



STORMWATER MANAGEMENT AS A COMMUNITY ASSET: TRANSFORMING A NECESSITY INTO AN AMENITY

LRGV WATER QUALITY
MANAGEMENT & PLANNING
CONFERENCE
05.25.17

PREPARED BY

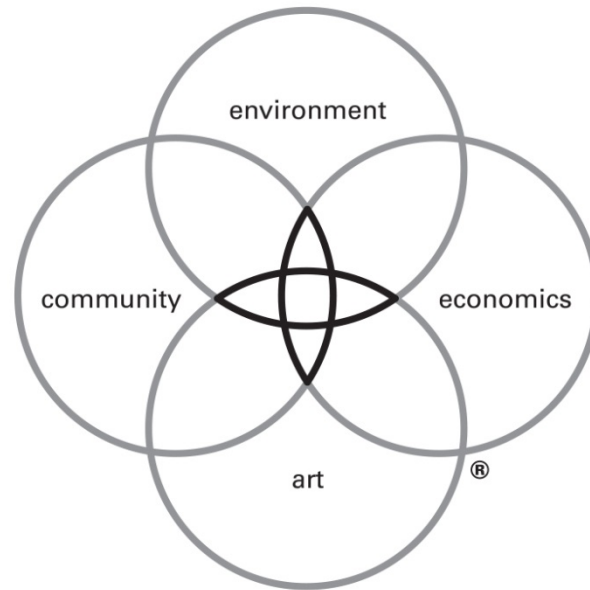
DESIGNWORKSHOP

Aspen ▫ Asheville ▫ Austin ▫ Chicago ▫ Denver ▫ Dubai ▫ Houston ▫ Lake Tahoe ▫ Los Angeles ▫ Shanghai

ABOUT DESIGN WORKSHOP

rethinking
ENVIRONMENT

building
resilient
COMMUNITIES



innovating
ECONOMIC
landscapes

through
ARTFUL integrity

ABOUT DESIGN WORKSHOP



TODAY'S AGENDA

DISCUSSION OF ISSUES / DILEMMA

DISCUSSION OF SOLUTION / THESIS

Regional Scale: New Braunfels Regional Stormwater Plan

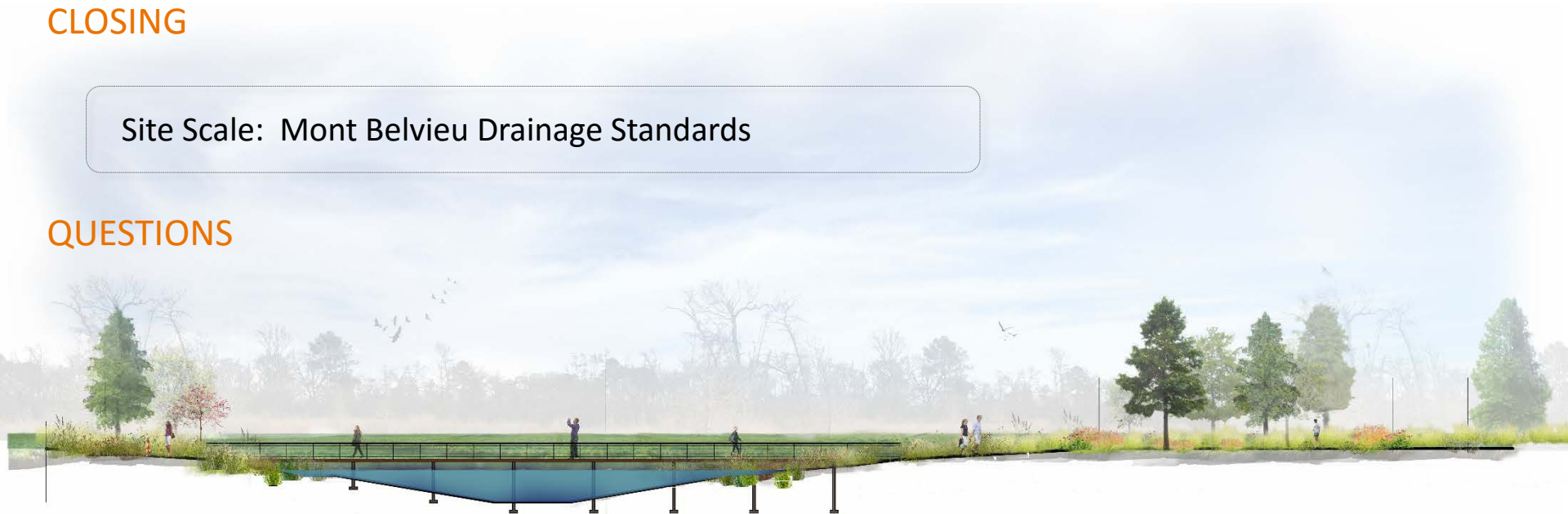
CASE STUDIES

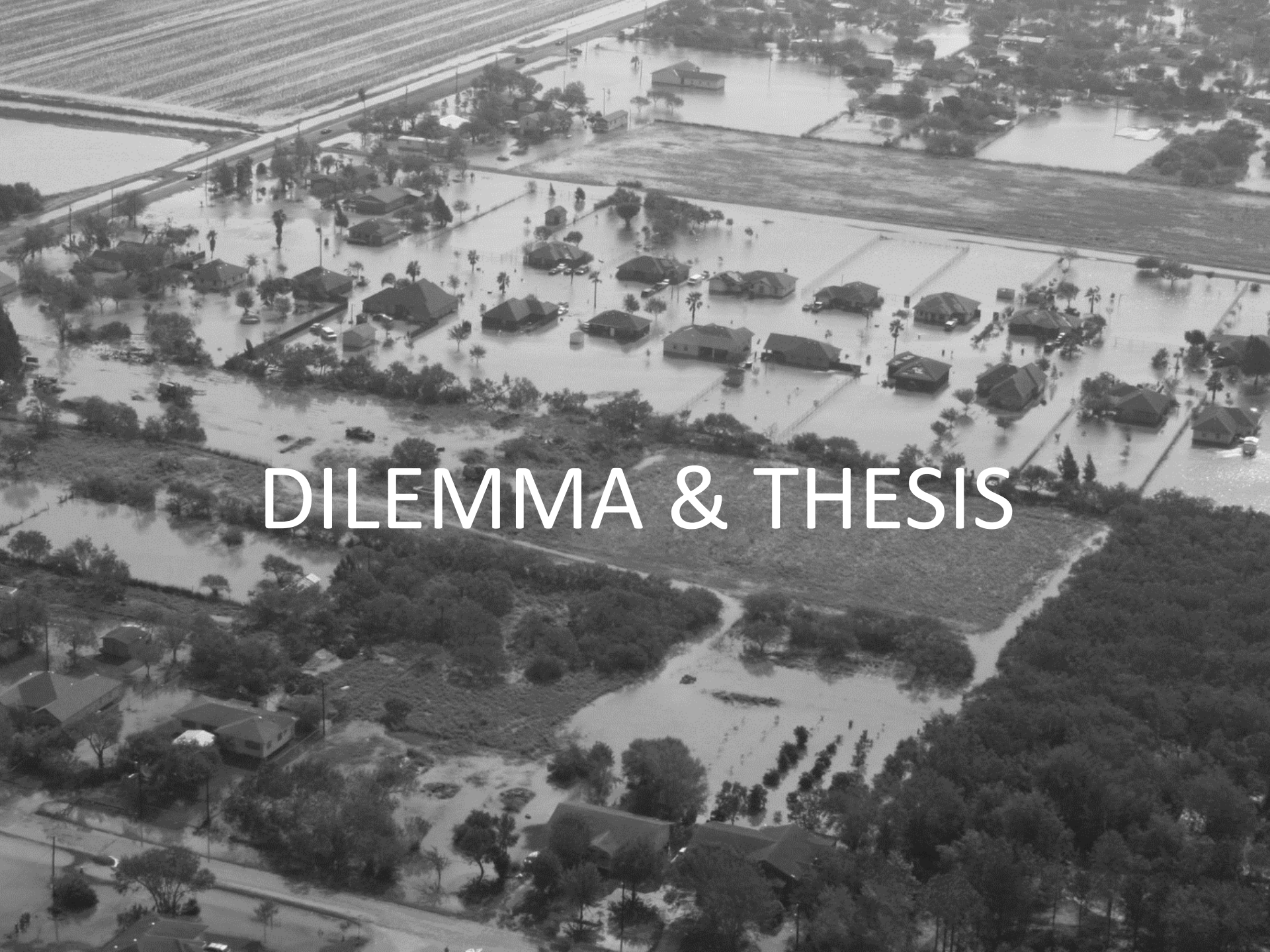
Community Scale: Bagby Street Reconstruction //
Hackberry Gully Regional Park

CLOSING

Site Scale: Mont Belvieu Drainage Standards

QUESTIONS





DILEMMA & THESIS

DILEMMA

Many cities along the U.S. Gulf Coast are highly susceptible to flooding and drainage problems. There is a challenge of providing safety to residents, complying with water quality regulations, and providing an adequate quality of life through infrastructure and services.



