
Pond Elevation per Storm Event

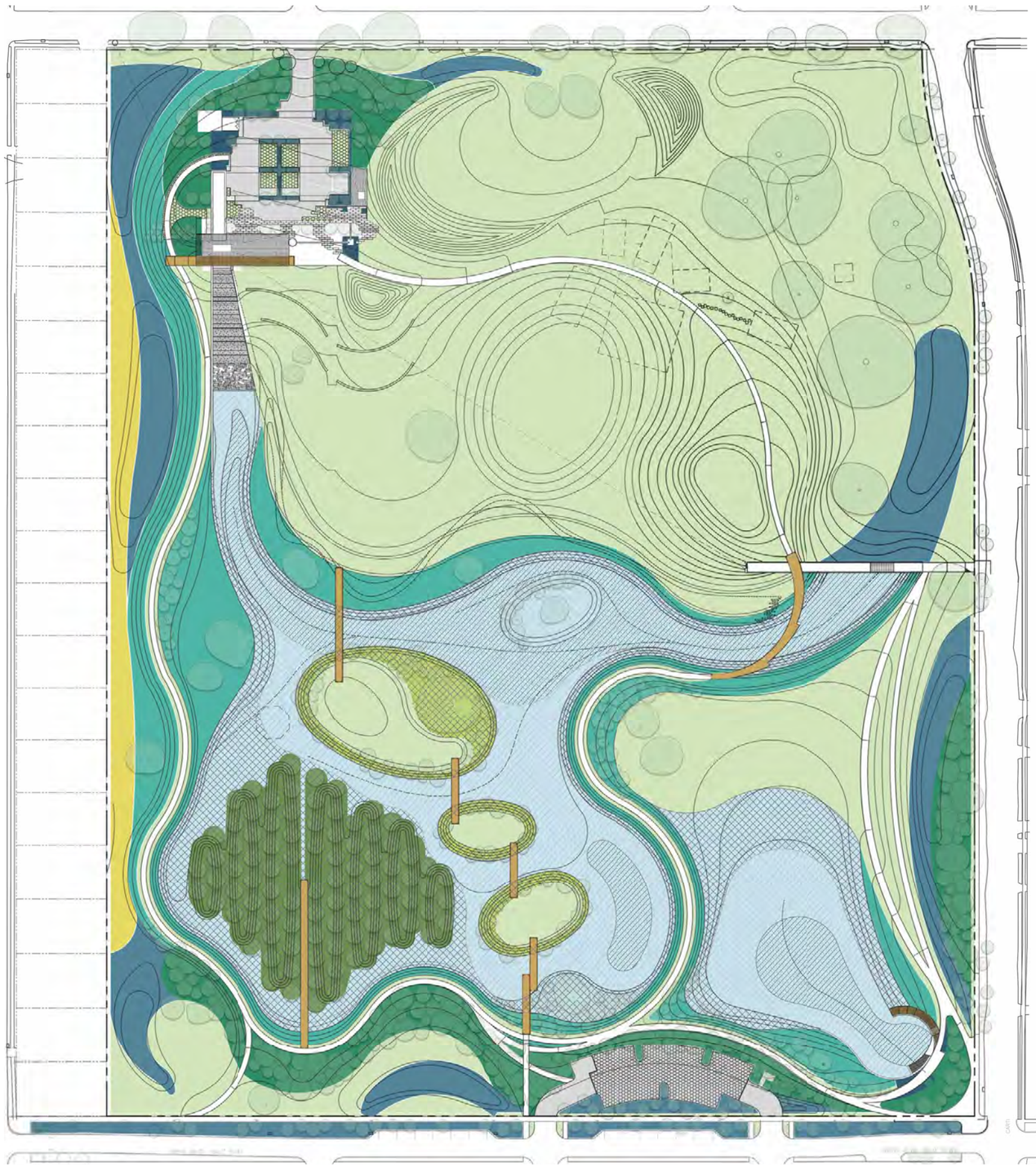
Mirabeau Pond	
Storm Event	**Elevation of Water**
1 YR	-5.57′
2 YR	-5.09′
5 YR	-4.59′
10 YR	-4.25′

Owens Pond	
Storm Event	**Elevation of Water**
1 YR	-5.46′
2 YR	-4.65′
5 YR	-3.92′
10 YR	-3.58′

