Community & Site Scale

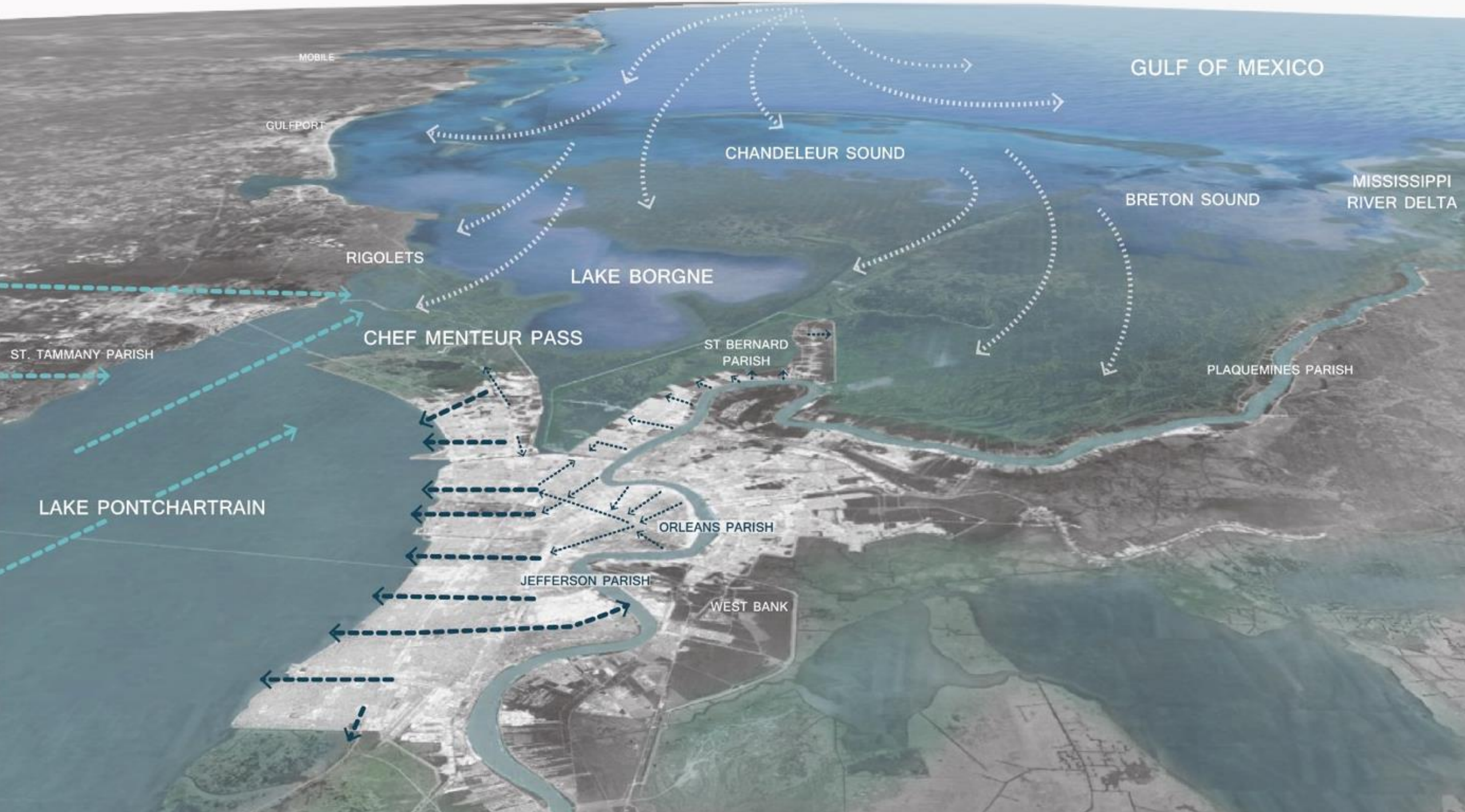
COMMUNITY ADAPTION FOR RESILIENCE

Dana Nunez Brown, FASLA, PLA, AICP, LEED AP

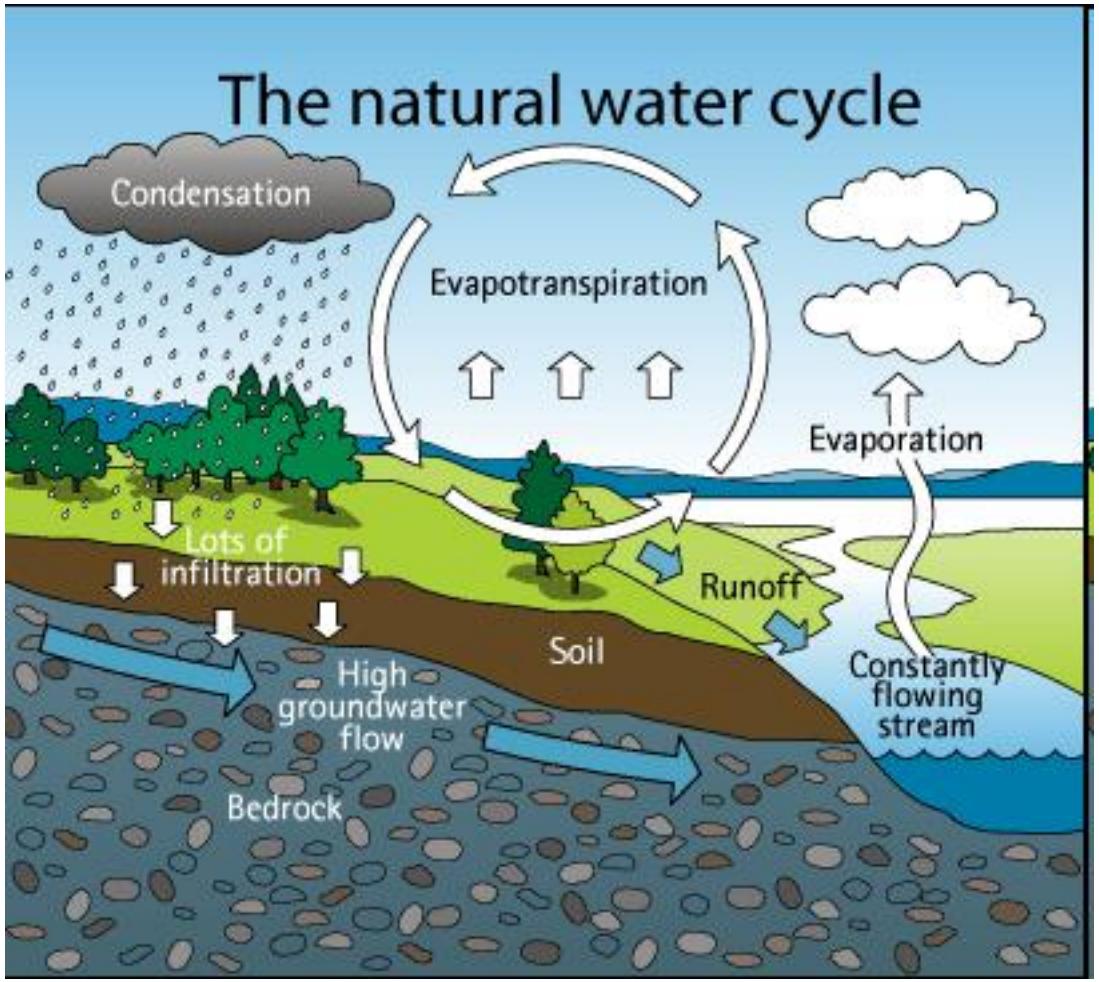
DANA BROWN& Associates

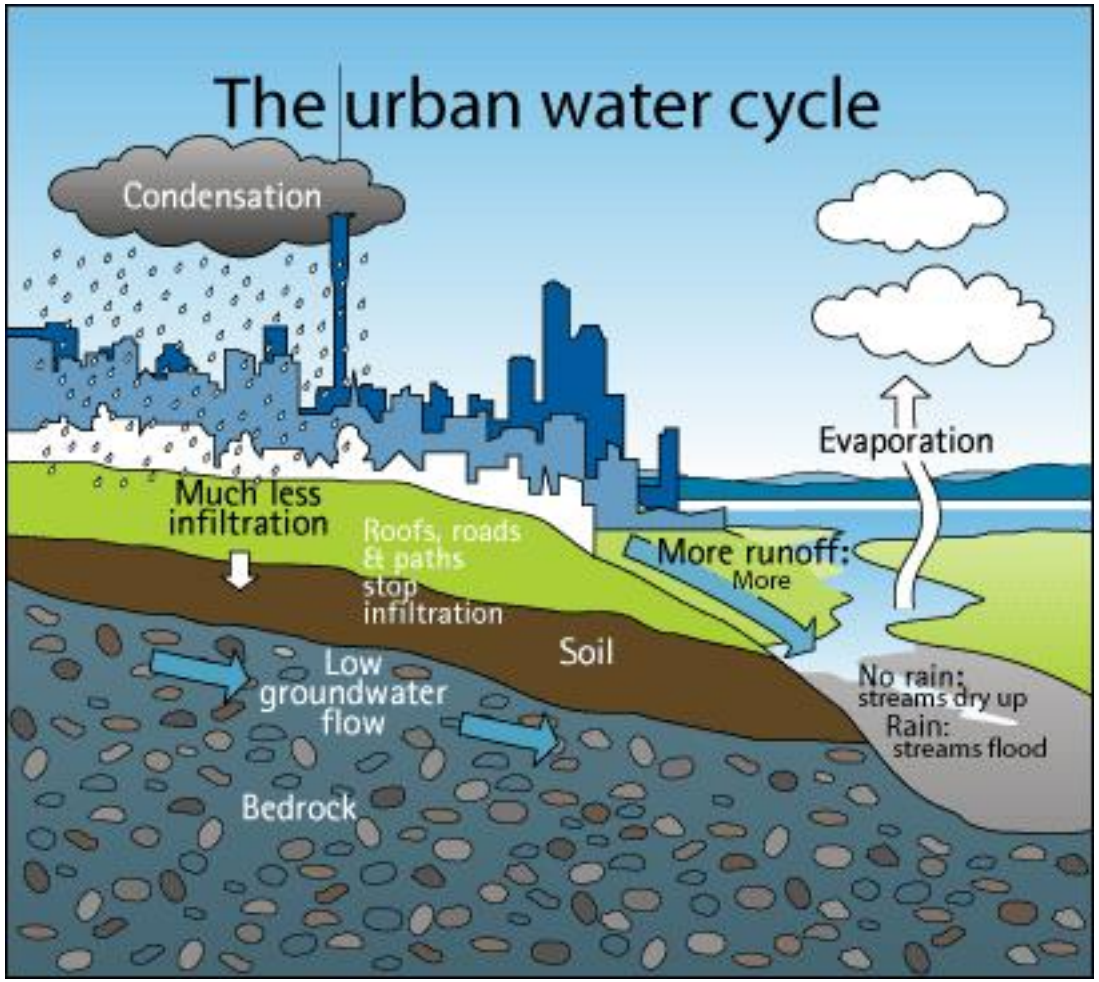
Lafitte Greenway. New Orleans, LA. Completed 2015.