2016 HOUSTON FLOODING



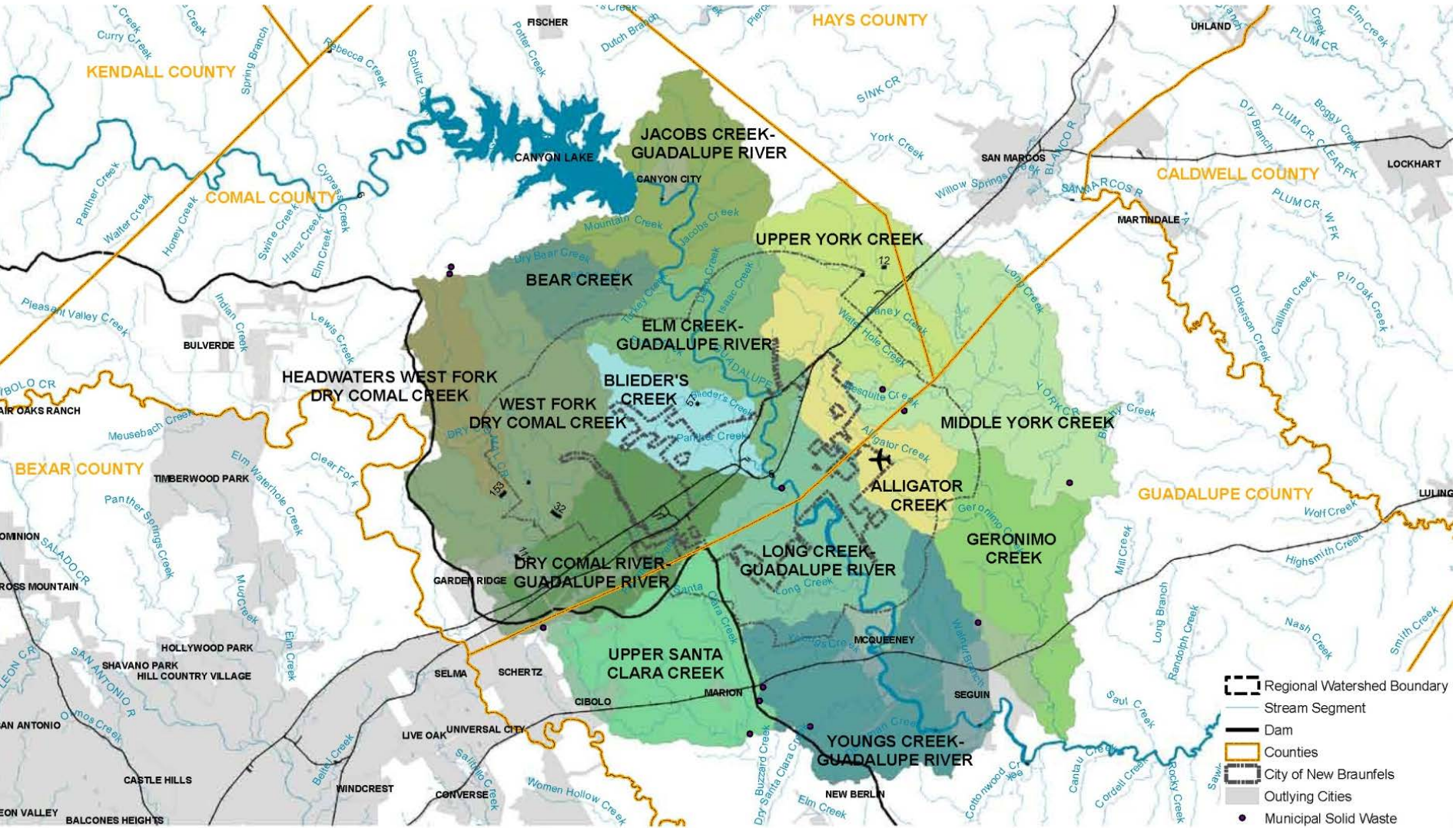
Buffalo Bayou, Memorial Drive and Allen Parkway | Houston, Texas

THESIS

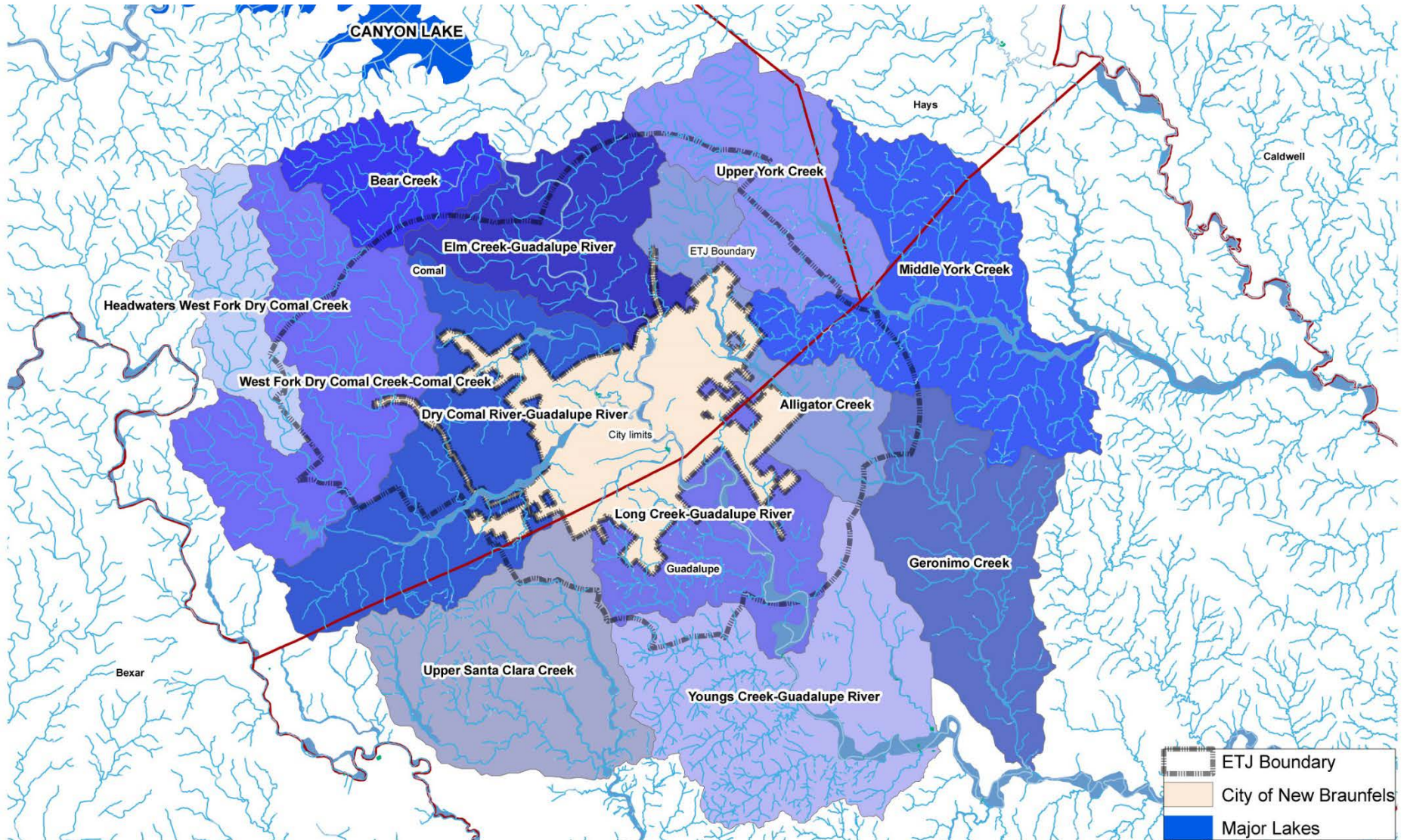
We, as designers and engineers, have the opportunity to combine our expertise in creative ways which manage both stormwater and open space challenges through the creation of multifunctional spaces that benefit the community and bolster economic development.