Max. Capacity:
2.5M Gallons
Stormwater flows
into pond via gravity



LANDSCAPE
Planting Zones



LEGEND

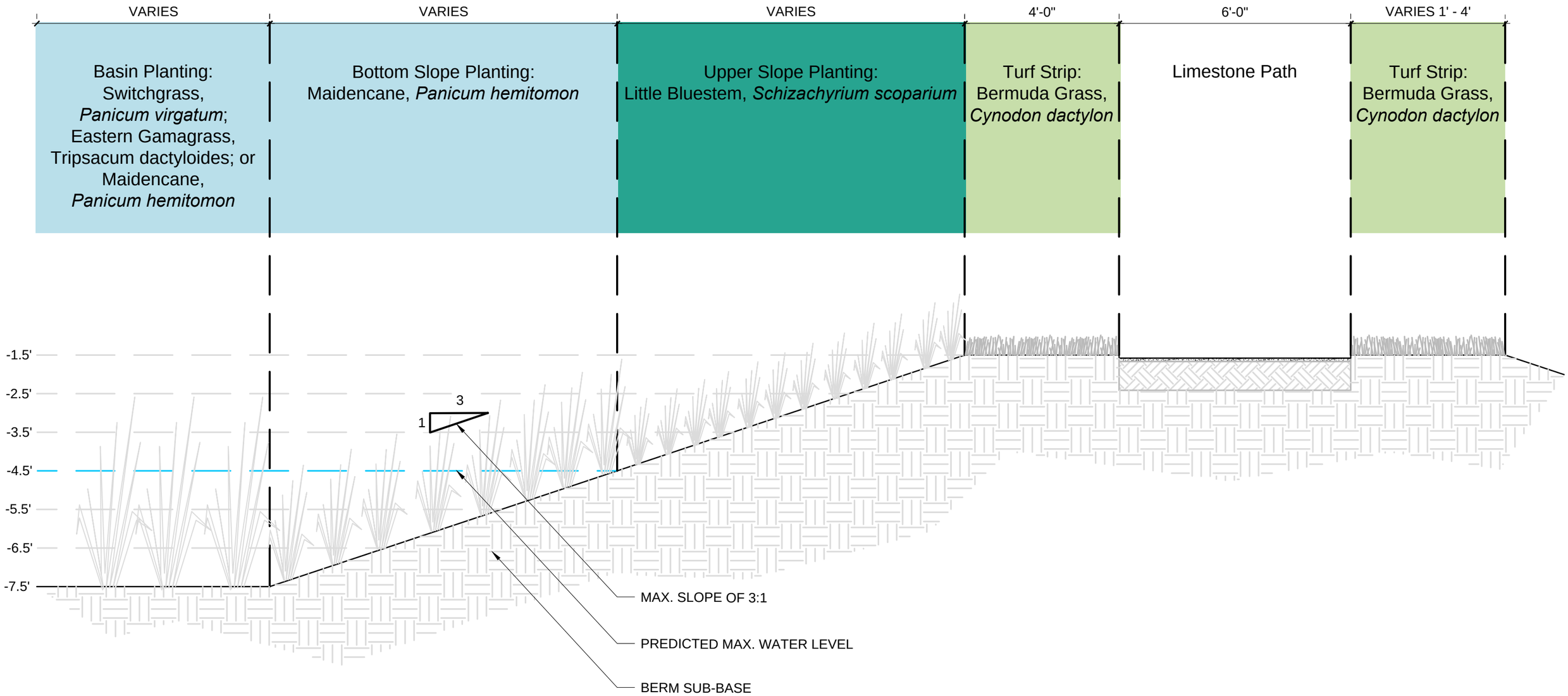
- Pine Island Forest
- Bottomland Forest
- Turf Grass
- Basin Meadow
- Cypress Forest
- Sloped Meadow
- Bioswales/Bioretention cells
- Understory Planting
- Existing Native Bamboo

- Maidencane
- Switchgrass
- Eastern Gamagrass
- Bermuda Sod
- Paving
- Gravel
- Decking

- Bald Cypress, 12’ ht.
- Bald Cypress, 8’ ht.
- Slash Pine, 10’ ht.
- Slash Pine, 8’ ht.
- Swamp Chestnut Oak, 12’ ht.
- Swamp Chestnut Oak, 10’ ht.
- Swamp Blackgum
- Red Swamp Maple

0 30’ 60’ 120’

LANDSCAPE
Basin Berm Section



BERM MEADOW PLANTING DIAGRAM

SCALE: 1/4" = 1' - 0"