TCHEFUNCTA RIVER
TANGIPAHOA RIVER
NORTH PASS
BAYOU LACOMBE
PEARL RIVER
LAKE MAUREPAS
LAKE PONTCHARTRAIN
MISSISSIPPI RIVER
LAKE BORGNE
GULF OF MEXICO


MOBILE
GULFPORT
GULF OF MEXICO
CHANDELEUR SOUND
BRETON SOUND
MISSISSIPPI
RIVER DELTA
RIGOLETS
LAKE BORGNE
CHEF MENTEUR PASS
ST. TAMMANY PARISH
ST BERNARD
PARISH
PLAQUEMINES PARISH
LAKE PONTCHARTRAIN
ORLEANS PARISH
JEFFERSON PARISH
WEST BANK

Natural vs Urban Water Cycles



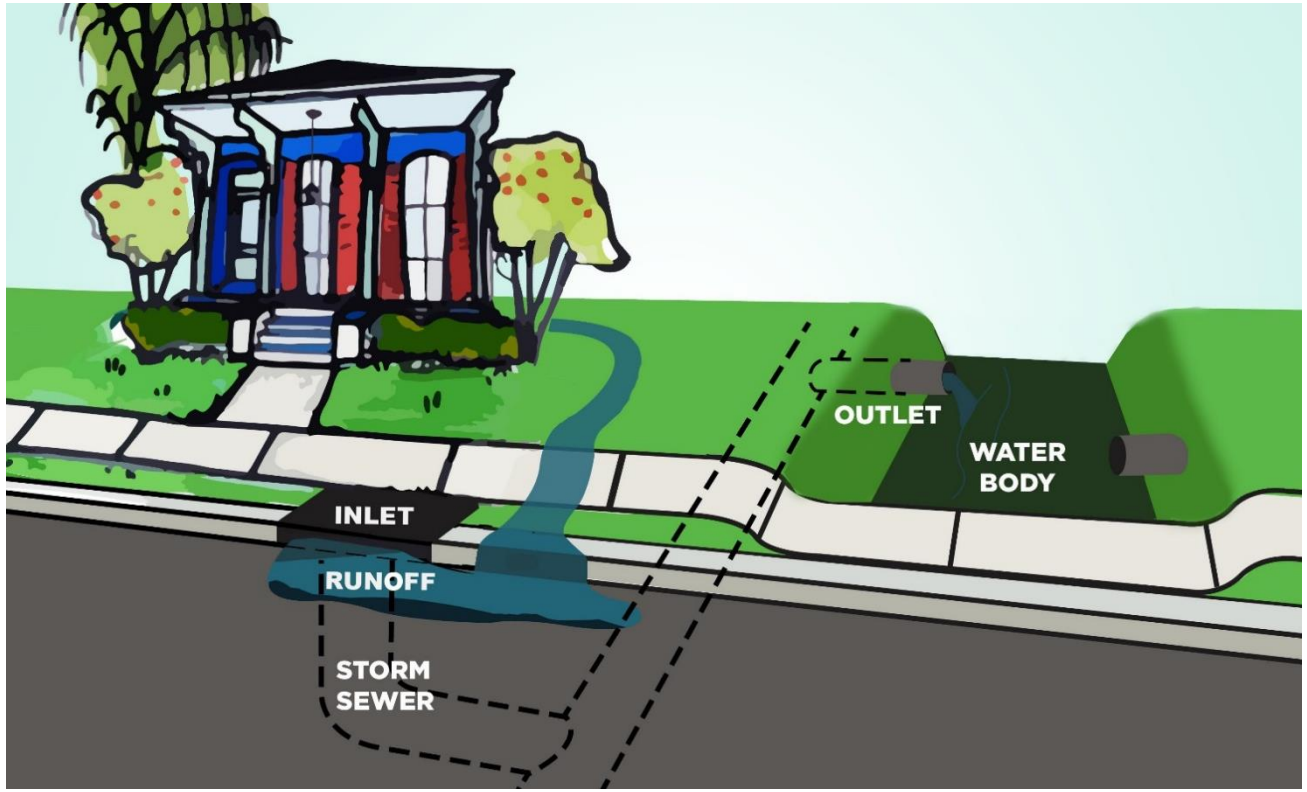


WHY WORRY ABOUT URBAN STORMWATER?

- Hydrologic processes disturbed
- Excessive rainfall overwhelms the drainage system
- Runoff backs up causing localized flooding

TRADITIONAL APPROACH

- Engineer structures to CONTROL stormwater
- Move water as quickly as possible from where it falls
- Shorten the time of concentration
- Costly to construct, operate, & maintain
- Drainage only – single benefit
- Reduces neighborhood livability and quality



FREQUENT FLOODING

WATER QUALITY

- Runoff picks up pollutants
- Pollutants are pumped into the lakes and rivers
- Water quality in the lakes/rivers/coastal wetlands degrades

Source: CBS News

Source: http://www.fromthesouthblog.com/2016/08/my-hometown-is-flooded-heres-what-i-know.html

REDUCED GROUNDWATER RECHARGE & SUBSIDENCE

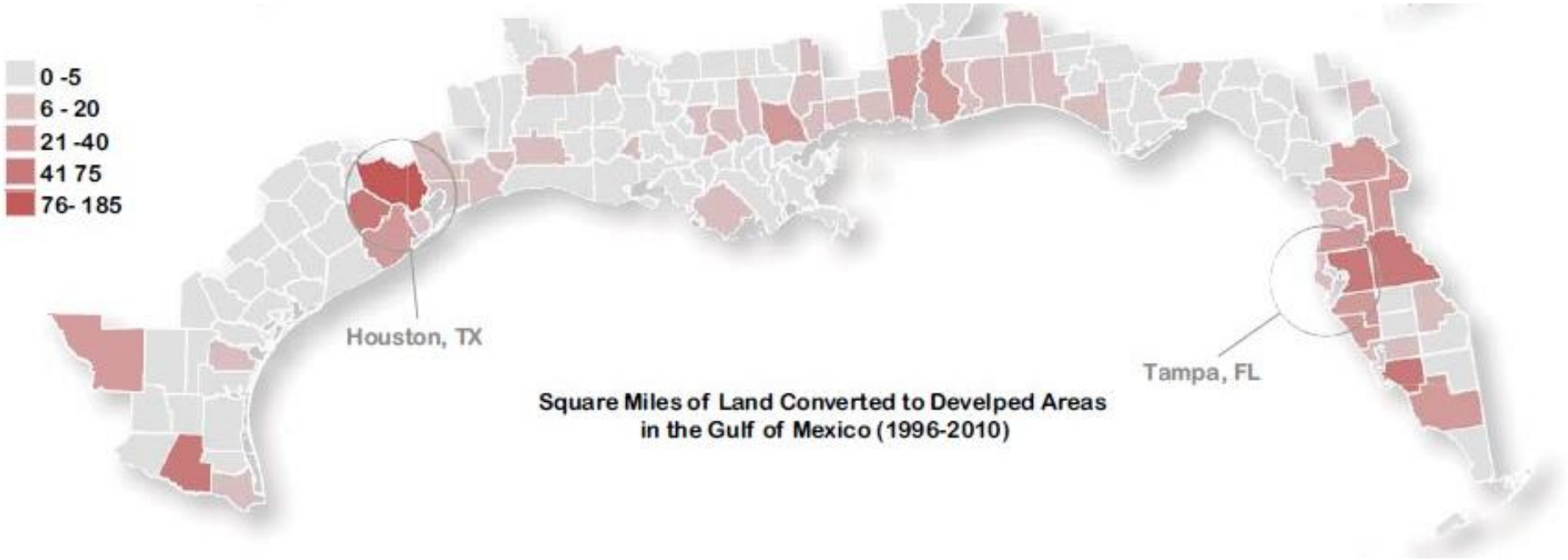
DETRIMENTAL DISCONNECTION: LACK OF PUBLIC AWARENESS

WHY WORRY ABOUT URBAN STORMWATER FOR RESILIENCE?

- Localized Flooding
- Subsidence
- Groundwater
- Water pollution
- Ecoregion shifts
- Sea level rise
- Increasingly stronger storms
- Receding coastline