REGIONAL STORMWATER PLANNING



REGIONAL STORMWATER PLANNING



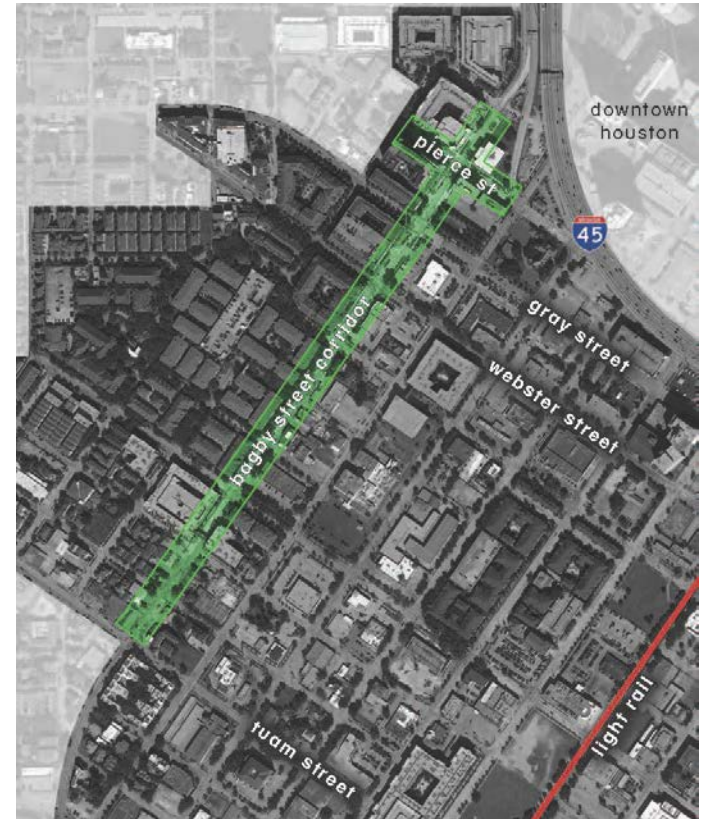
COMMUNITY INVOLVEMENT

Strategy	Public Ranking (23 is highest, 1 is lowest)	Stakeholder Ranking (23 is highest, 1 is lowest)	Overall Ranking
Floodway Building Prohibitions	23	15	1
Open Space Conservation	22	18	2
Flood Hazard Mitigation	21	22Som	3
Stream and River Restoration	20	17	4
Litter Control	18	19	5
Construction Control Measures	16	16	6
Retrofit Stormwater Facilities	20	15	7
Building Runoff Capture	14	10	8
Impervious Coverage Reductions	13	14	9
Stormwater Utility Fee	12	9	10
Maintenance and Monitoring	11	23	11
Detention Basin	10	21	12
Stream Bank Setbacks	8	11	13
City Incentives or Fees	5	13	14
Retention	19	8	15
Density Bonuses	17	2	16
Stormwater Facilities Inventory	3	12	17
Clustering	9	4	18
Wetland Basin	7	3	19
Biofilter	6	5	20
Building Materials	4	1	21
Infiltration Basin	2	6	22
Porous Pavement	--	7	23

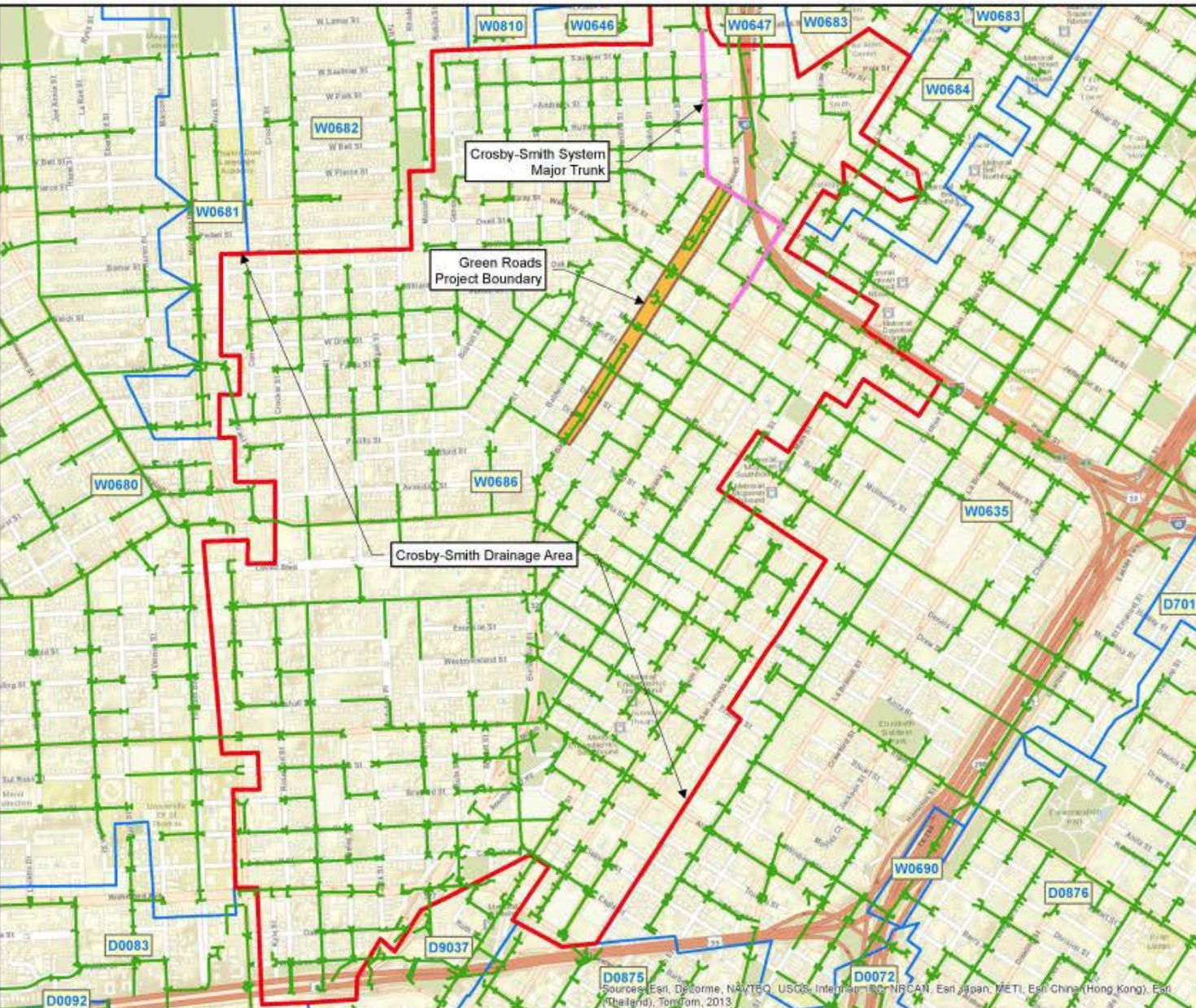
A black and white photograph of a city sidewalk. A woman in a dark, patterned dress is walking away from the camera on a wide, paved sidewalk. The sidewalk is bordered by young trees on the left and a brick building on the right. The text "CASE STUDIES" is overlaid in the center of the image.

CASE STUDIES

BAGBY STREET LOCATION MAP



WATERSHED: 4.7 acre - 2-year storm event (437,000 gallons)



WALTER P MOORE
WALTER P. MOORE AND ASSOCIATES, INC.
1301 MCKINNEY, SUITE 1100
HOUSTON, TX 77010
PHONE: 713.630.7300 FAX: 713.630.7305

Midtown Bagby Street Reconstruction
Houston, Texas

Location of Project in
Crosby-Smith System

Job Number: M03-12025-00	Date: October 2013	Drawn By: M.W. Henze	Exhibit: 2
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SITE CONTEXT

[Freedmen's Town]



[Downtown]



0.6 MILES

[Bagby Street Corridor]

[Midtown]



3.7 Miles
Texas Medical Center



[Third Ward]



Hwy 527 Spur

Hwy 59

...to Highway 59

Light rail



Highway 288



PRE-EXISTING STREET CONDITIONS

Standard vehicle- focused street
Four travel lanes despite low traffic
demands



PRE-EXISTING STREET CONDITIONS



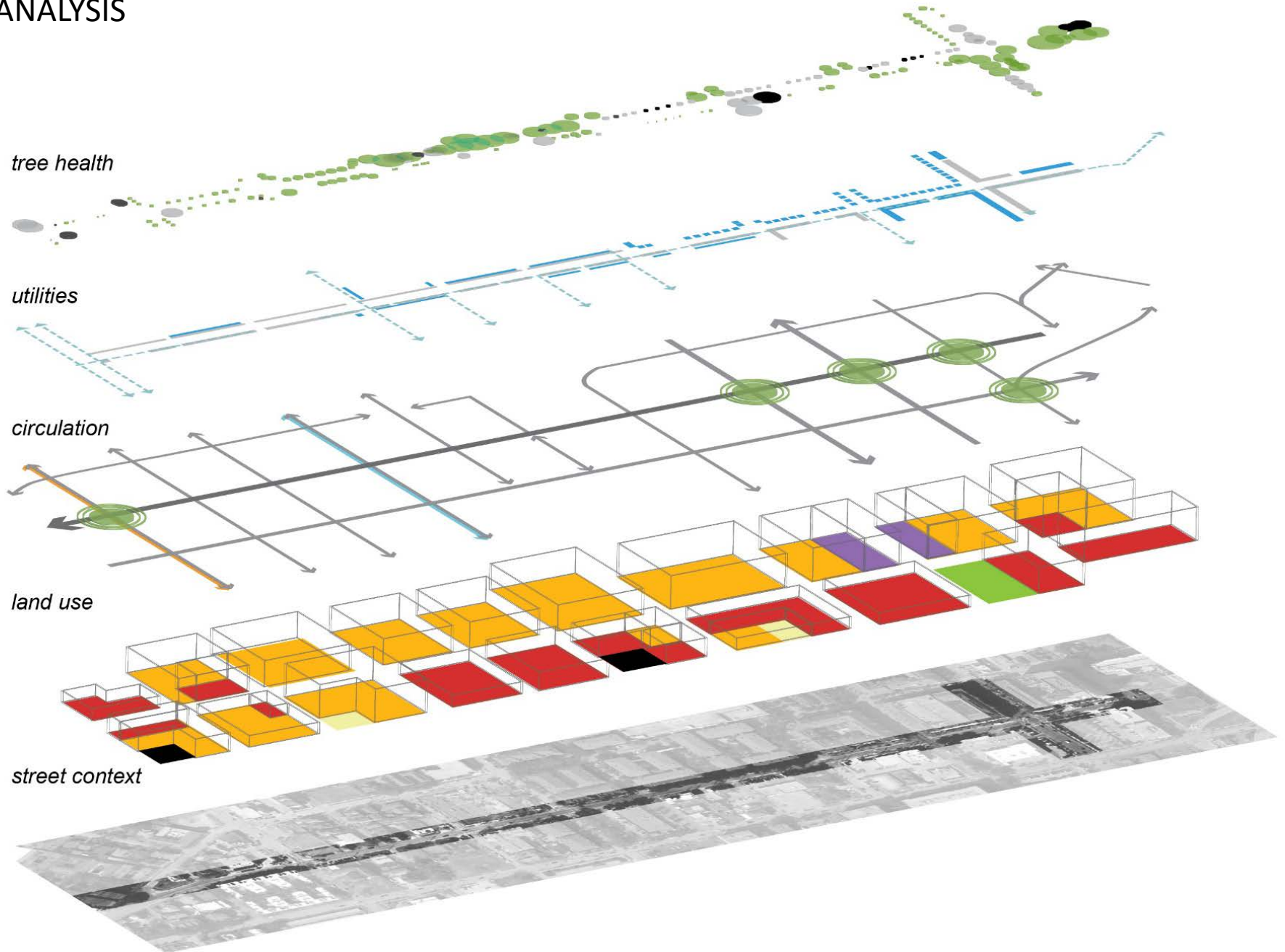
**Conventional swale system
Dilapidated sidewalks**