LANDSCAPE
Plant Examples

PINE ISLAND FOREST

DWARF PALMETTO

WAX MYRTLE

TITI TREE BLOOM

BOTTOMLAND FOREST

RED MAPLE LATE WINTER COLOR

BASIN MEADOW

SWTICHGRASS

EASTERN GAMAGRASS

MAIDENCANE

WILD WHITE INDIGO

YELLOW WHITE INDIGO

CORALBEAN

SWAMP ROSEMALLOW

SLOPED MEADOW

LITTLE BLUESTEM

LITTLE BLUESTEM: FALL/WINTER

MARSH BLAZING STAR

RATTLESNAKE MASTER

SHINY CONEFLOWER

TEXAS CONEFLOWER

BIOSWALES AND BIORETENTINO CELLS

MAIDENCANE

SWAMP ROSEMALLOW

UNDERSTORY PLANTING: PARKING LOTS

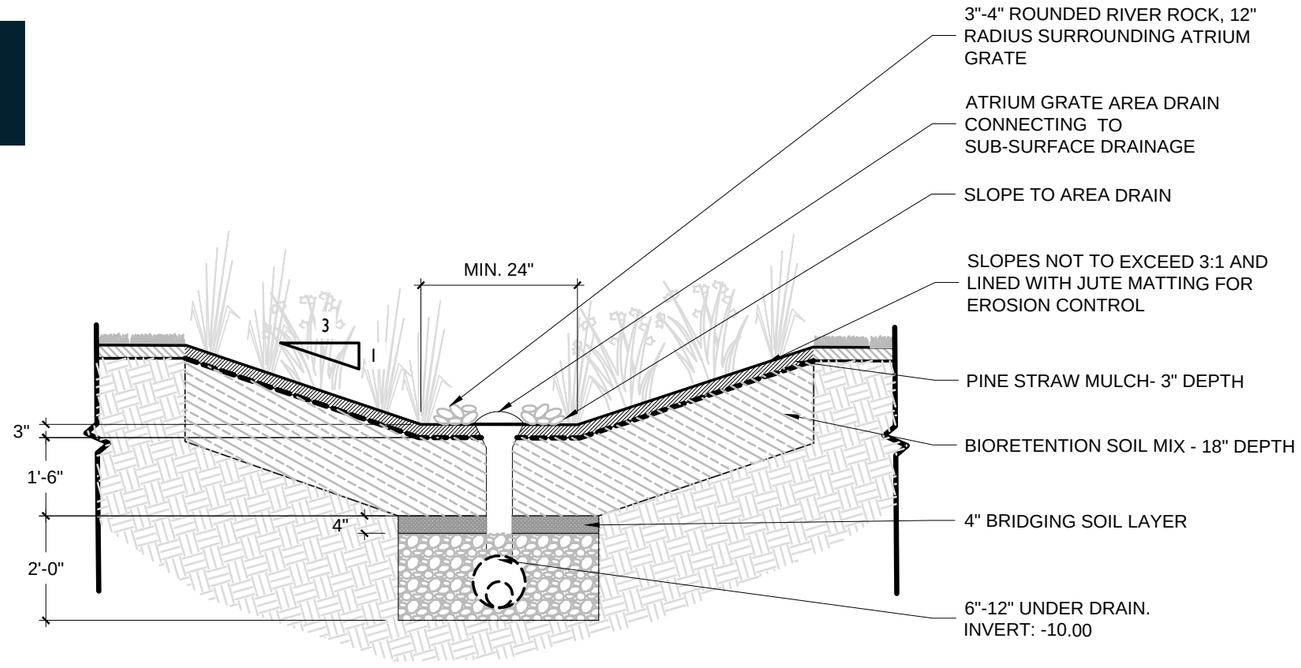
YELLOW FLAG IRIS

BLUE ARROW JUNCUS

LANDSCAPE

Bioswale and Bioretention Cell Sections

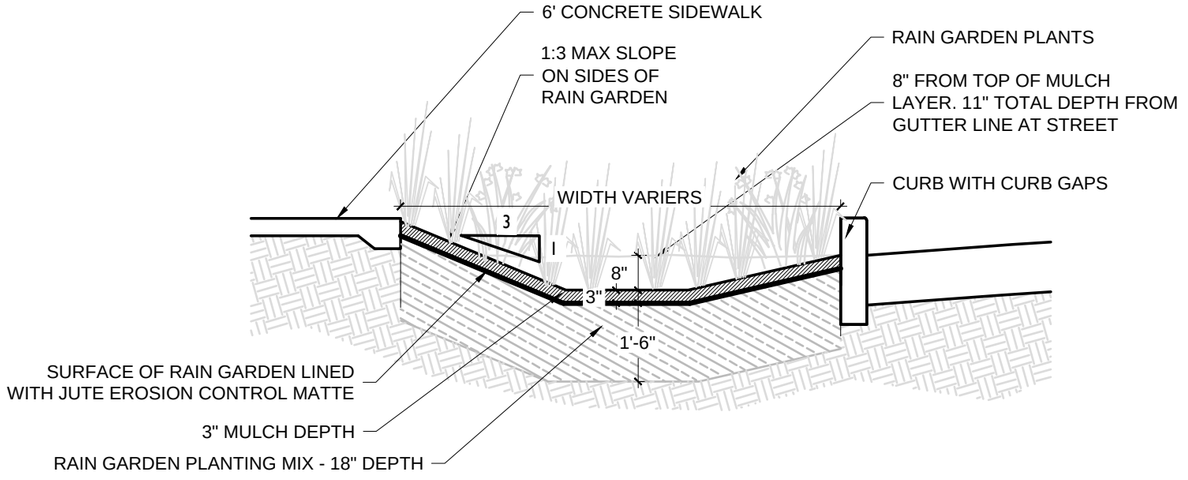
Example of bioswale with Maidencane



TYPICAL BIOSWALE SECTION

SCALE: 1/4" = 1' - 0"

Urban bioretention cell



TYPICAL BIORETENTION CELL SECTION

SCALE: 1/4" = 1' - 0"