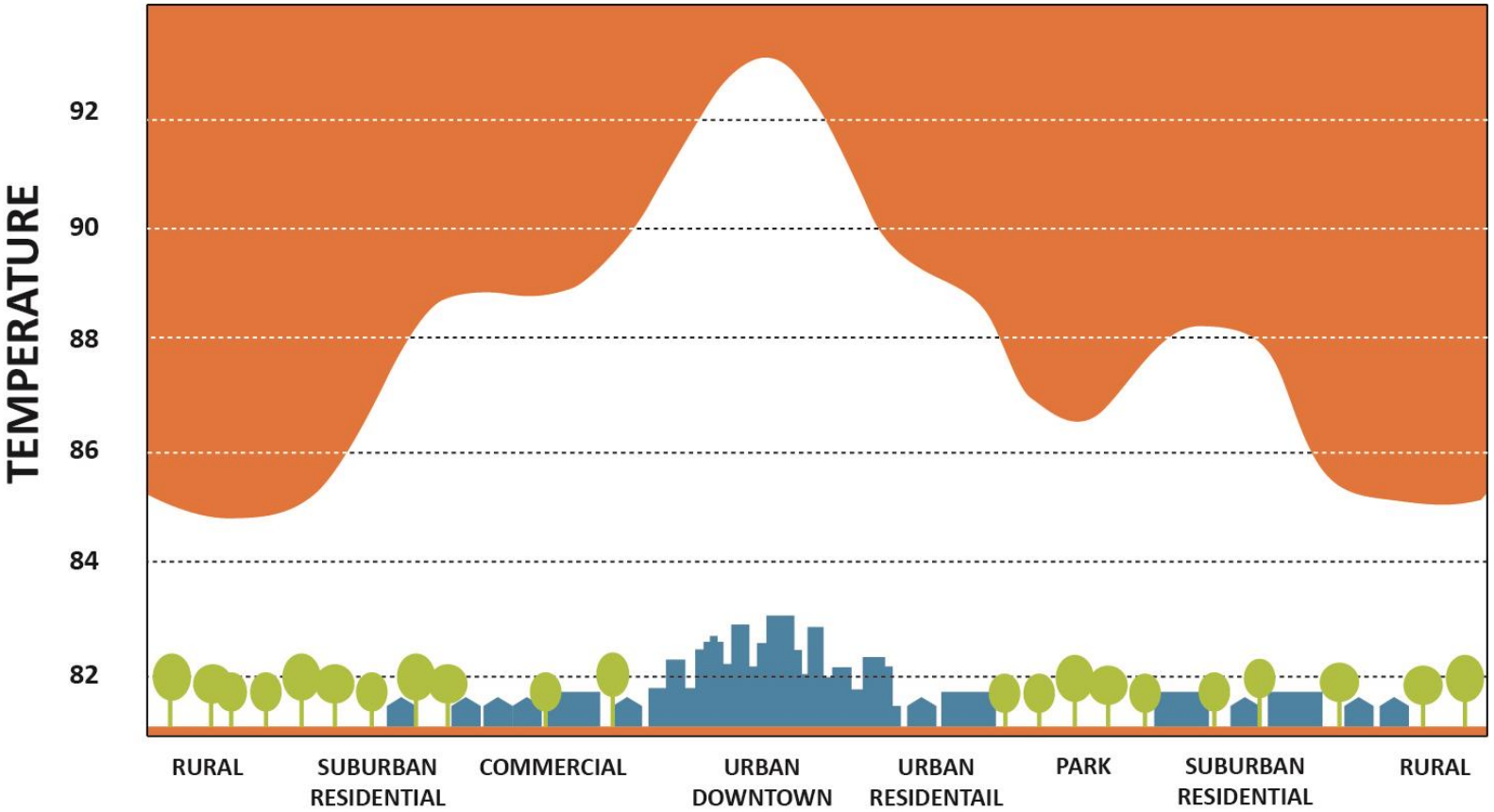
DEVELOPMENT

- Increase in impervious surfaces
- Increase in temperatures
  - Higher energy consumption
  - Bigger, stronger storms



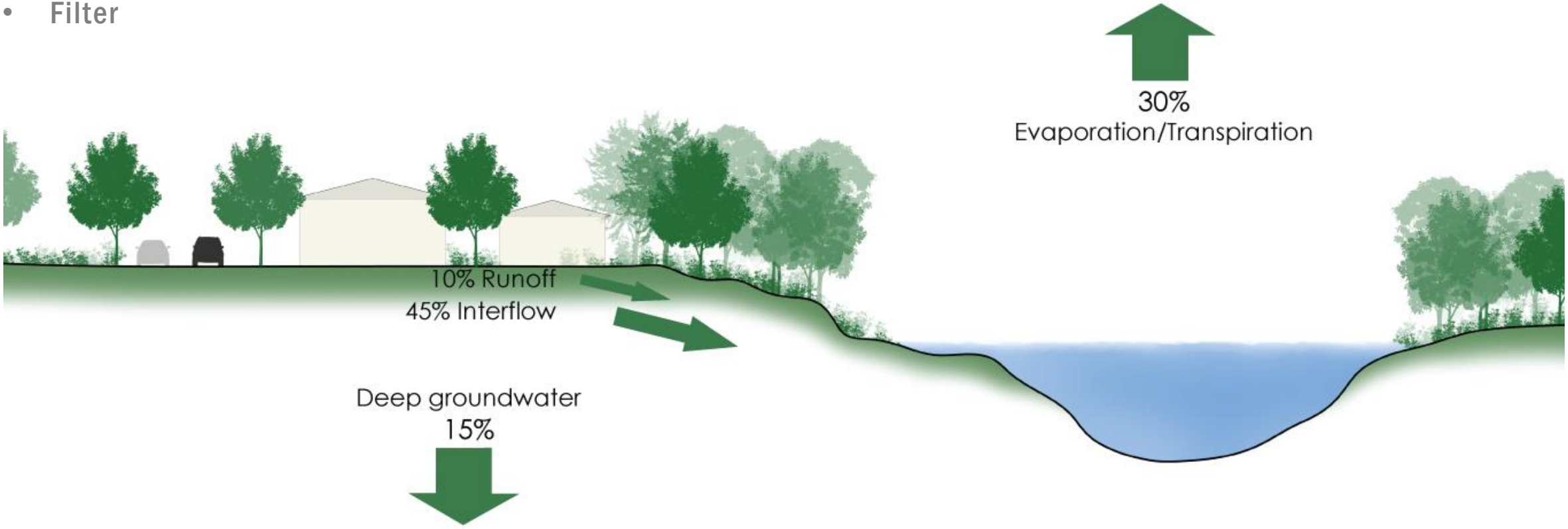
URBAN HEAT ISLAND EFFECT

- Increase in impervious surfaces
- Increase in temperatures
  - Higher energy consumption
  - Bigger, stronger storms



STORMWATER MANAGEMENT APPROACH

- Mimic nature
- Detain
- Infiltrate
- Filter



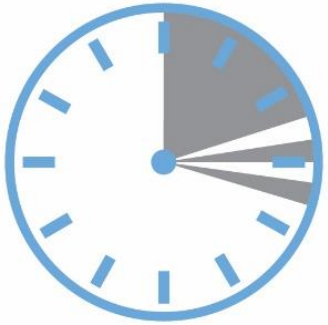
STORMWATER MANAGEMENT APPROACH

- Develop to be resilient
- Manage each drop of rainwater as close to where it falls as possible
- Extend time of concentration to reduce peak
- Treat runoff to improve water quality
- Make places for water to exist
- Live *with* water

STORMWATER MANAGEMENT STRATEGY

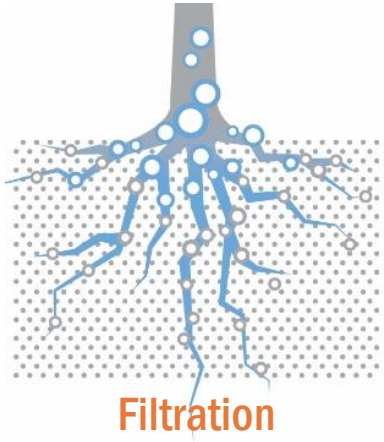
- DETENTION temporarily store each drop of rain as close as possible to where it falls
- INFILTRATION Store runoff to increase recharge of groundwater
- FILTRATION Store and convey runoff to facilitate pollutant removal by plants and soil

- All are involved in extending the time of concentration
- All are involved in increasing residence time in stormwater green infrastructure



Detention

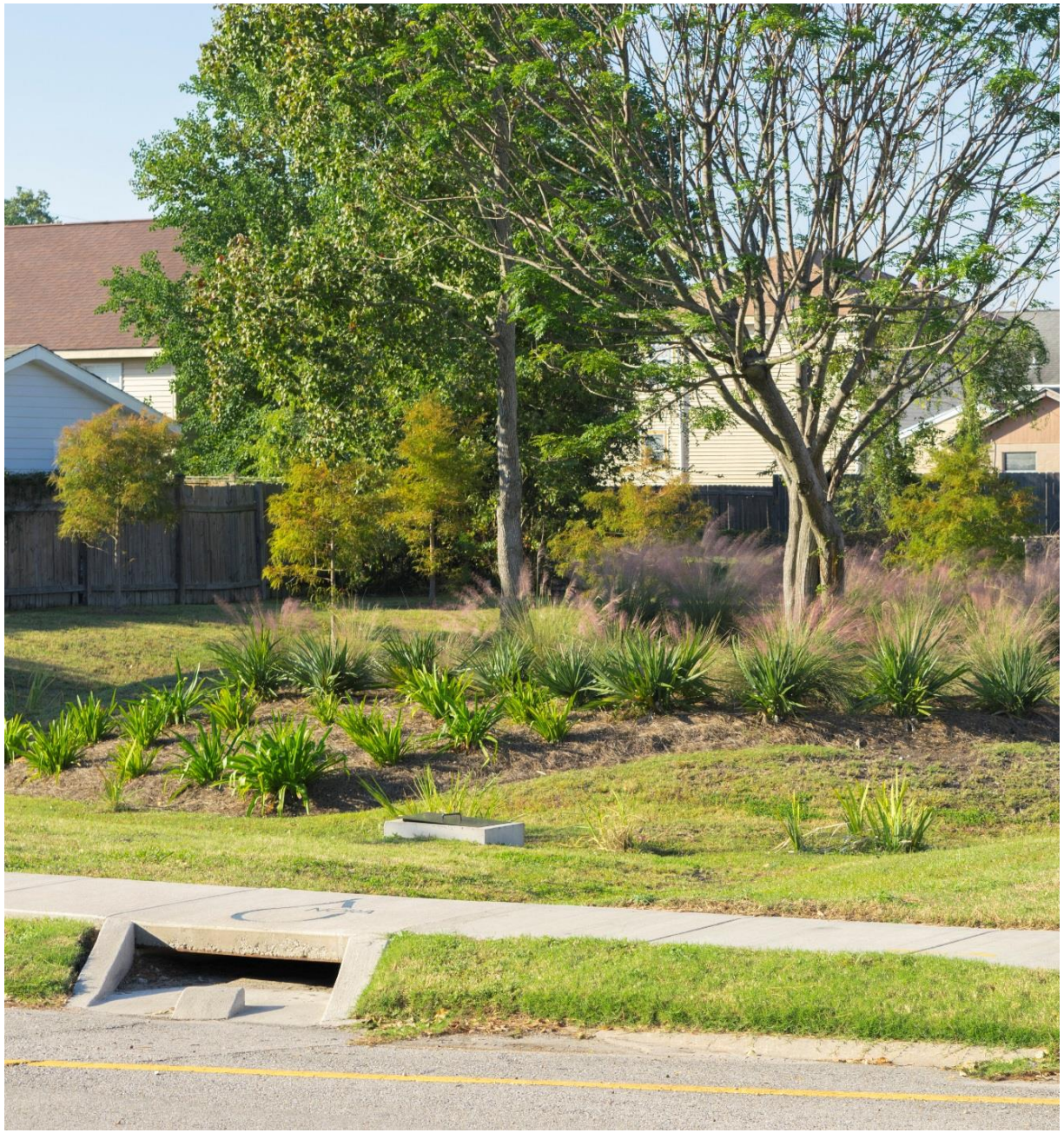
Infiltration



Filtration

GREEN INFRASTRUCTURE

- Mimics natural hydrology
- Detains water
- Filtering stormwater runoff through a plant/soil/ microbe complex to remove pollutants.
- Provides multiple benefits
  - Reduces flood risk
  - Reduces burden on drainage system
  - Retains or uptakes pollutants such as N, P, bacteria, & heavy metals
  - Recharges groundwater
  - Reduces soil subsidence
  - Increases urban habitat
  - Improves Air Quality
  - Reduces urban heat island effect
  - Increases value of neighborhoods
- Applicable at any scale