PRE-EXISTING STREET CONDITIONS



Conventional curb and gutter system

ANALYSIS



PROJECT SITE PLAN – 0.6 MILES OF STREET RECONSTRUCTION



ENVIRONMENT

- Beneficial planting
- Reduction of heat island effect
- Reduction of noise pollution
- Increase green stormwater use
- Implement Green Streets Standards

COMMUNITY

- Provide community programming/activities
- Collaborate with community members
- Foster neighborhood identity and character
- Improve wayfinding and visitor experience

ART/AESTHETIC

- provide a distinct and unique 'place'
- implement public art as a long term benefit

ECONOMICS

- Potential return on investment
- Limit impact on business during construction
- Implement plan that is financially attractive for redevelopment

A nighttime photograph of a modern building with a courtyard and a street. The building has a dark facade and large glass windows. The courtyard features a large tree and a paved area. The street is illuminated by streetlights, and there are light trails from cars. The sky is dark with some clouds.

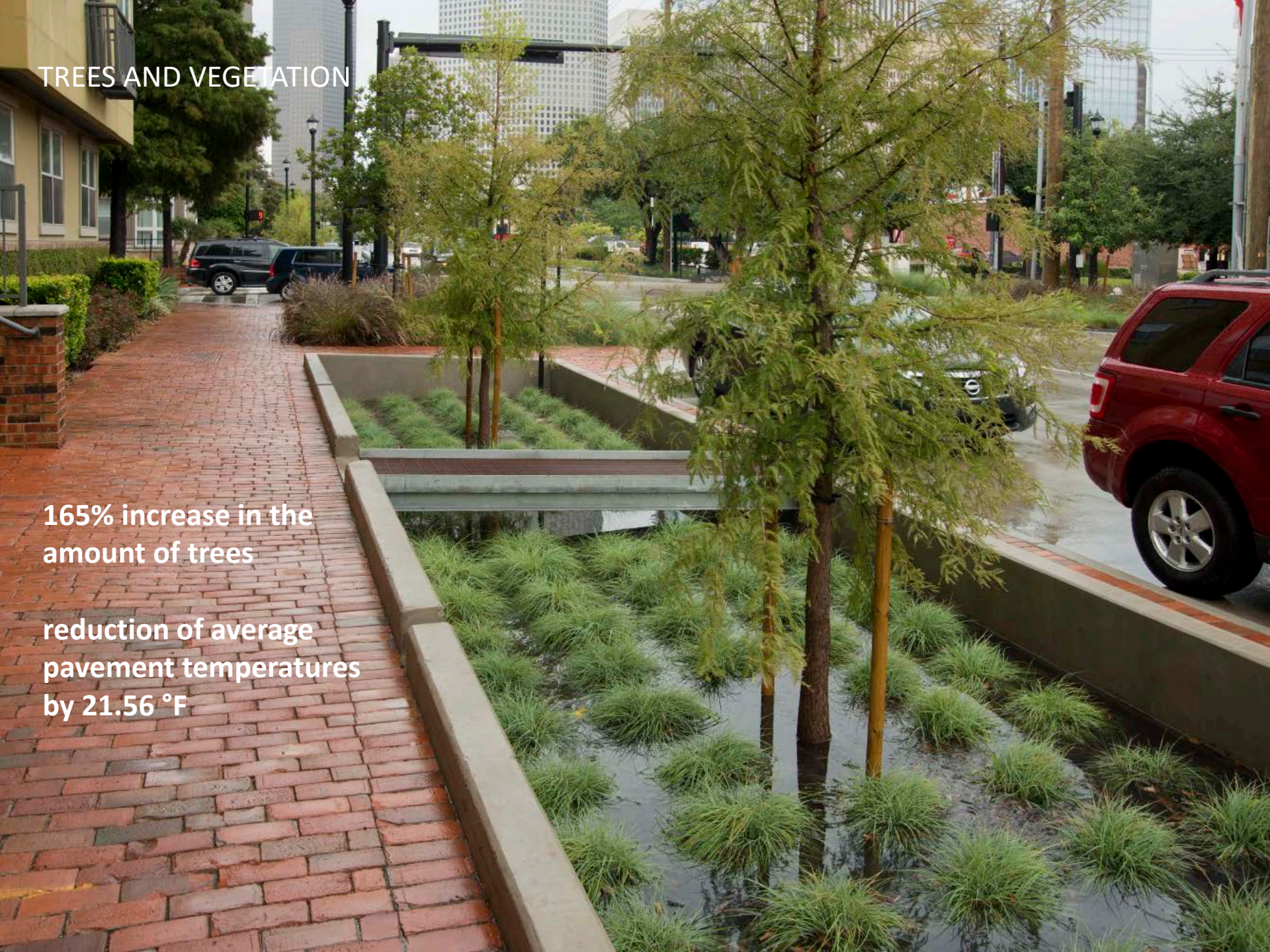
42% increase of existing tree growth area

276% increase in dedicated pedestrian areas

300% tons of carbon reduced from emissions due to use of 25% fly ash in the concrete mix

TREES AND VEGETATION

165% increase in the amount of trees
reduction of average pavement temperatures by 21.56 °F