NATIONAL & INTERNATIONAL EXAMPLES

Hold / Move / Filter

Renaissance Park, Chattanooga

Hans Tavsens Park, Copenhagen

Weir and Canal, Netherlands

Westerpark, Amsterdam

Watergraafsmeer Polder, Amsterdam

NATIONAL & INTERNATIONAL EXAMPLES

Engage / Play / Learn

Westerpark, Amsterdam

Westerpark, Amsterdam

Westerpark, Amsterdam

Middleton Place, Charleston

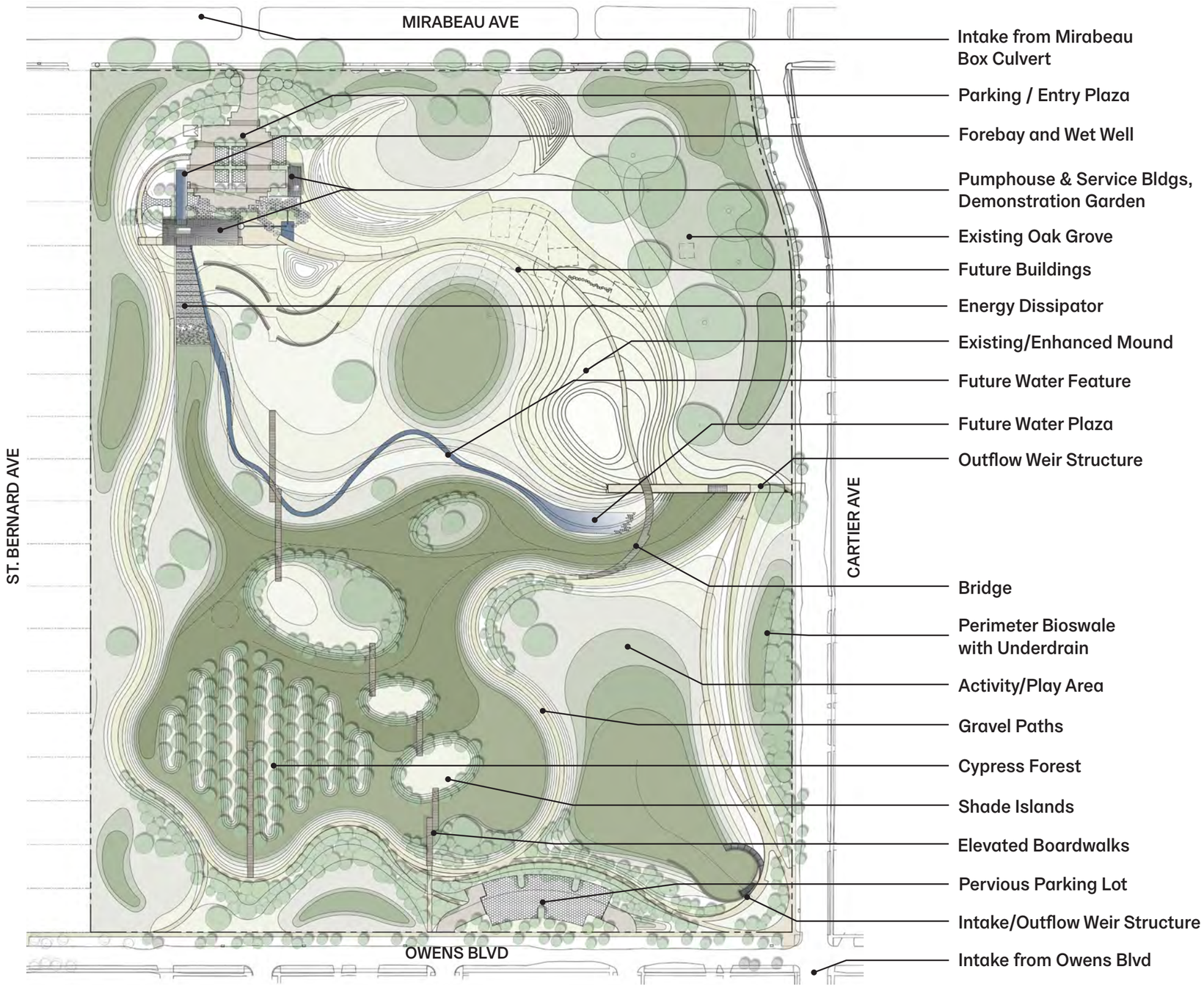
Seonyundo Park, Korea

Water Playground, Netherlands

Fazenda Vargem Grande, Sao Paulo

Chapultapec Park, Mexico City

SITE PLAN
90% Design



HMGP Budget
$12.5M

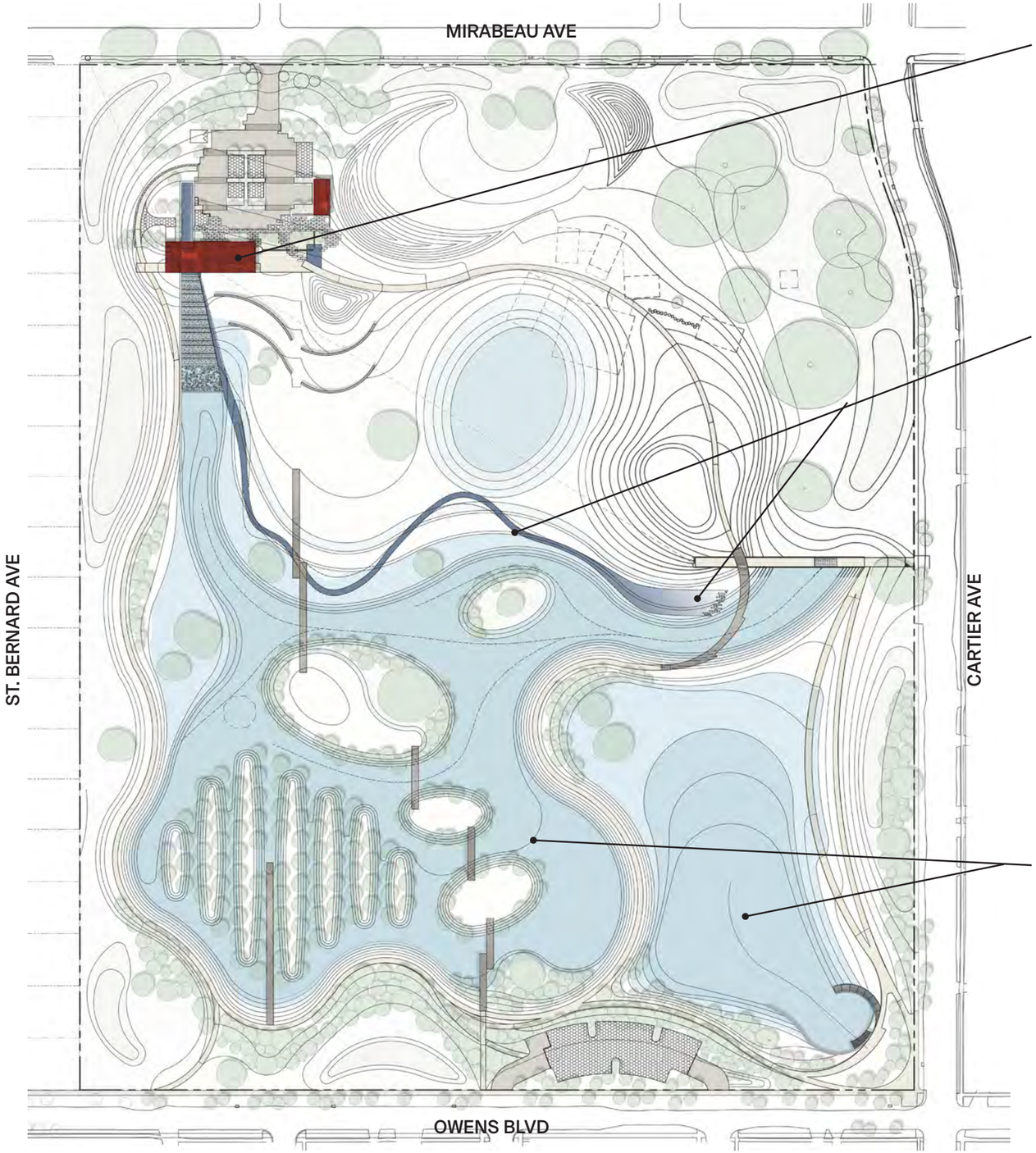
Interventions
drainage diversions into detention basins
perimeter bioswales
water treatment
pervious parking
subsurface storage