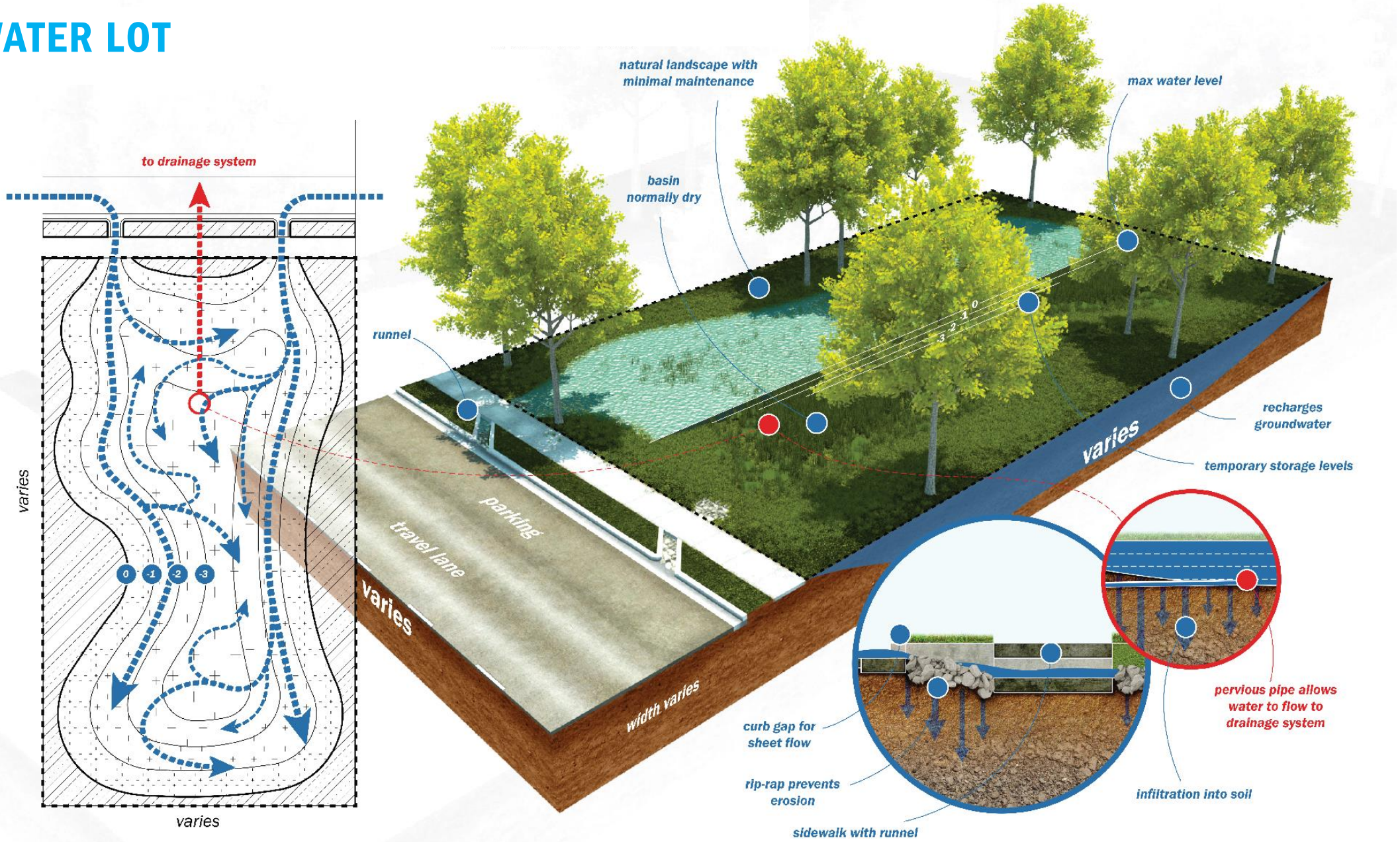


GREEN INFRASTRUCTURE FACILITIES

GREEN INFRASTRUCTURE

STORMWATER LOT

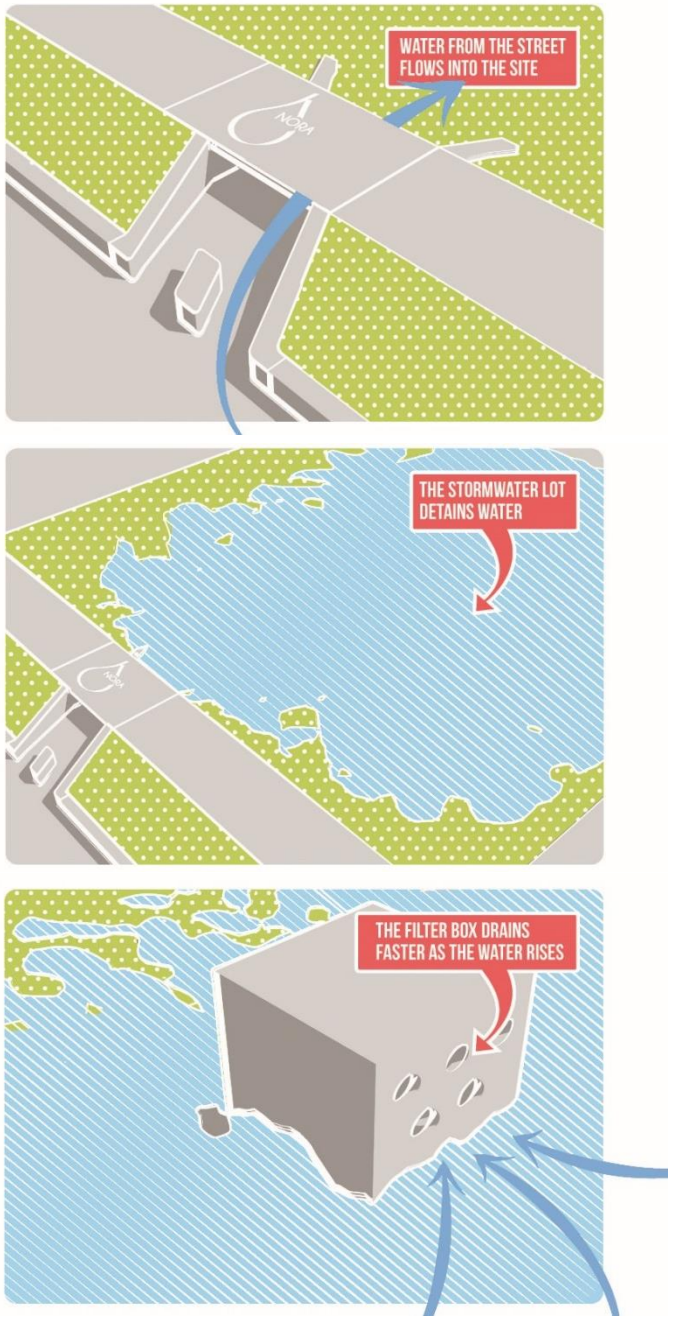
DETENTION



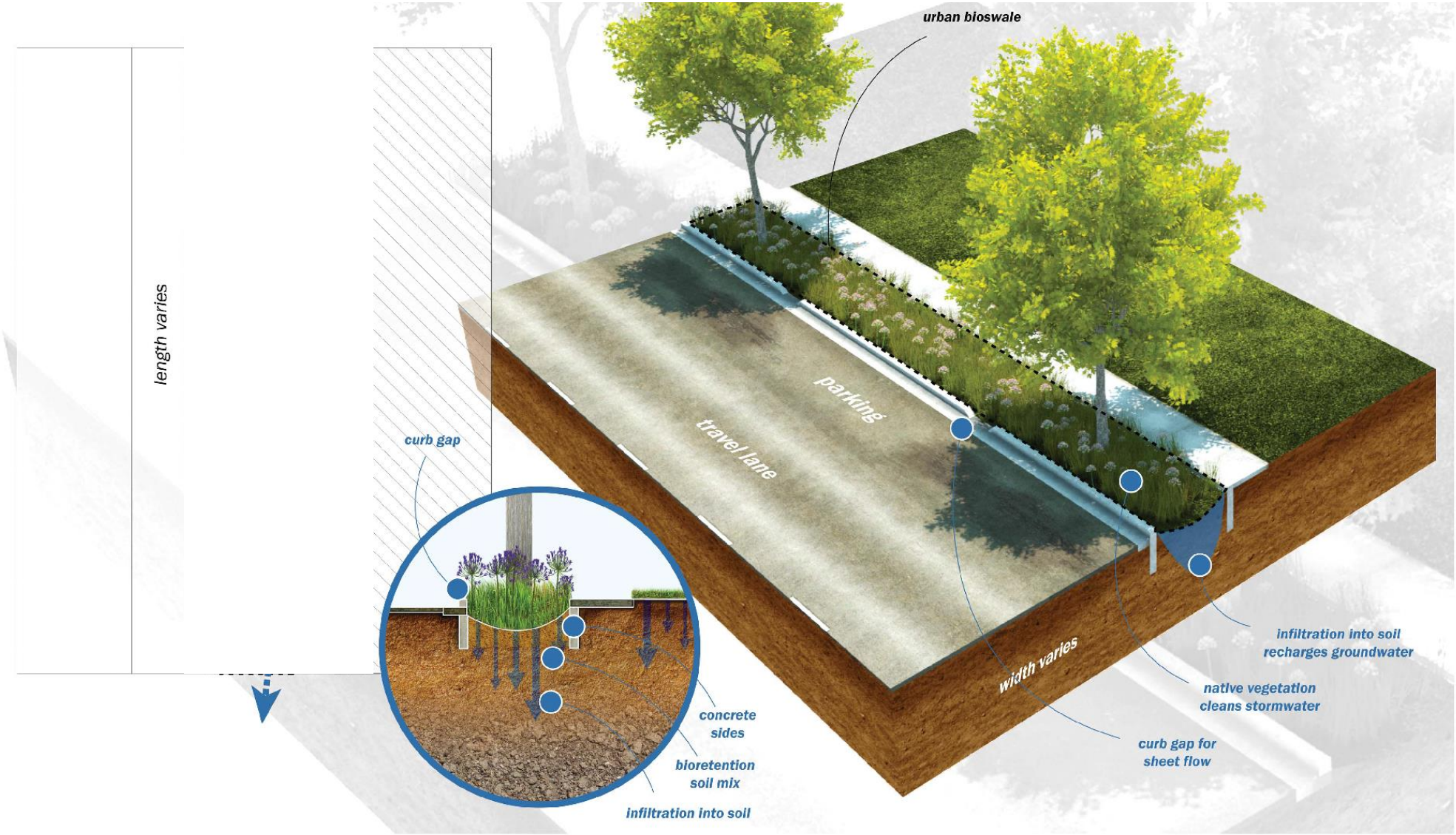
GREEN INFRASTRUCTURE

STORMWATER LOT

FILTRATION



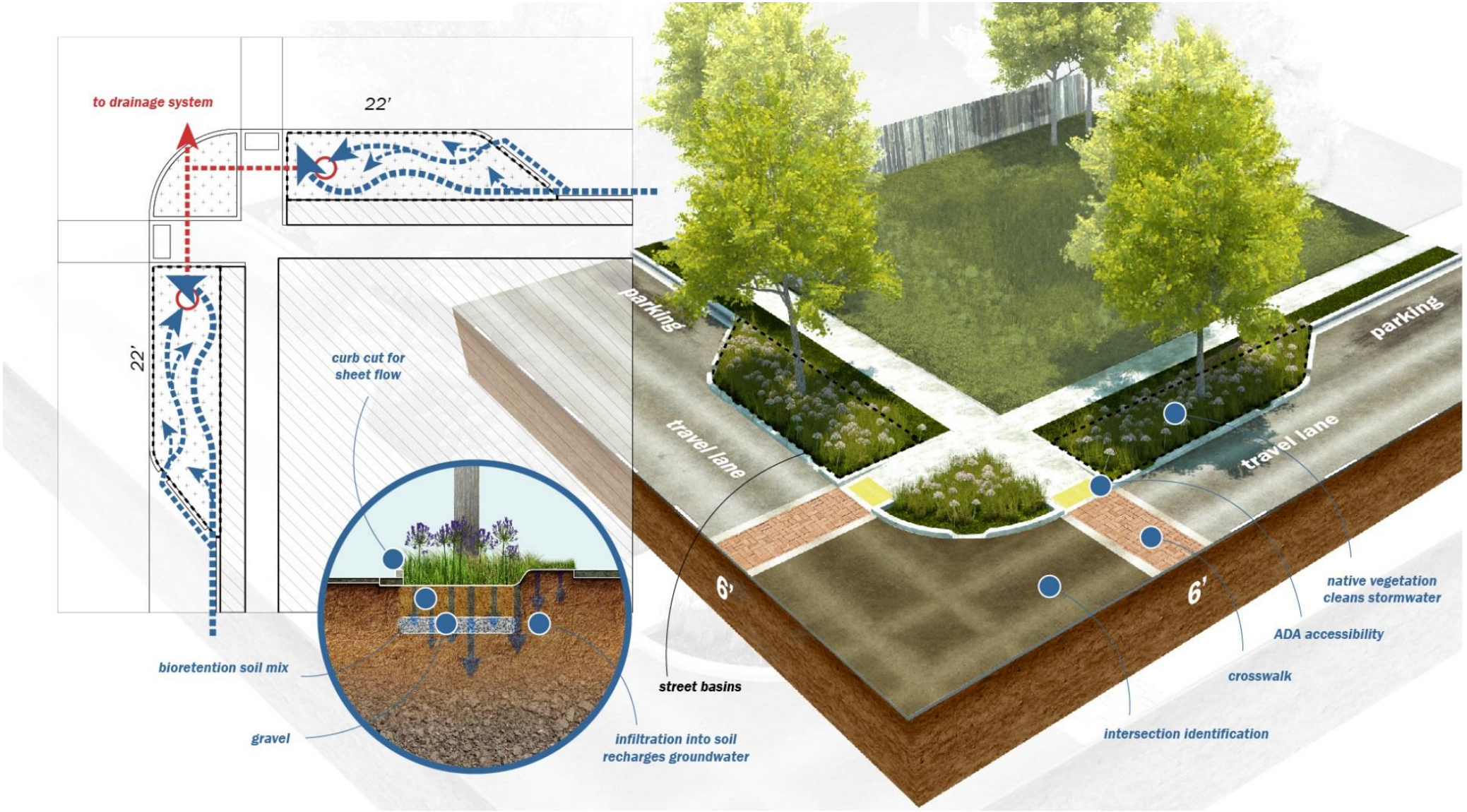
GREEN INFRASTRUCTURE
URBAN BIOSWALE



GREEN INFRASTRUCTURE
URBAN BIOSWALE

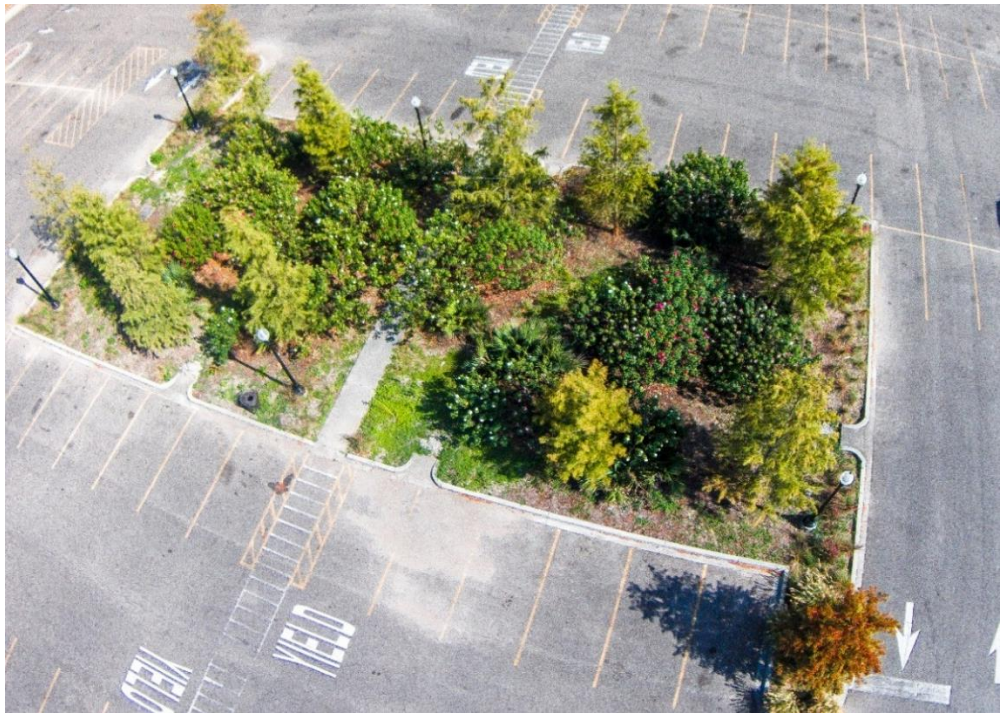
GREEN INFRASTRUCTURE