RAINGARDENS



33% captured/filtered stormwater

75% bacteria removed

73% phosphorus removed

93% oil and grease removed

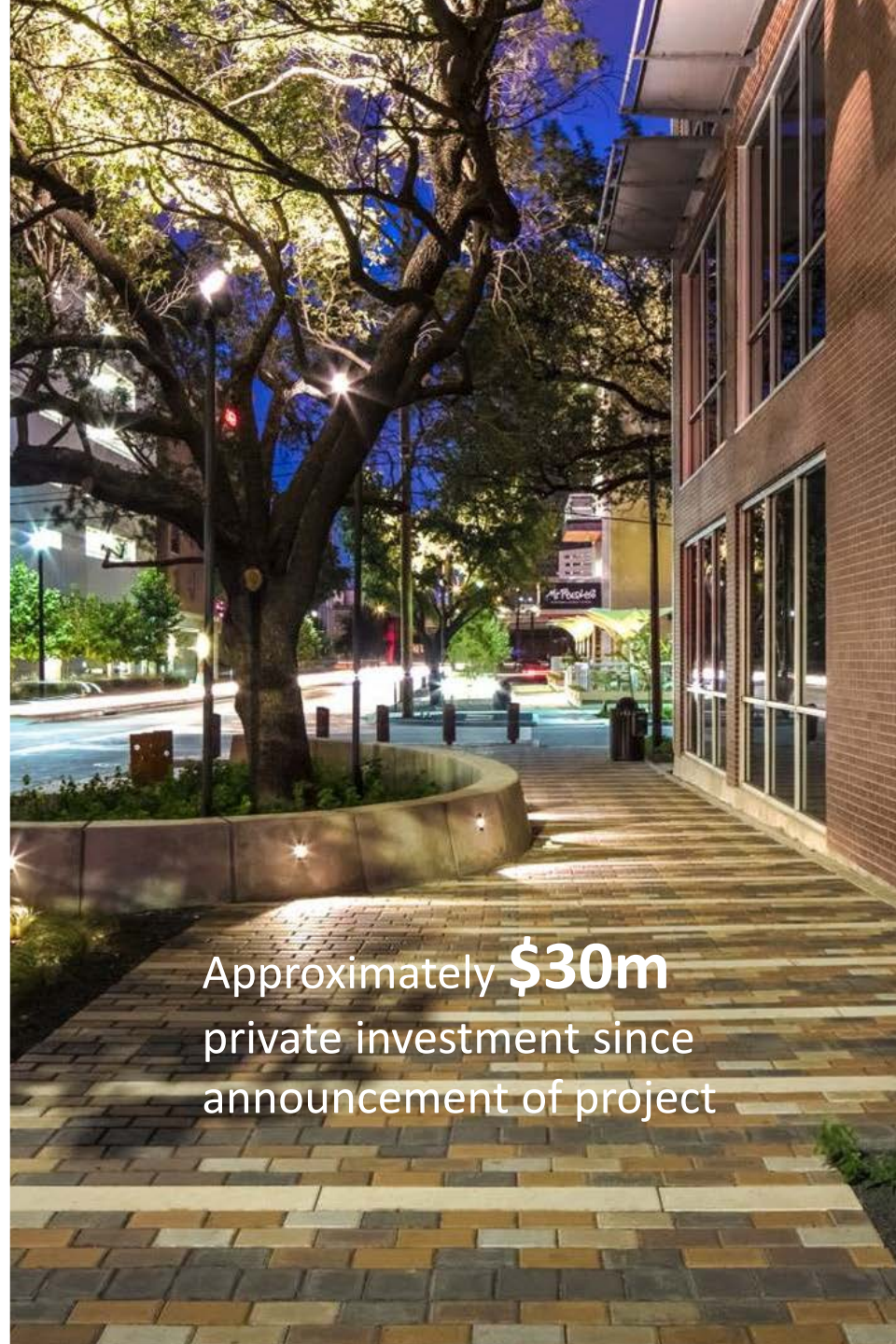
85% suspended solids removed

RAIN GARDENS: Sustainable Storm Water Management

- 1. Rain gardens provide a natural, cost-effective way to manage storm water runoff. They are designed to capture and filter rain water from impervious surfaces such as roofs, parking lots, and streets.
- 2. Rain gardens help reduce the volume of storm water runoff, which can cause flooding and erosion. They also help filter out pollutants such as oil, grease, and sediment.
- 3. Rain gardens are easy to install and maintain. They can be designed to fit into any landscape and can be built in a variety of sizes and shapes.
- 4. Rain gardens are a sustainable way to manage storm water runoff. They help reduce the volume of storm water runoff, which can cause flooding and erosion. They also help filter out pollutants such as oil, grease, and sediment.



For more information on rain gardens, visit www.epa.gov/rainwater.
EPA is proud to support the Rain Garden program. The Rain Garden program is a national effort to promote the use of rain gardens in residential, commercial, and public settings. For more information on the Rain Garden program, visit www.epa.gov/rainwater.



Approximately **\$30m**
private investment since
announcement of project

STREET PARKING AREA DESIGNATION AND SIDEWALK ACCESS IMPROVEMENTS



20% rental market increase
25% property value increase

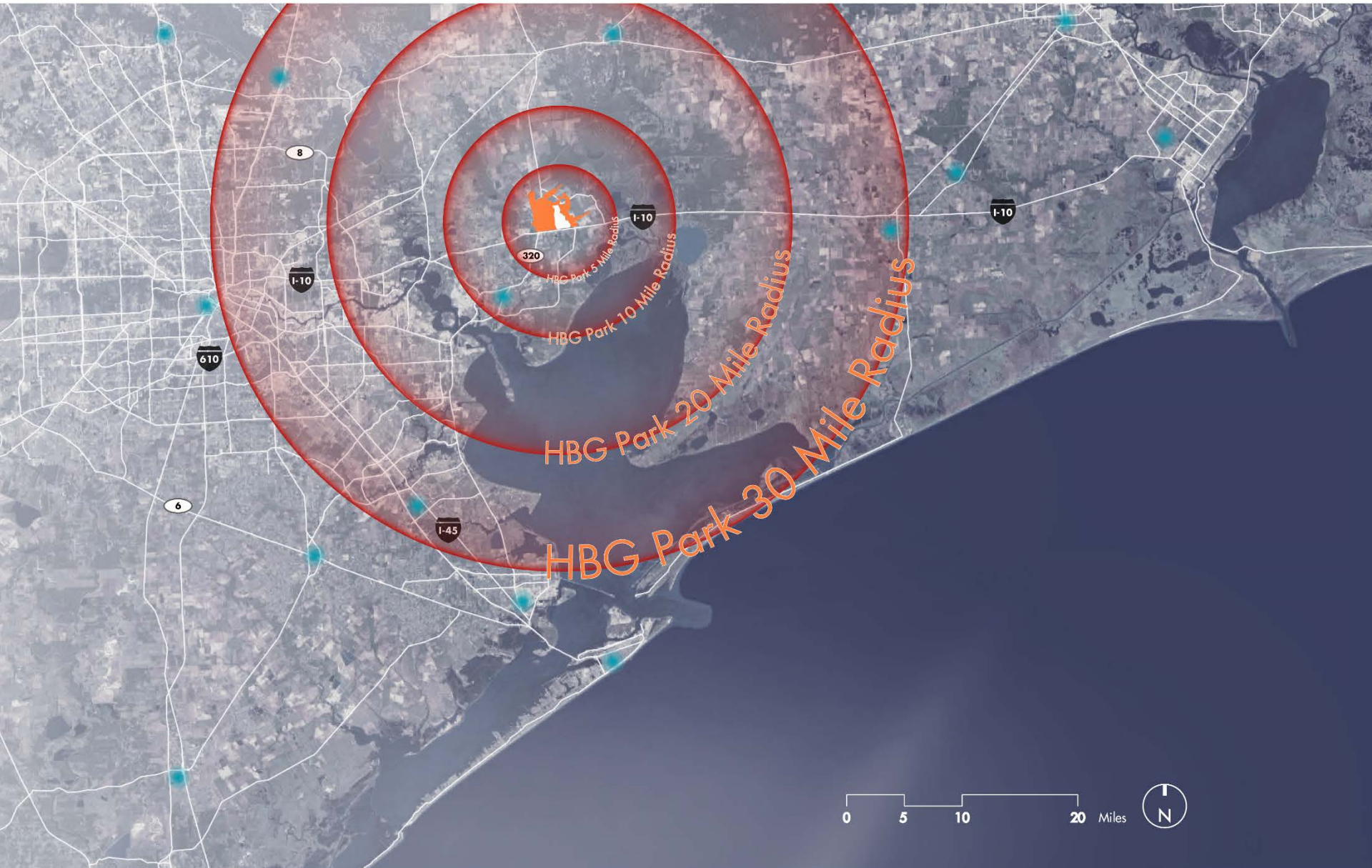
BAGBY STREET | GREENROADS

The Greenroads® Rating System is an easy way to measure and manage sustainability on transportation projects. It challenges Project Teams to go above and beyond minimum environmental, social, and economic performance measures and be evaluated by an independent, expert, third-party review.