Water Storage Capacity
11 Million Gallons

Key Benefits
50 - 60% flood reduction from 2-year storm
30 - 40% flood reduction from 10-yr storm
Recreation
Environmental education

Flood reduction benefits are estimated at approximately double the investment

PROGRAM
Stormwater Storage



EXAMPLES/INSPIRATION

Pumphouse

Future Water Runnel & Plaza (recirculating water feature)

Largo, FL

St Pol de Léon, France

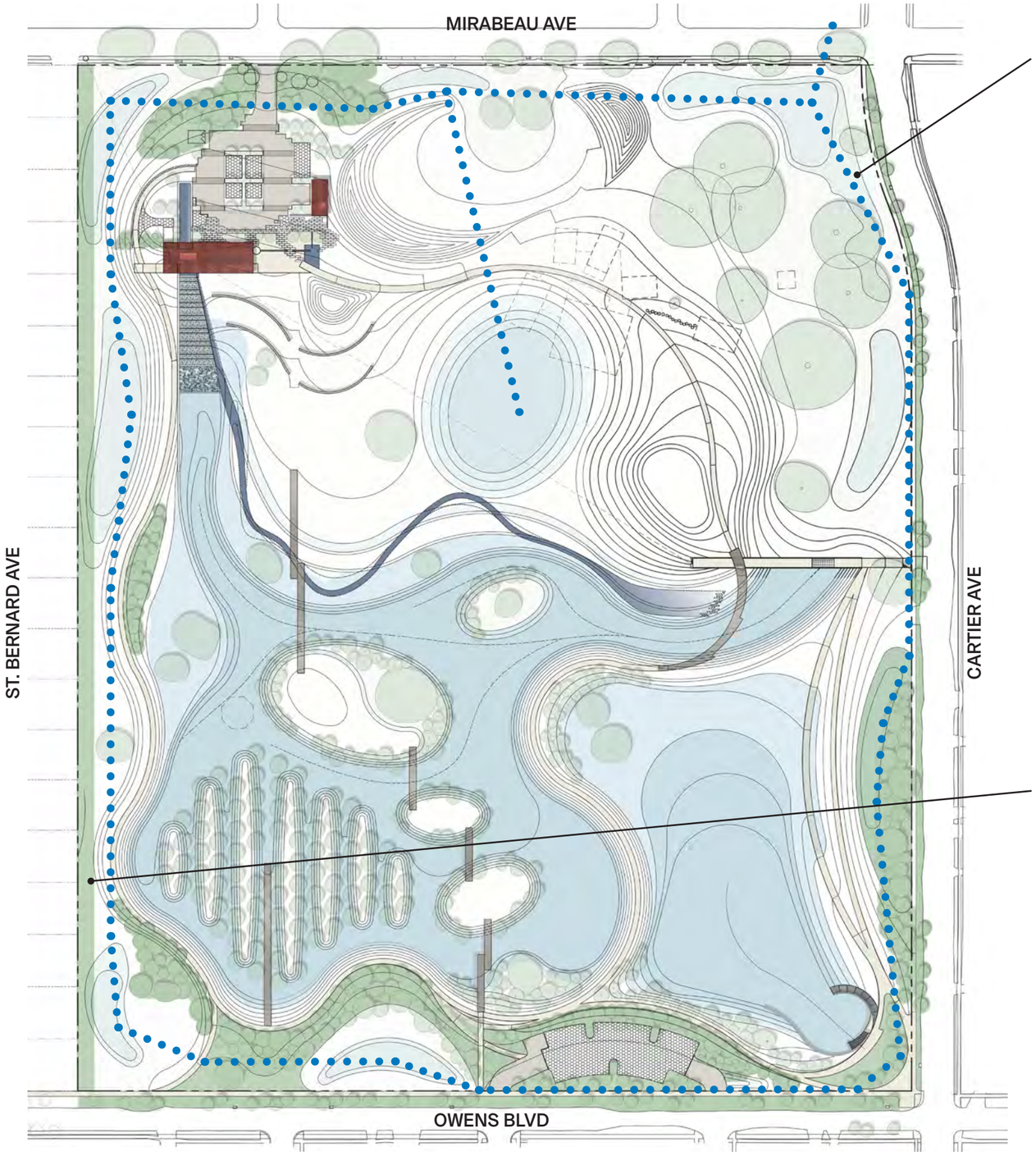
San Francisco, CA

Netherlands

Dry Detention Basins (temporary water storage)