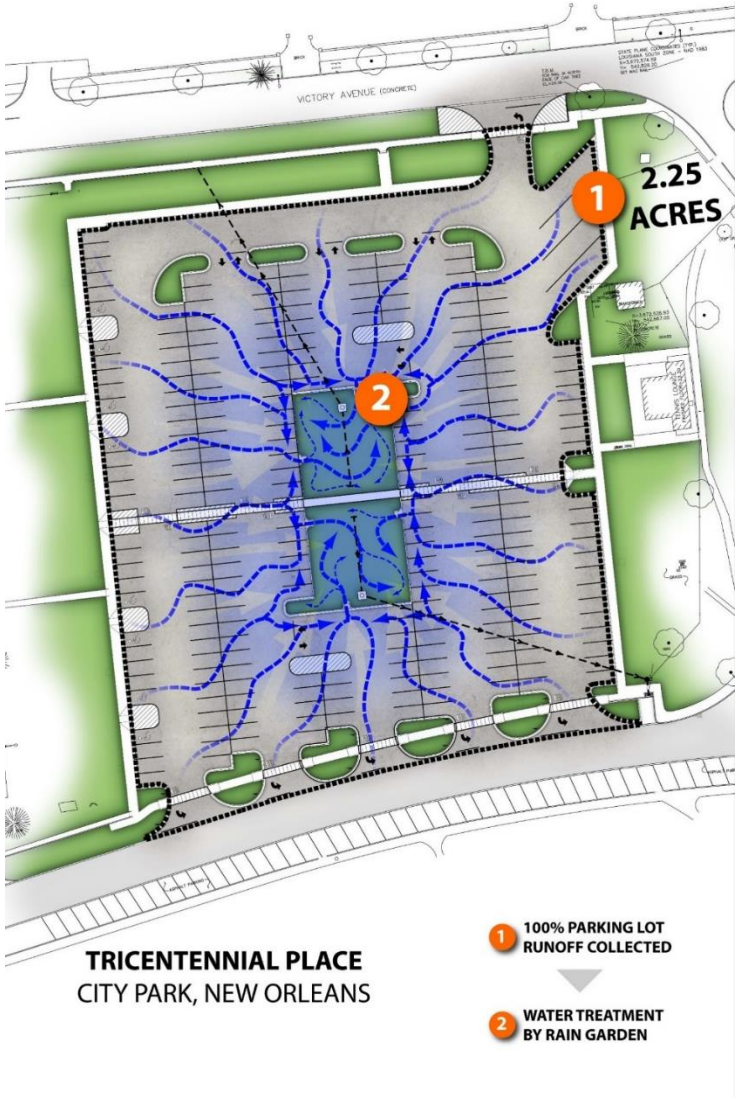
CORNER STREET BASIN




STOP

GREEN INFRASTRUCTURE
BIORETENTION CELL



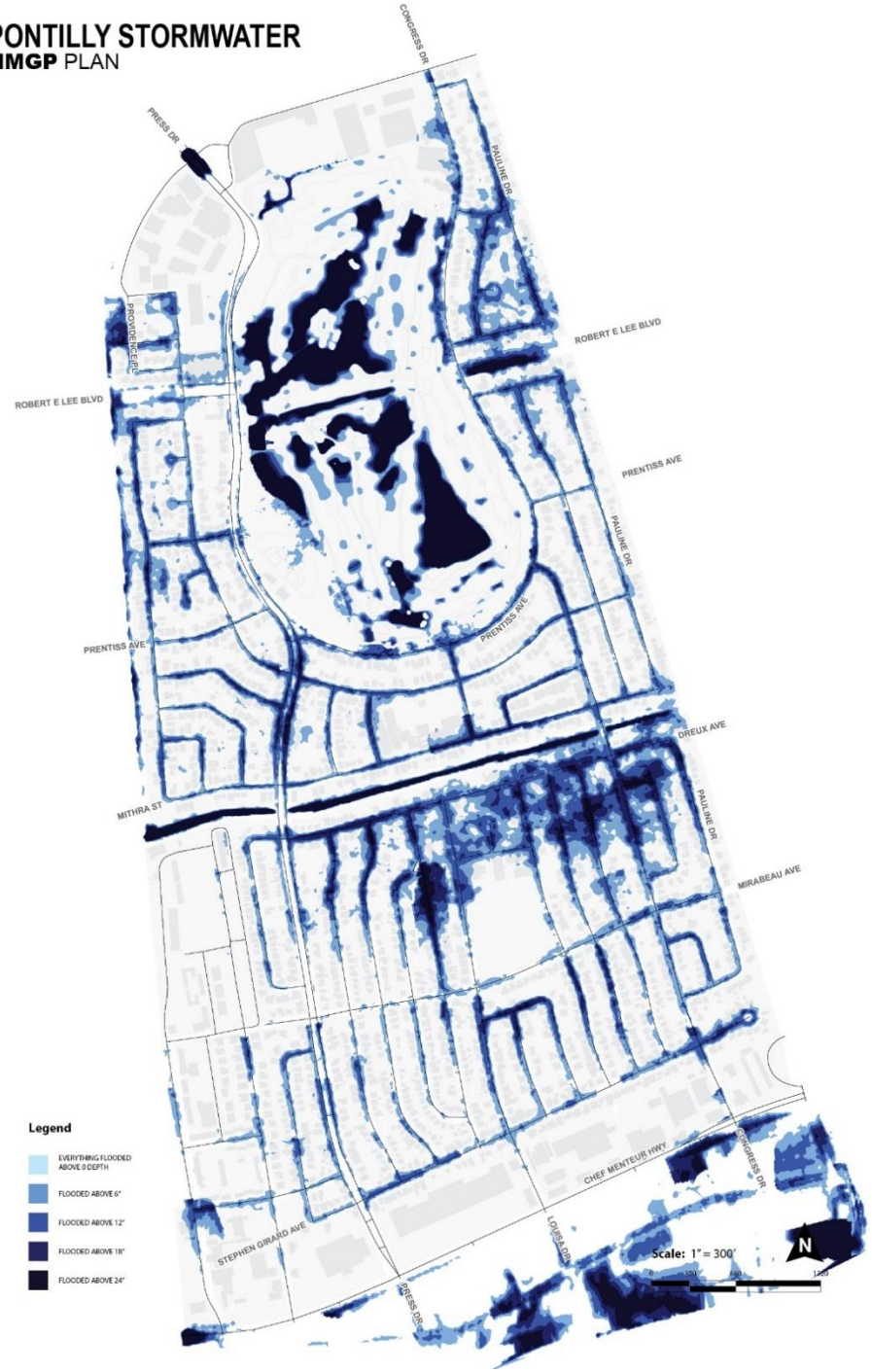


GREEN INFRASTRUCTURE
STORMWATERWETLAND

1: INFLOW
2: SEMI WET ZONE
3: MARSH ZONE
4: POOL ZONE

CURRENT RESILIENCE PROJECTS IN NEW ORLEANS
RECONNECTING ECOHYDROLOGIC PROCESSES

PONTILLY STORMWATER
HMGP PLAN



PONTILLY STORMWATER
HMGP PLAN

MID CONCEPT

LOCALIZED FLOODING MITIGATION