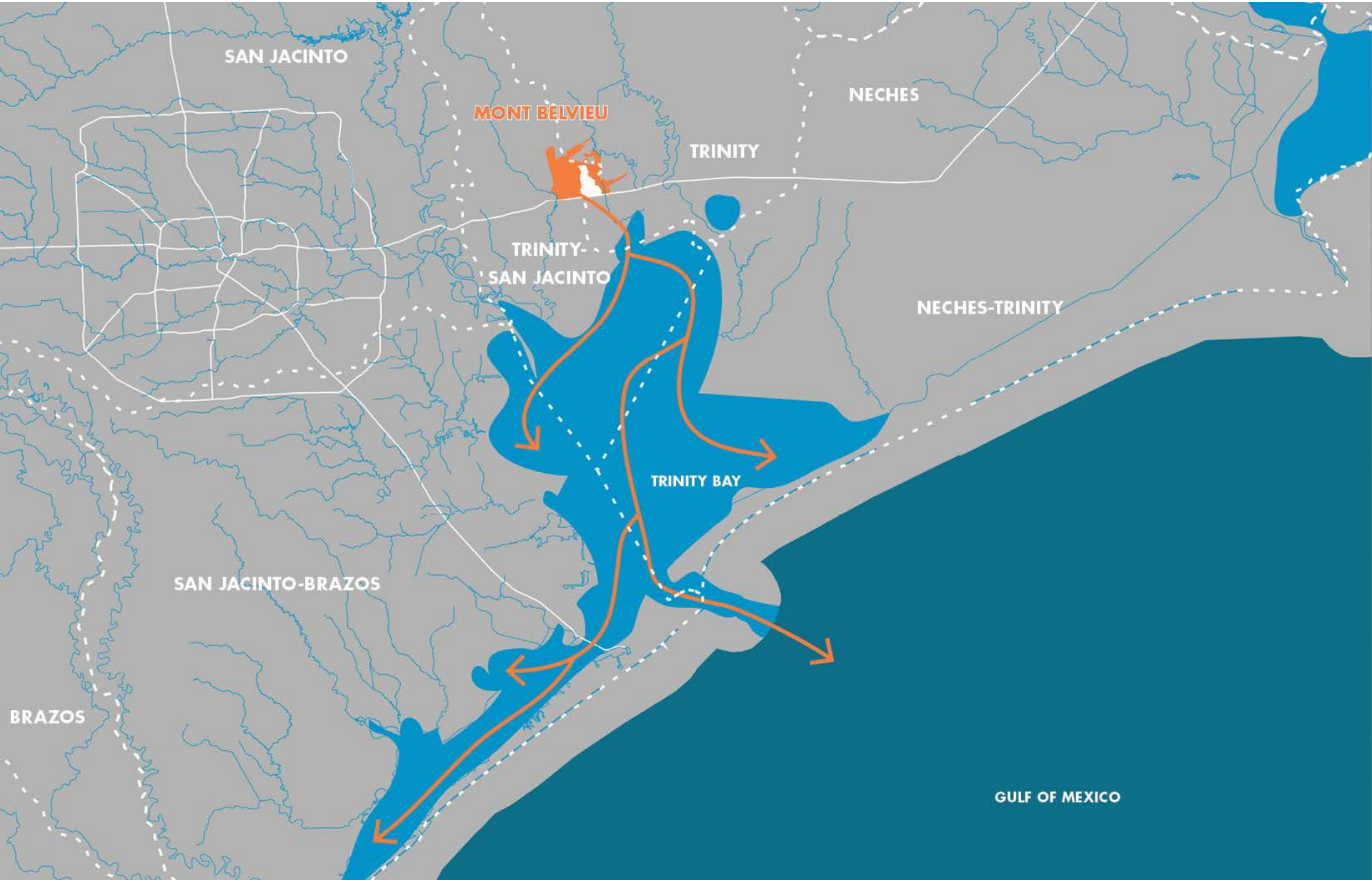
HACKBERRY GULLY REGIONAL PARK

Project Location – Mont Belvieu, Texas



HACKBERRY GULLY REGIONAL PARK

Role in the Watershed



HACKBERRY GULLY REGIONAL PARK

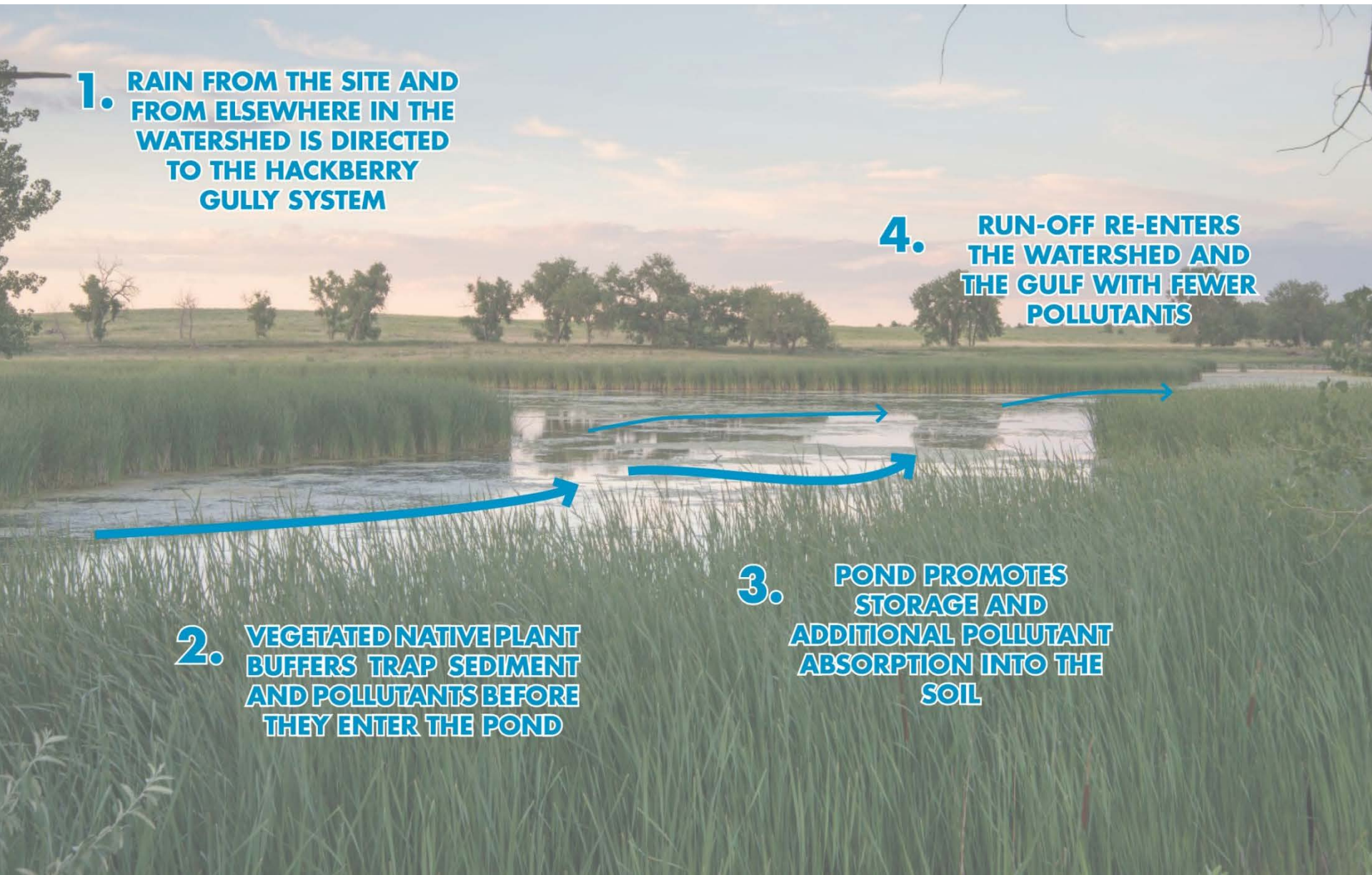
Role in the Watershed

1. RAIN FROM THE SITE AND FROM ELSEWHERE IN THE WATERSHED IS DIRECTED TO THE HACKBERRY GULLY SYSTEM

2. VEGETATED NATIVE PLANT BUFFERS TRAP SEDIMENT AND POLLUTANTS BEFORE THEY ENTER THE POND

3. POND PROMOTES STORAGE AND ADDITIONAL POLLUTANT ABSORPTION INTO THE SOIL

4. RUN-OFF RE-ENTERS THE WATERSHED AND THE GULF WITH FEWER POLLUTANTS



HACKBERRY GULLY REGIONAL PARK



**REIMAGINE
STORMWATER AS A
MULTI-FUNCTIONAL
AMENITY**

ECONOMICS



**CREATE AN
ECOLOGICALLY
RESTORATIVE
RESOURCE**

ENVIRONMENT



**PROVIDE
COMMUNITY
PROGRAMMING
FOR A GROWING
POPULATION**

COMMUNITY



**ESTABLISH THE
PARK AS A UNIQUE
DESTINATION**

ART

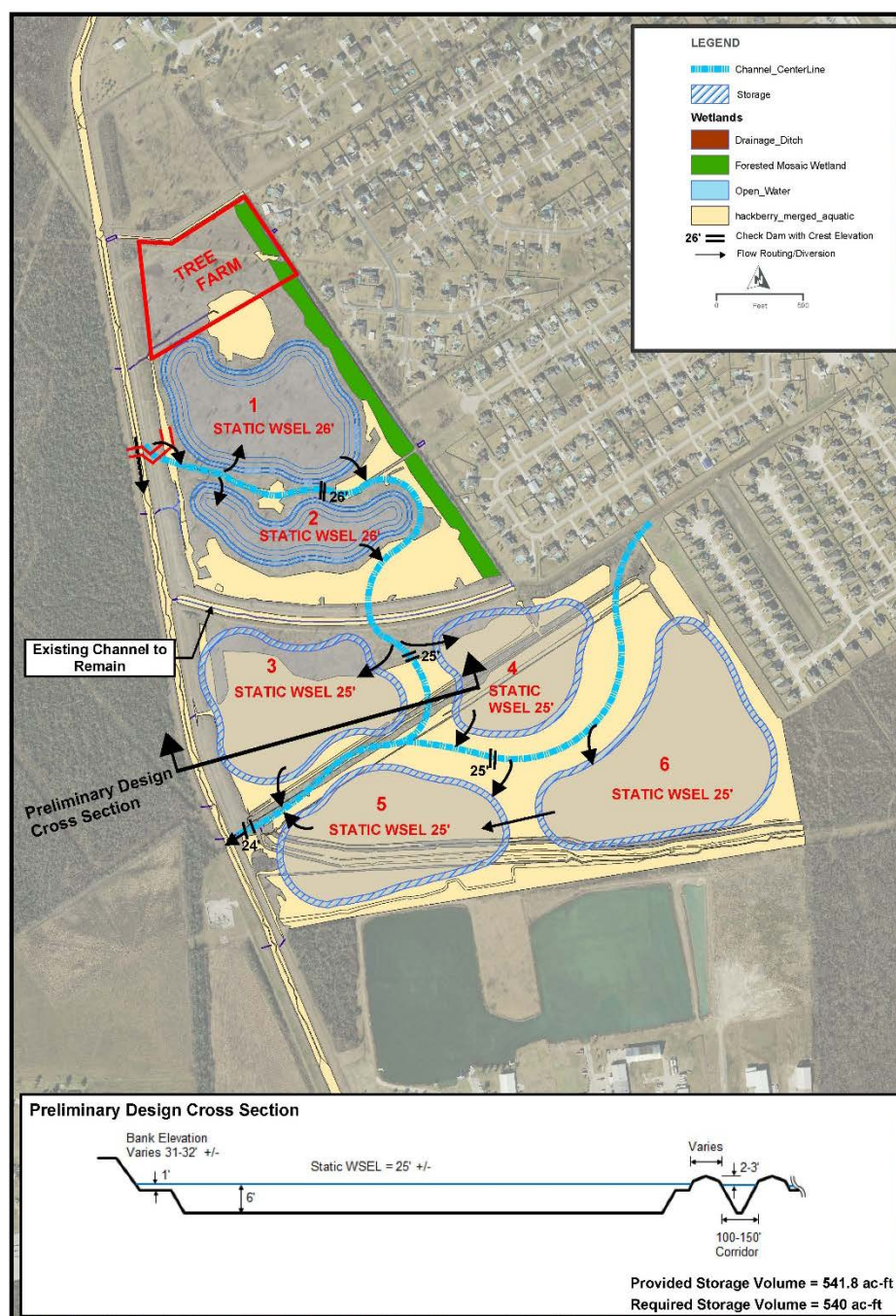
HACKBERRY GULLY REGIONAL PARK

Planning for Volume

- HDR calculated pond volume for “build out” of the Hackberry Gully Watershed – 540 ac-ft
- Team envisioned a multi-pond approach
- Minimum flow line was maintained in Hackberry Gully
- A system of wet bottom ponds were studied and a diversion channel was introduced to carry the water to each pond