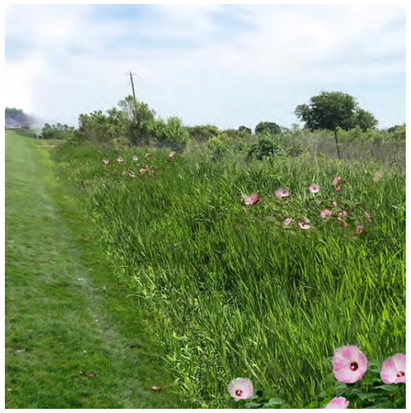
Inner Nørrebro, Copenhagen

PROGRAM
Perimeter Buffering & Groundwater Control

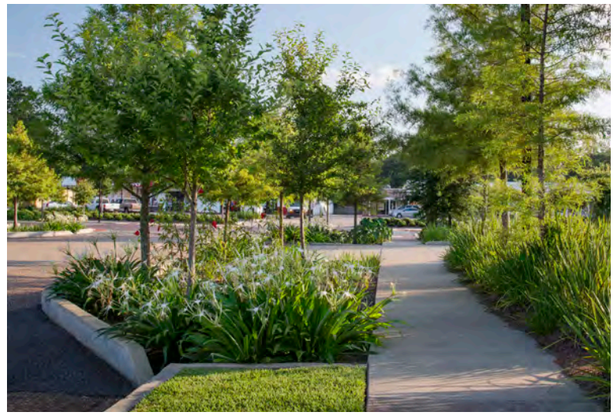


EXAMPLES/INSPIRATION

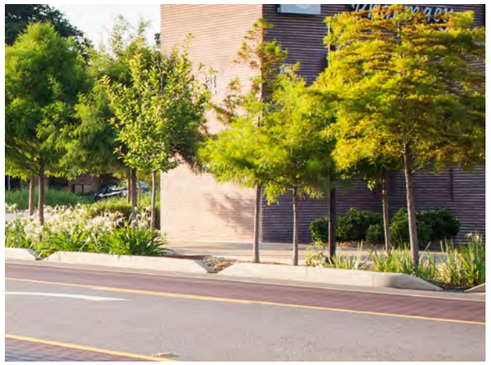
Perimeter Bioswale and Underdrain



Example of bioswale with Maidencane



Urban bioretention cell, Alexandria, LA



Curb gaps, Alexandria, LA

Grate connecting to street bioretention cells

West Edge: Native Bamboo

Existing Native Bamboo will be allowed to spread

PROGRAM
Forested Areas

EXAMPLES/INSPIRATION

Sacred Oak Grove

Existing Live Oaks Grove

Salvaged CSJ Terrazzo Crest

Shaded Islands (aquatic shade trees)