PEAK FLOOD STAGE BEFORE AND AFTER MORE STORMWATER MANAGEMENT MEASURES

BEFORE

AFTER

DANA BROWN & Associates

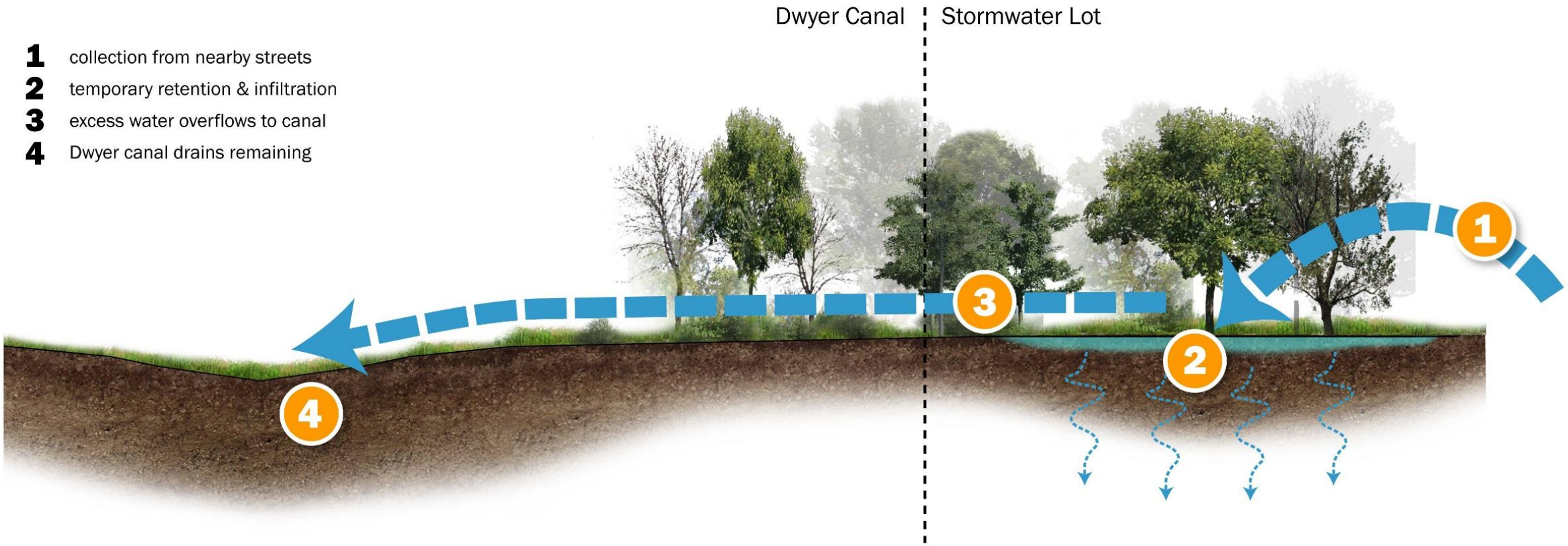
A. Stormwater Park

B. Urban Bioswale

C. Stormwater Lot

D. Street Basin

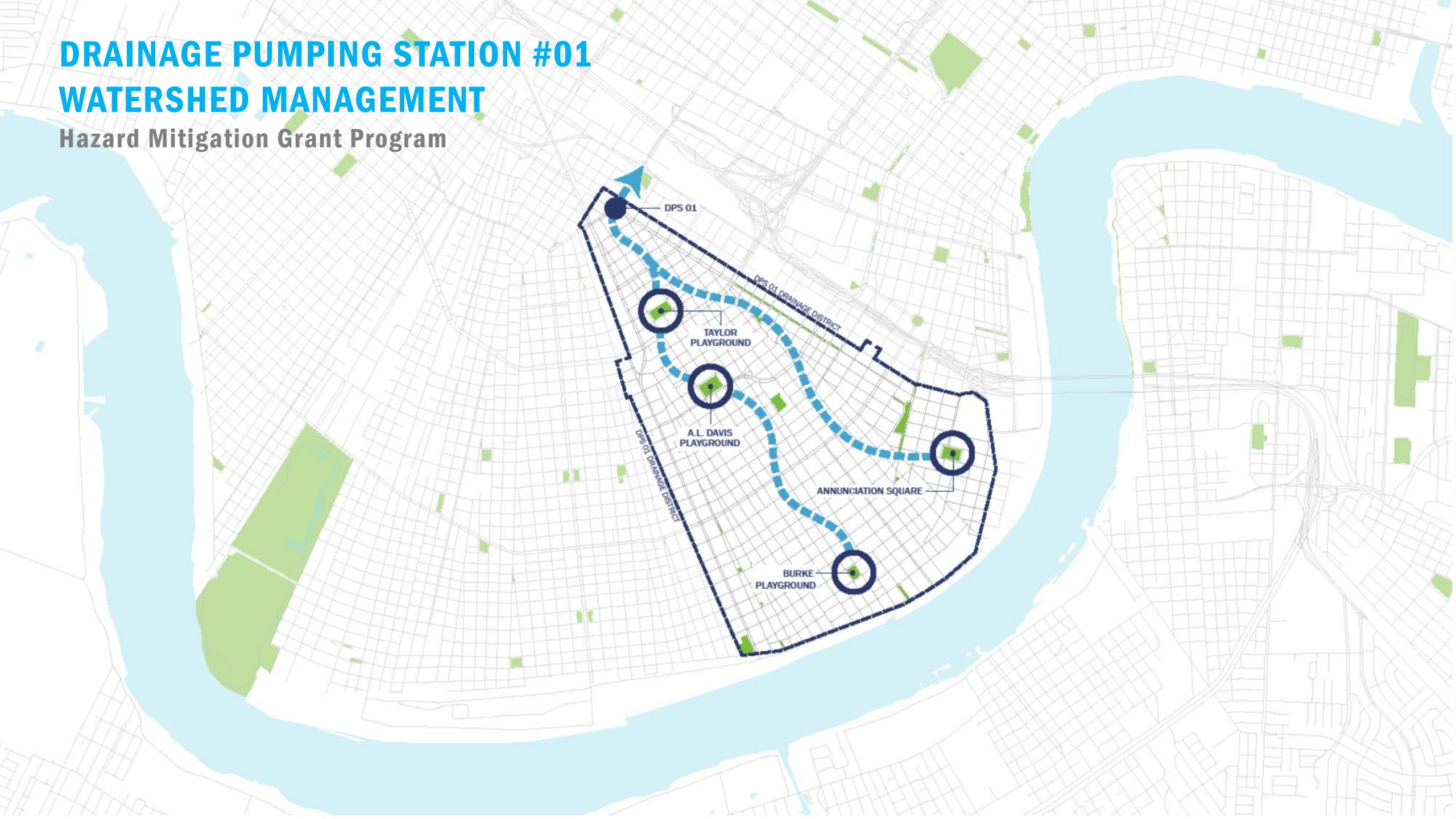
E. Urban Bioswale and Pervious Paving


Dwyer Canal
Stormwater Lot
1 collection from nearby streets
2 temporary retention & infiltration
3 excess water overflows to canal
4 Dwyer canal drains remaining
1
2
3
4


STOP

DRAINAGE PUMPING STATION #01
WATERSHED MANAGEMENT

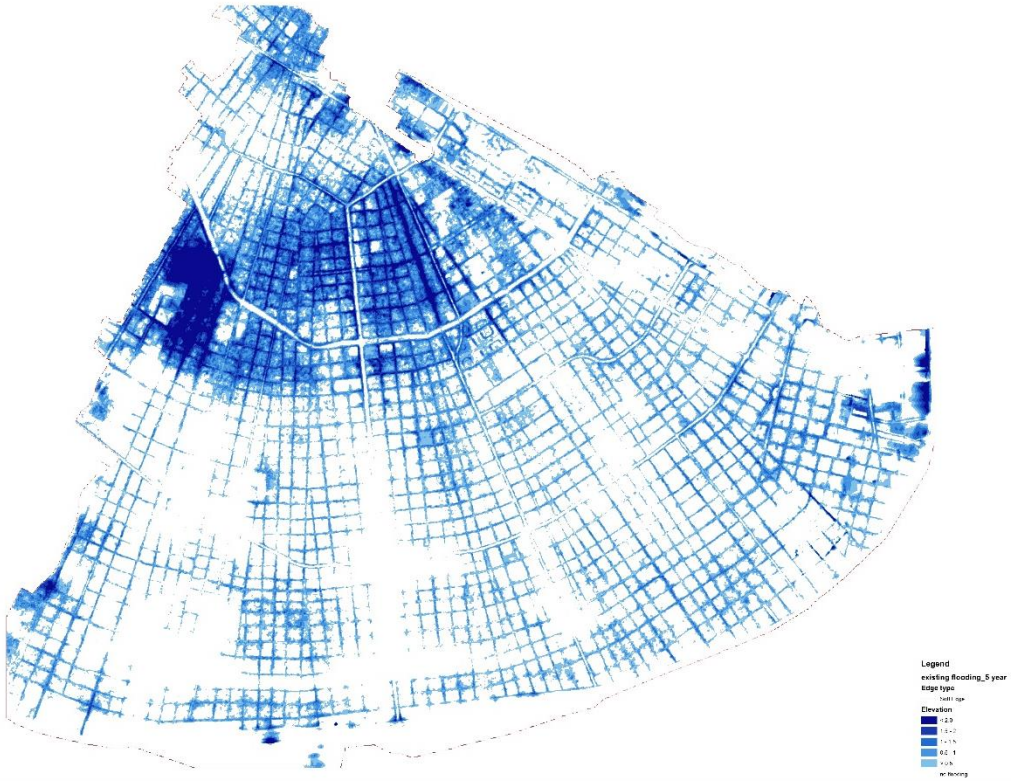
Hazard Mitigation Grant Program



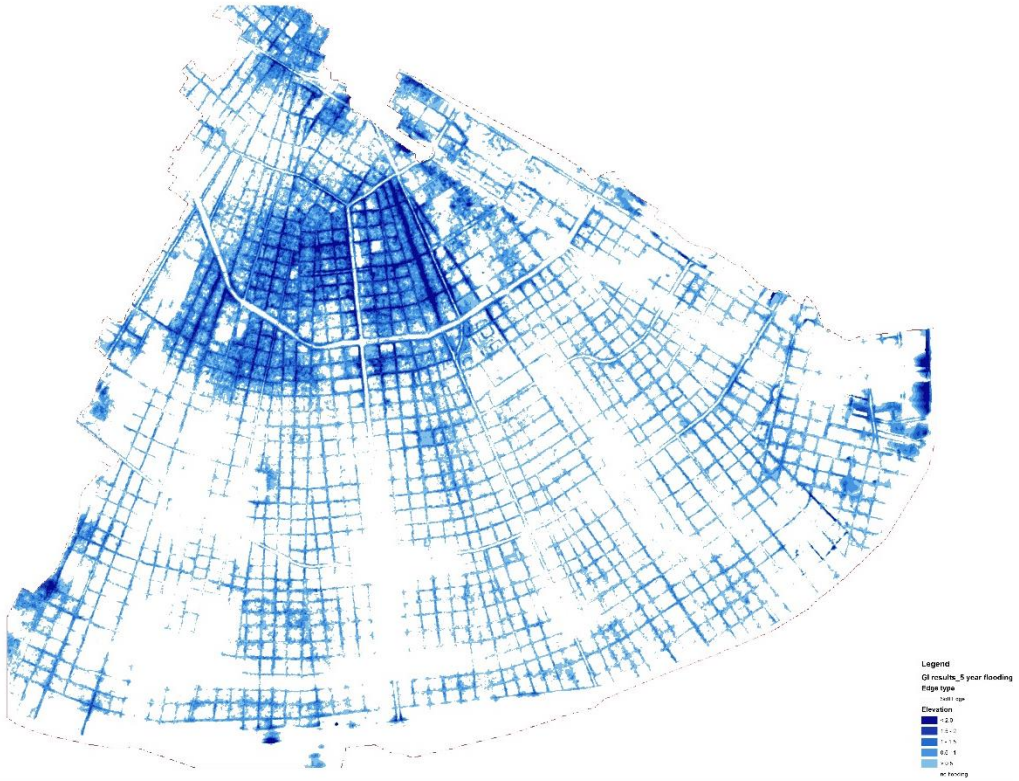
DRAINAGE PUMPING STATION #01
WATERSHED MANAGEMENT

Hazard Mitigation Grant Program

Stormwater becomes floodwater – modeling the storm event



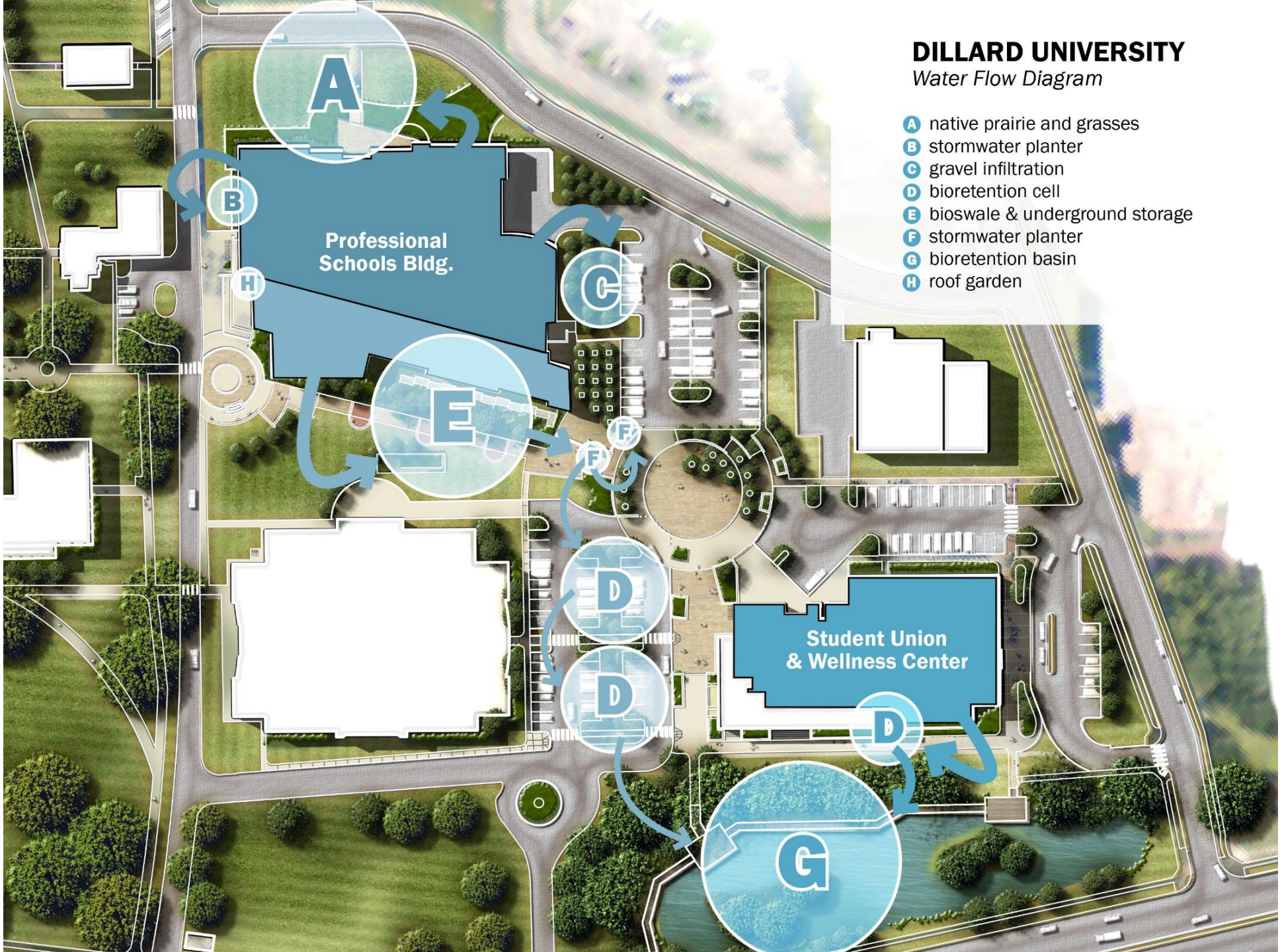
EXISTING 5 YEAR FLOOD

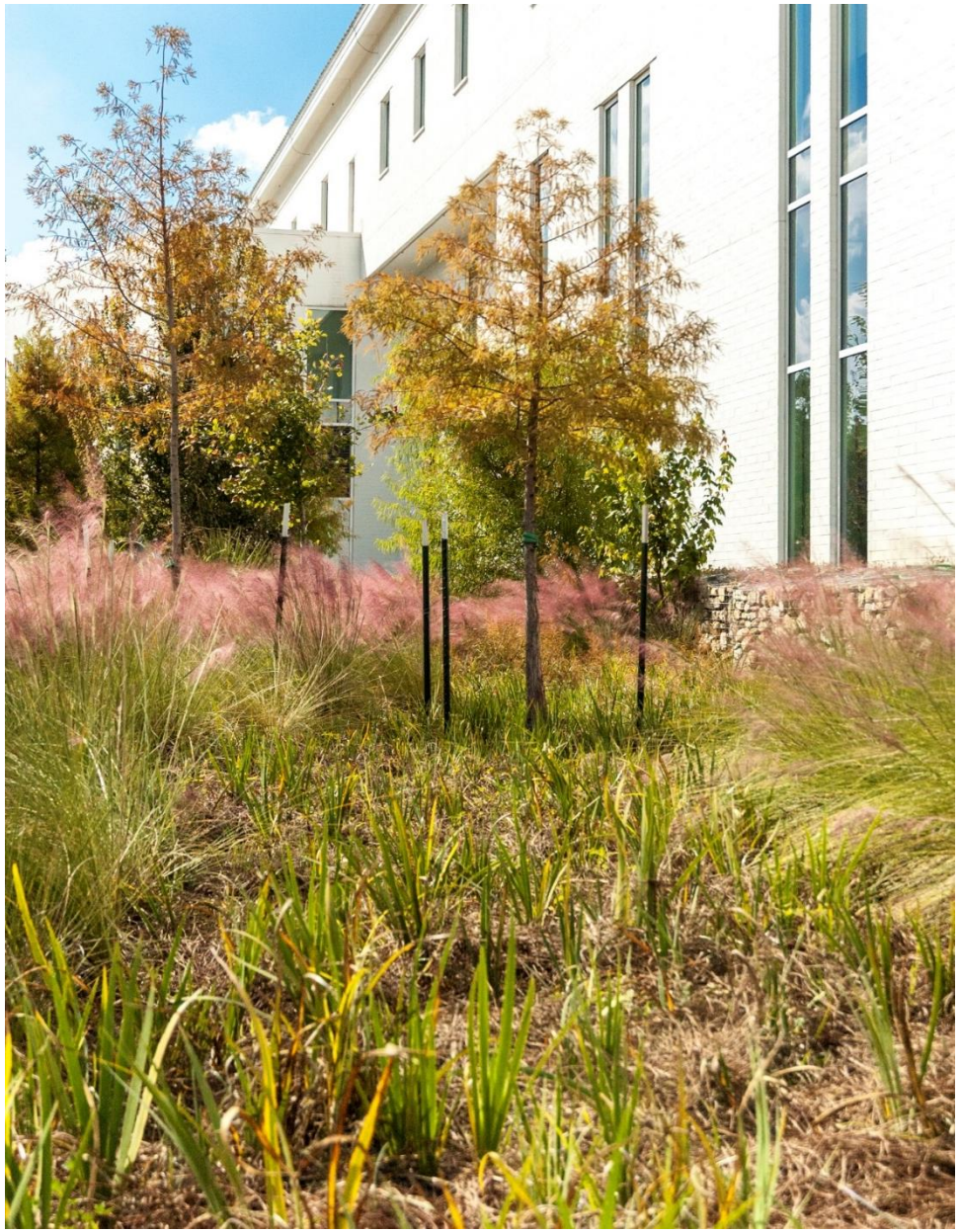


REDUCED 5 YEAR FLOOD

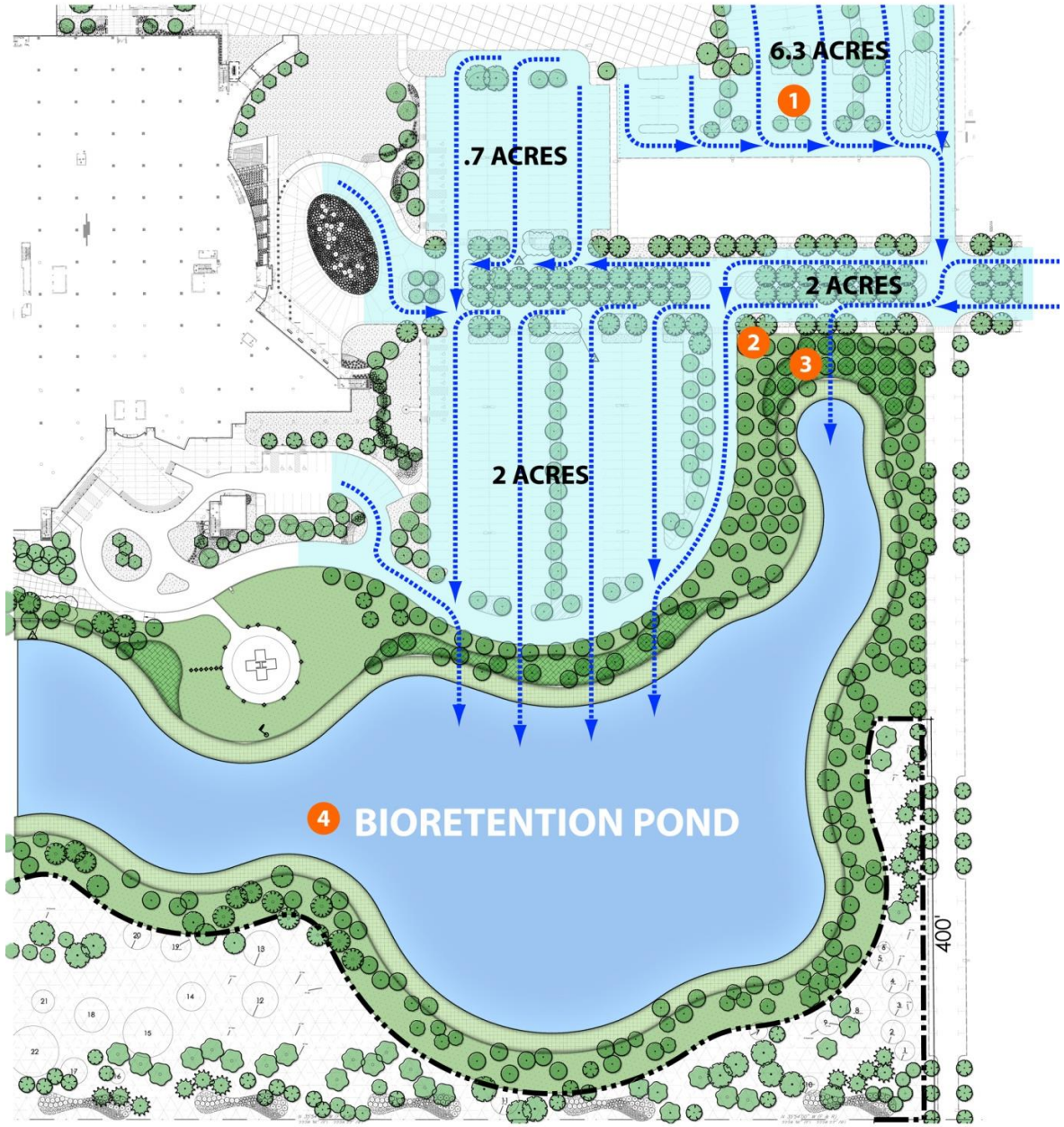
DRAINAGE PUMPING STATION #01
WATERSHED MANAGEMENT

Hazard Mitigation Grant Program


DILLARD UNIVERSITY
Water Flow Diagram
A native prairie and grasses
B stormwater planter
C gravel infiltration
D bioretention cell
E bioswale & underground storage
F stormwater planter
G bioretention basin
H roof garden