Swamp Chestnut Oak

Swamp Blackgum

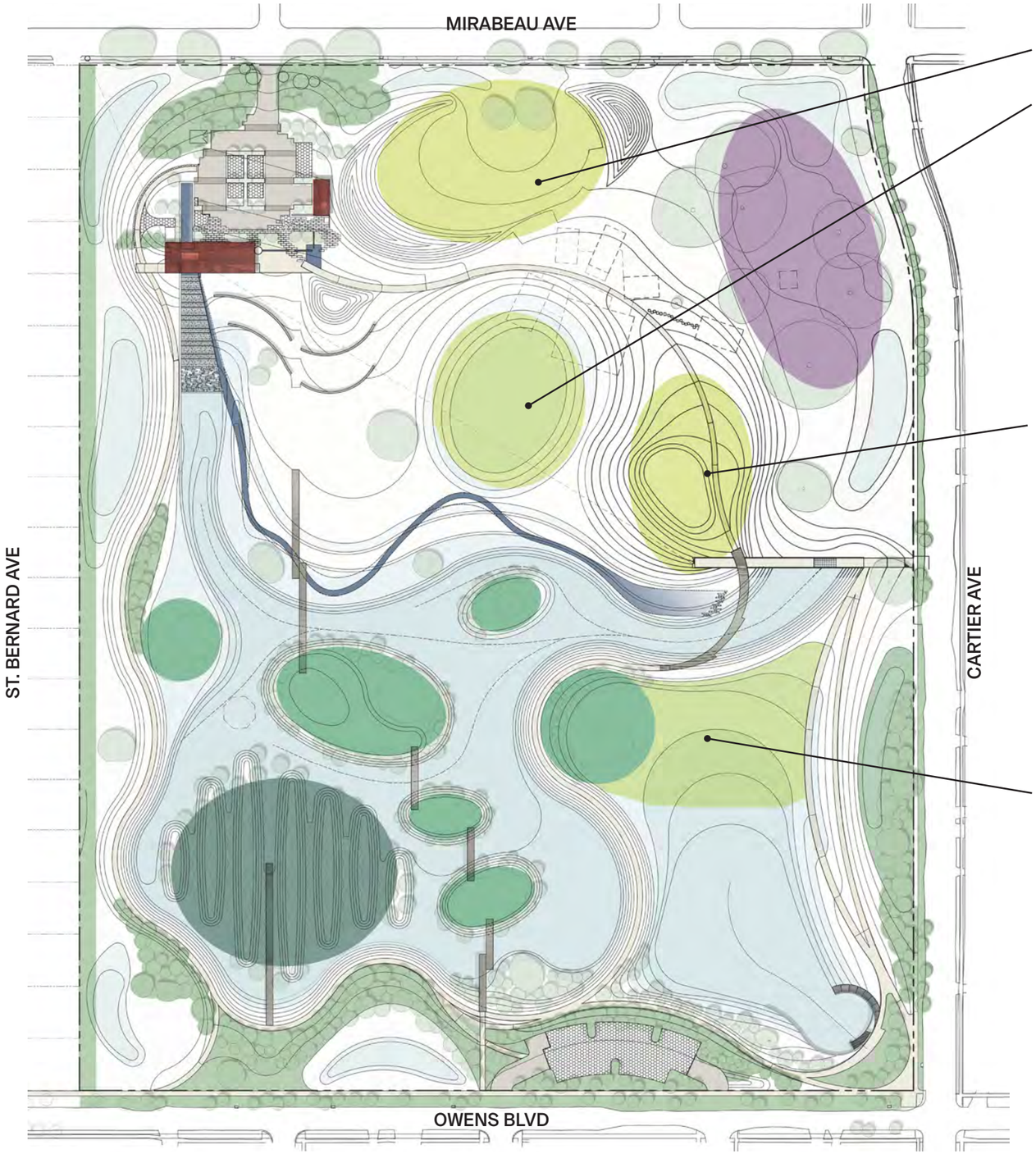
Swamp Red Maple

Cypress Forest

Watergraafsmeer Polder, Amsterdam, NL

Shorter growth habitat of Maidencane planted on Polders makes elevation changes visible

PROGRAM
NDR Phase - Programmable Areas



EXAMPLES/INSPIRATION

Lawn (potential landscaped entry to future education pavilion)

Bowl Landform (potential amphitheater)

Grass Amphitheater, Aarhus University, Denmark

Mound (potential stepped landform or play mound)

Landform Ueda, Edinburgh, Scotland

The Hills, Governor's Island, NY

Open Field (potential play area)

PROGRAM
NDR Phase - Potential Building Sites

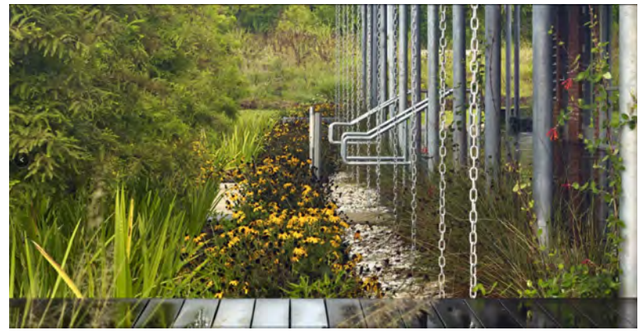
EXAMPLES/INSPIRATION

Potential Buildings


Katsura Imperial Villa - Kyoto


Hilltop Arboretum, Baton Rouge, LA


Visitor Center, St. Landry Parish, LA


Visitor Center, St. Landry Parish, LA

Potential Pavilions


Crosby Arboretum, Picayune, MS

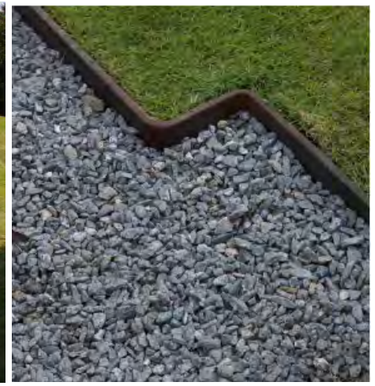

Queen Victoria Gardens, Melbourne, Australia

PROGRAM
Circulation, Parking, and Maintenance

EXAMPLES/INSPIRATION

Berm & Pathways

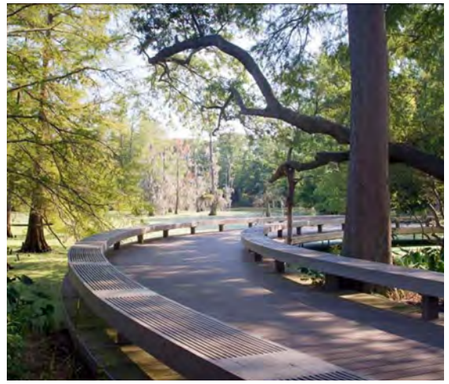
Landform Ueda, Edinburgh, Scotland



Minghu Wetland Park, Guizhou, China

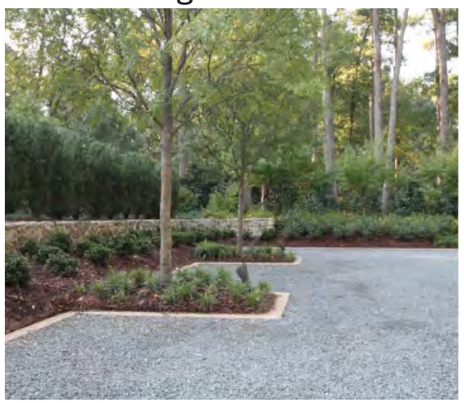
Boardwalks & Bridges

Crosby Arboretum, Picayune, MS



Shangri-La Botanical Gardens, Orange, TX

Public Parking



Service Area

PROGRAM
Overall Diagram

- Lawn
- Sacred Oak Grove
- Potential Building Locations
- Bowl/Amphitheater
- Mound
- Water Runnel
- Water Plaza
- Shade Islands
- Play Area
- Cypress Forest
- Bioswale Buffer