Professional Schools Bldg.
Student Union & Wellness Center
A
B
C
D
D
D
E
F
F
G
H



GREEN INFRASTRUCTURE TREATMENT TRAIN



WOMANS' HOSPITAL

1. 11 ACRES OF PARKING RUNOFF COLLECTED
2. NATIVE PLANTS & GRASSES
3. WETLAND FOREBAY FILTERING
4. BIORETENTION POND

DANA BROWN & Associates


WOMAN'S HOSPITAL - BRIARWOOD
JUNE 8, 2011
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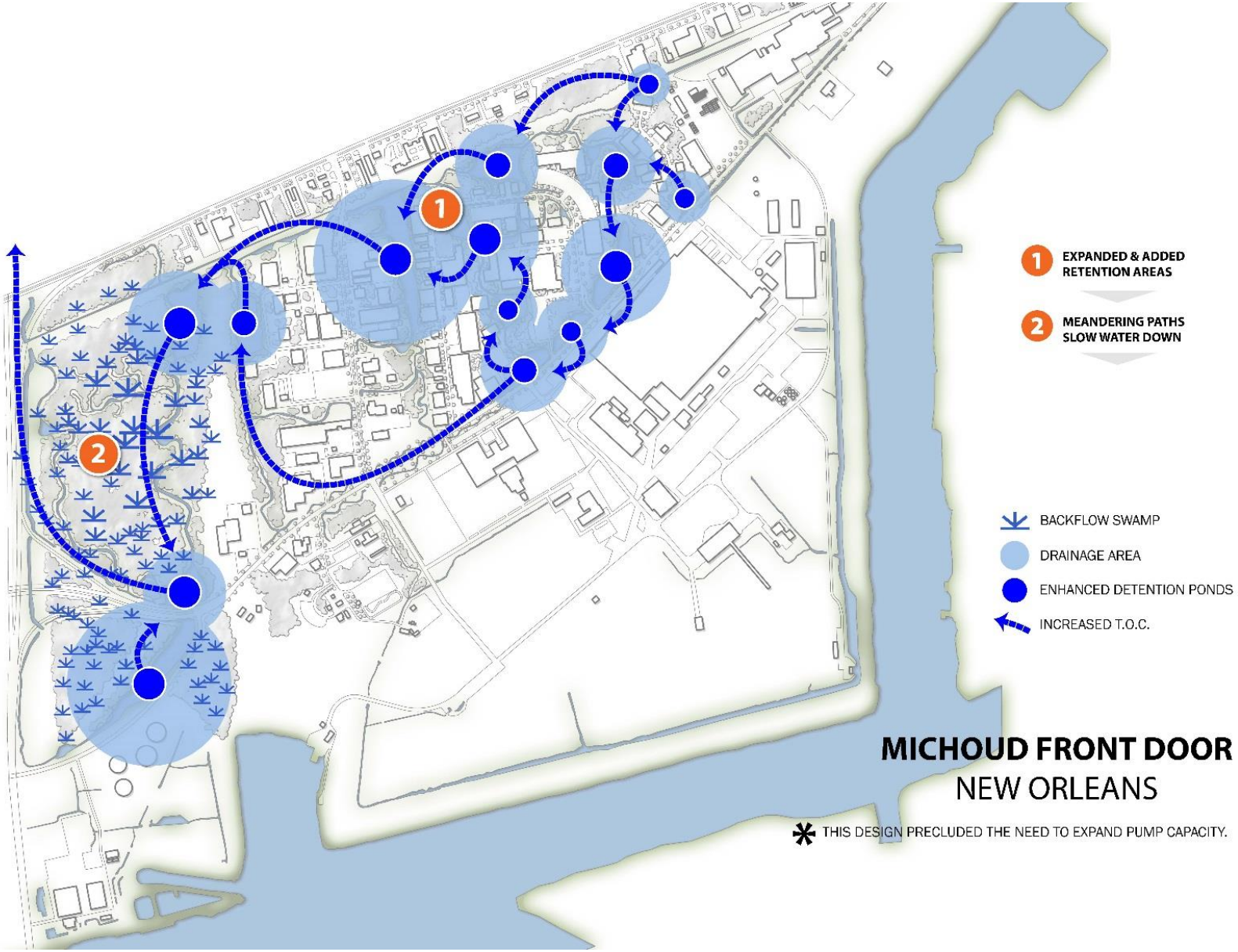
BIOSWALE IN PARKING LOT

DANA BROWN& Associates

MICHOUD
REVERSE ENGINEERING



MICHOUD
REVERSE ENGINEERING

Restore Hydrologic Systems

With Green Infrastructure

Reconnect urban and coastal ecologies

Reconnect people to water

Strengthen Resilience

Community & Site Scale

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Lafitte Greenway. New Orleans, LA. Completed 2015.