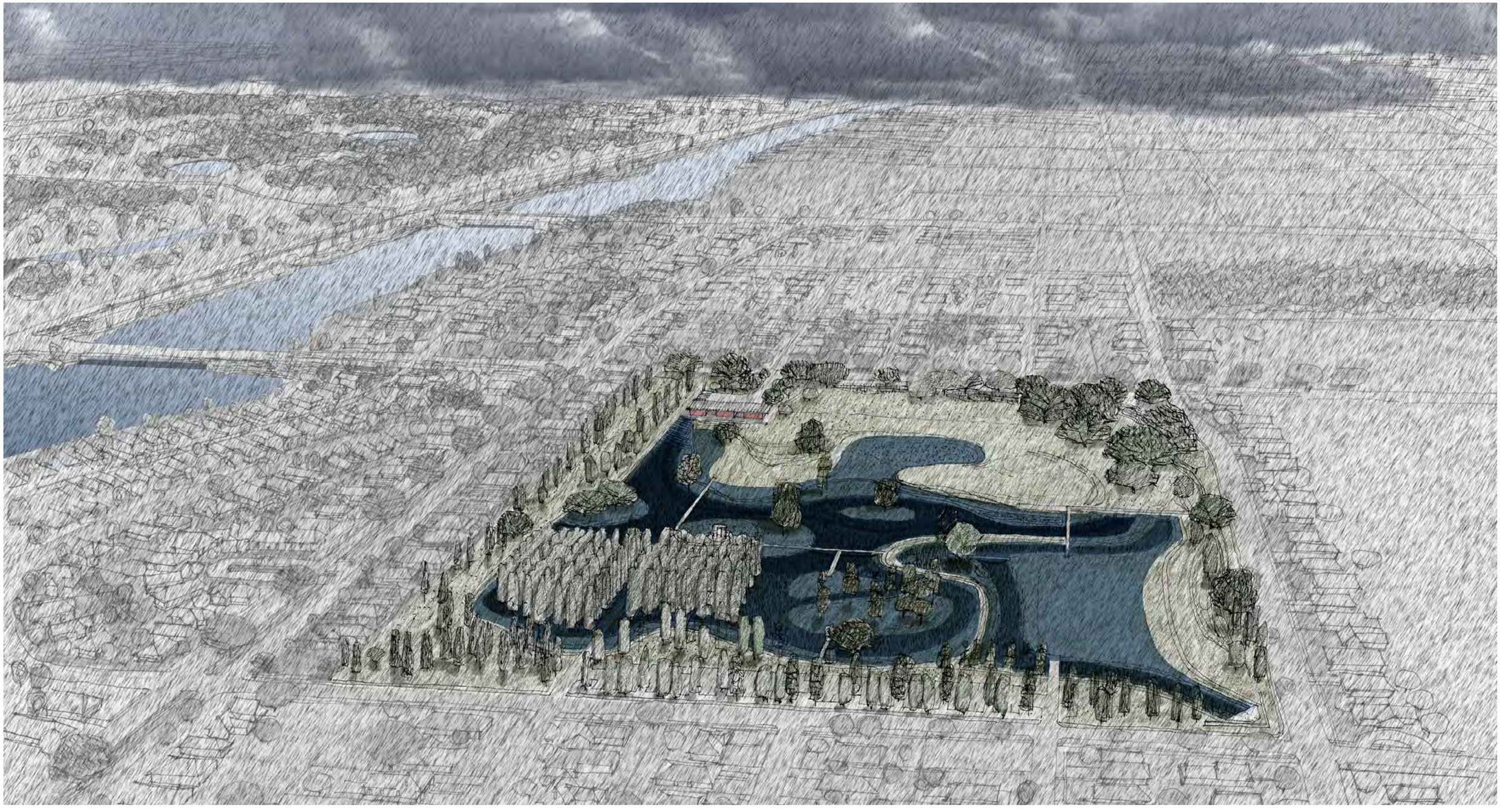
DRY CONDITION
Aerial Perspective Looking South

DRY CONDITION
Aerial Perspective Looking North

TYPICAL RAIN STORM

HEAVY RAIN STORM
2-Year Event

EXTREME RAIN STORM
10-Year Event



GET INVOLVED
Civic Leadership & Volunteering

The Adopt-A-Lot program in Genesee County, Michigan, leases vacant lots to community members, who use and maintain them as gardens.

Volunteering in the Paris Oaks Neighborhood for the City of New Orleans' Adopt-A-Catch-Basin program

The Friends of the High Line in New York City take responsibility for daily operations

The Green Up Pittsburgh program remediates blighted properties and lots with the assistance of residents and volunteers

A volunteer harvests fruit as part of the New Orleans Fruit Tree Project

Charles Allen III

ceallen@nola.gov

resilientnola.org

@resilientnola

nola.gov/resilience