REIMAGINE
STORMWATER AS A
MULTI-FUNCTIONAL
AMENITY

CREATE AN
ECOLOGICALLY
RESTORATIVE
RESOURCE



HACKBERRY GULLY REGIONAL PARK

Planning for Recreational Use

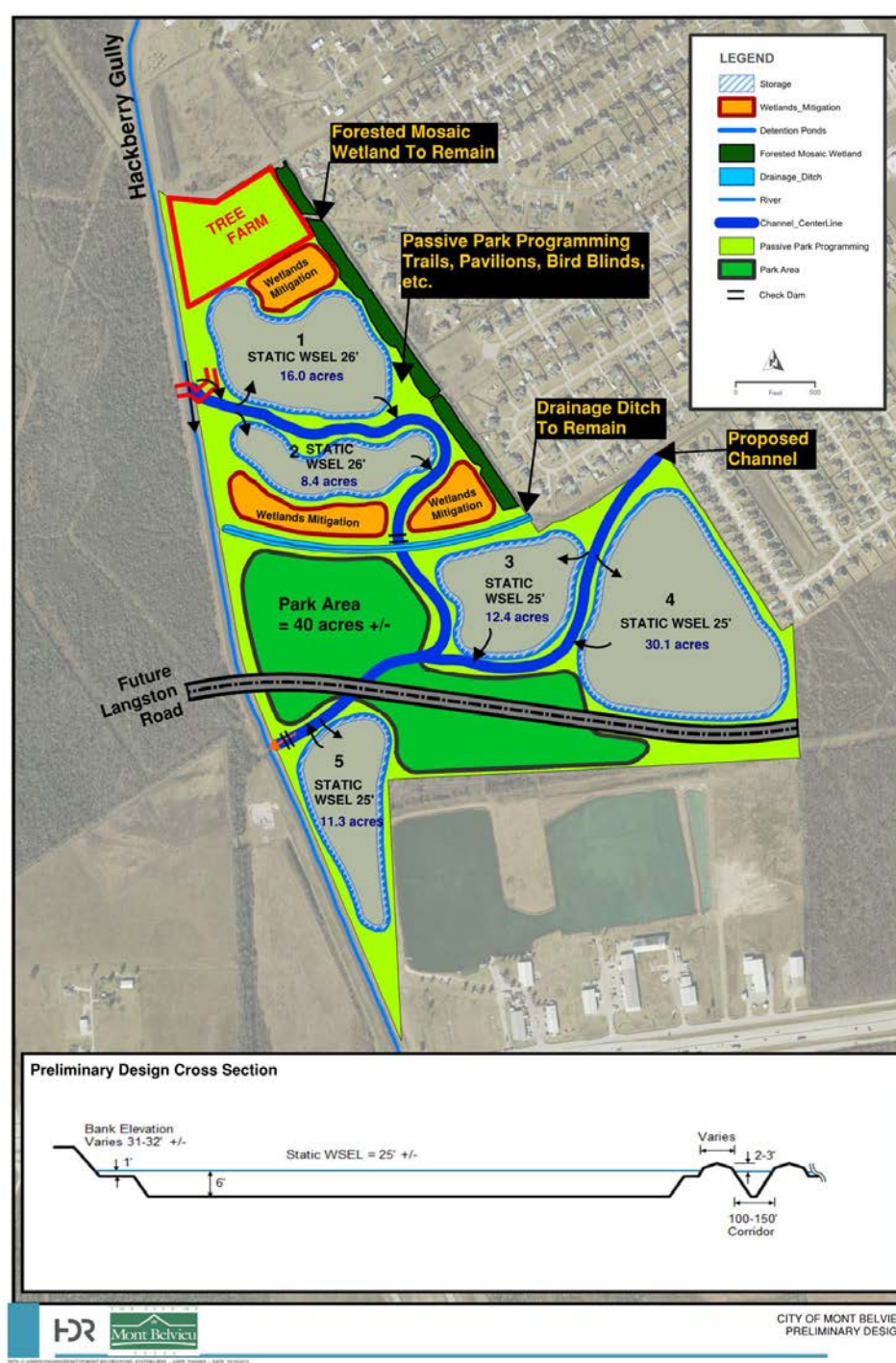
- Added room for trails and other park programs compatible with a focus on nature and wetland mitigation
- Added 40 acres of active recreational programming
- Presented the framework to the City and community to begin programming
- Deepening of ponds accommodated 545 ac-ft

**REIMAGINE
STORMWATER AS A
MULTI-FUNCTIONAL
AMENITY**

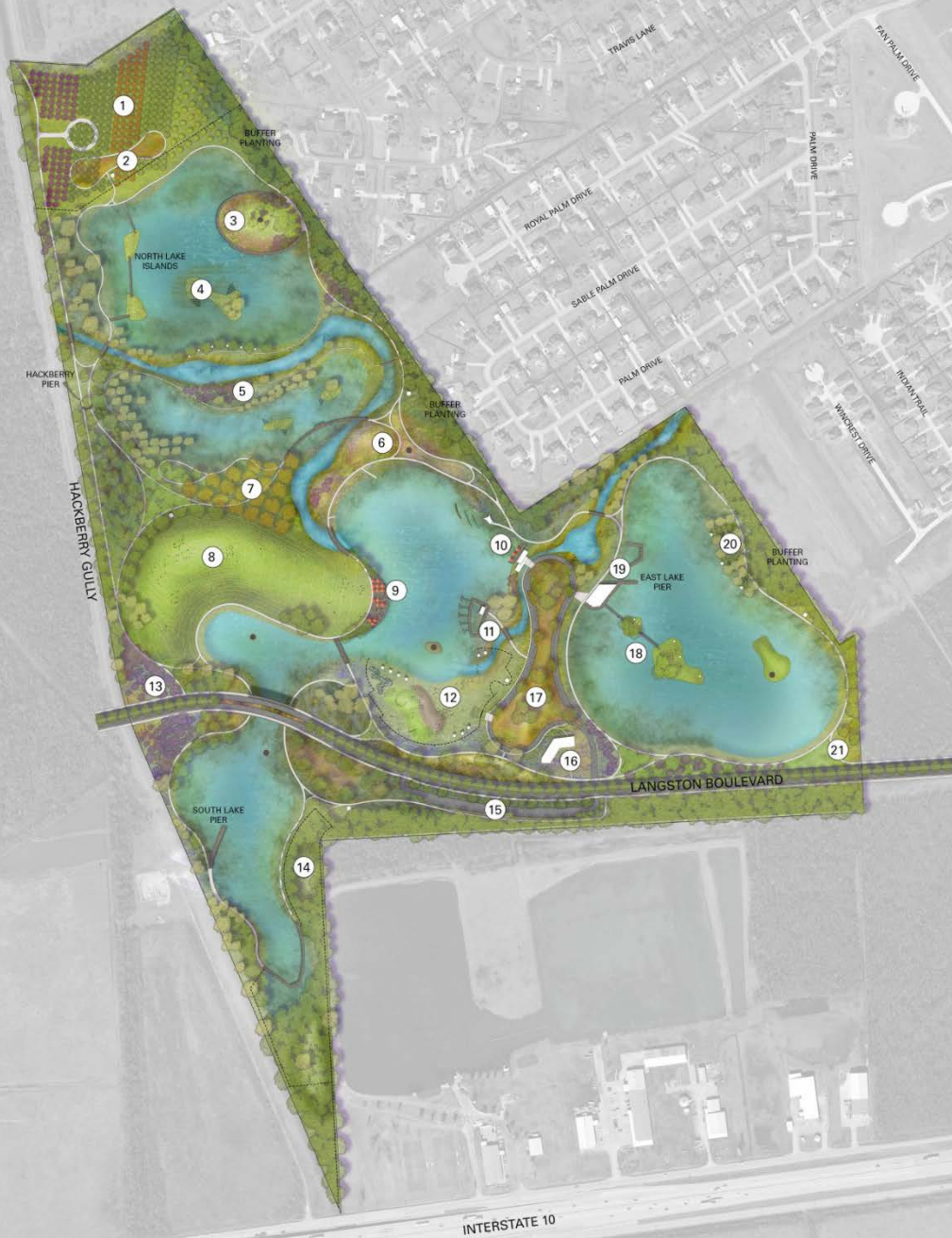
**CREATE AN
ECOLOGICALLY
RESTORATIVE
RESOURCE**

**PROVIDE
COMMUNITY
PROGRAMMING
FOR A GROWING
POPULATION**

**ESTABLISH THE
PARK AS A UNIQUE
DESTINATION**



HACKBERRY GULLY REGIONAL PARK



LEGEND:

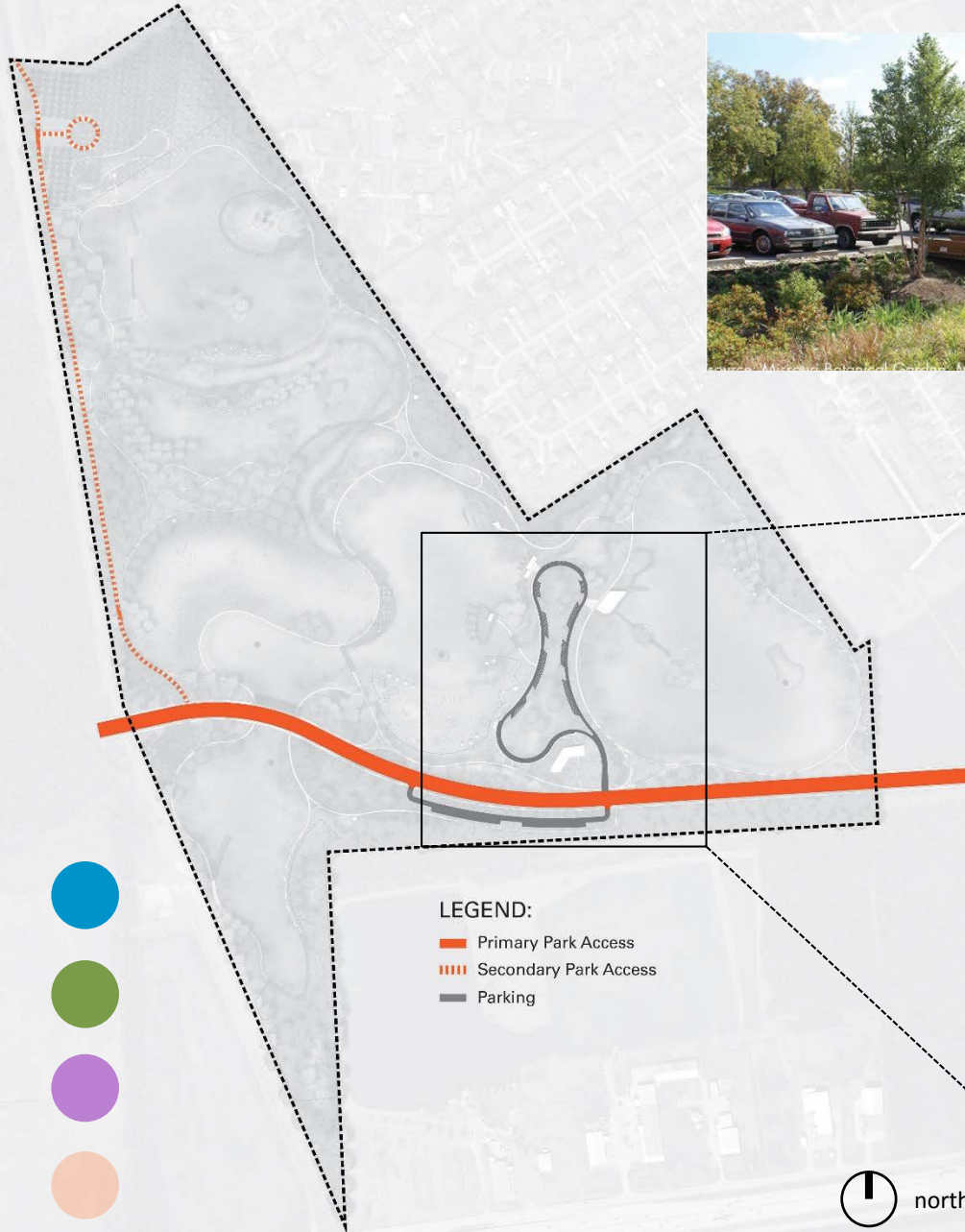
- 1 Tree Farm
- 2 Farm Trail and Bait Shop
- 3 Observation Hill, Boardwalk, Art
- 4 Habitat and Roosting Islands
- 5 Camping and Wetland Trail
- 6 Native Gardens
- 7 Hammock Grove
- 8 Great Lawn
- 9 Event Deck
- 10 Nature Center and Outdoor Classroom
- 11 Kayak Rental
- 12 Nature Playground
- 13 Western Park Entry Feature
- 14 Dog Park
- 15 Parking Lot
- 16 Future Community Building
- 17 Meadow Garden
- 18 Picnic Islands
- 19 Future Community Building
- 20 Picnic Pavilions
- 21 Eastern Park Entry Feature

HACKBERRY GULLY REGIONAL PARK

Enlargement of Northern Site - "Nature Focused"



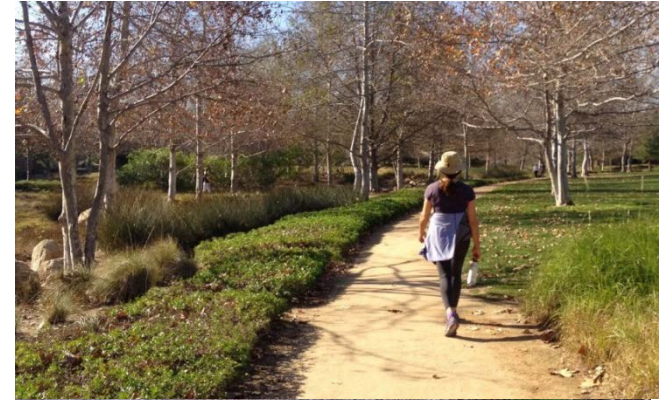
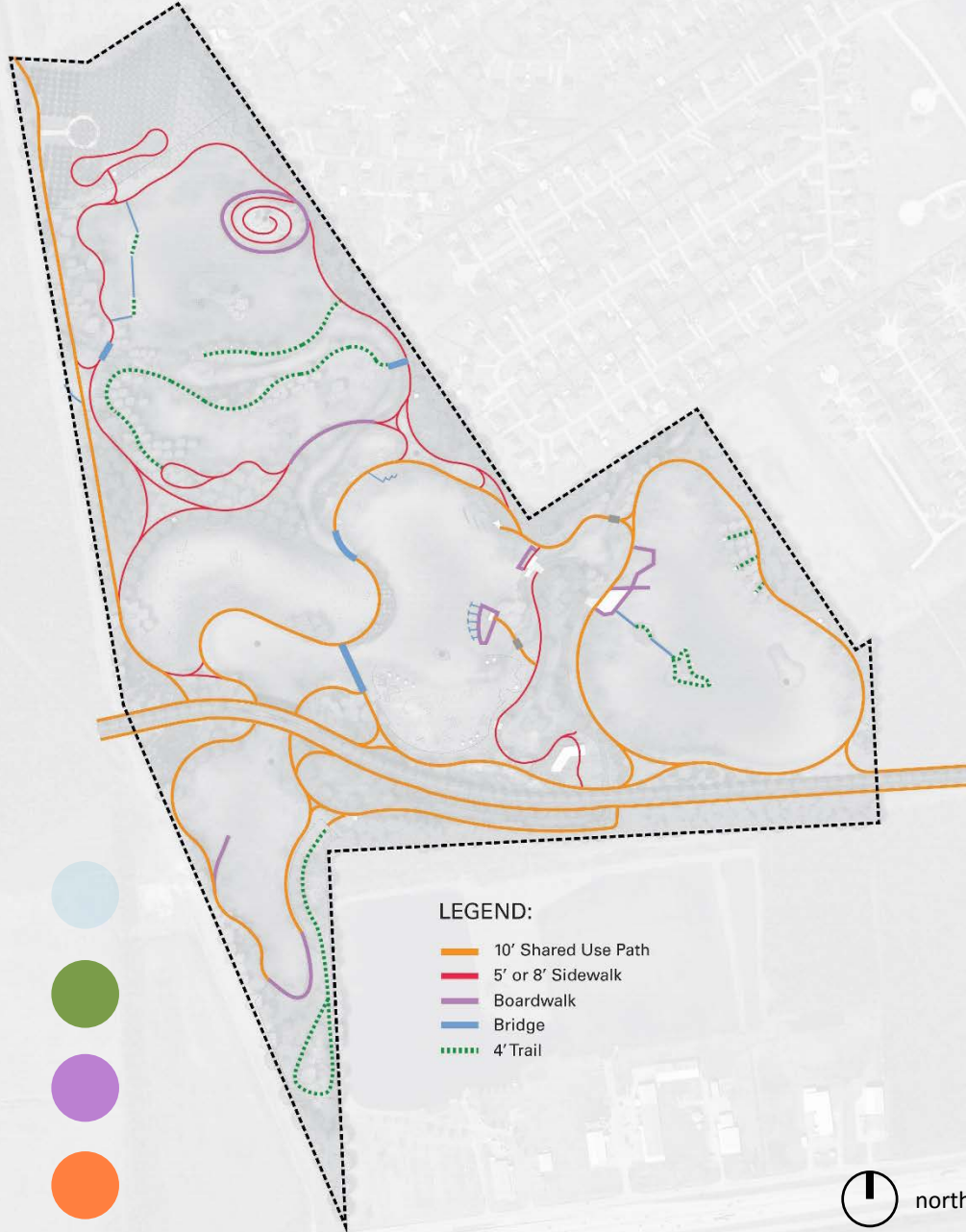
HACKBERRY GULLY REGIONAL PARK | Parking and Access



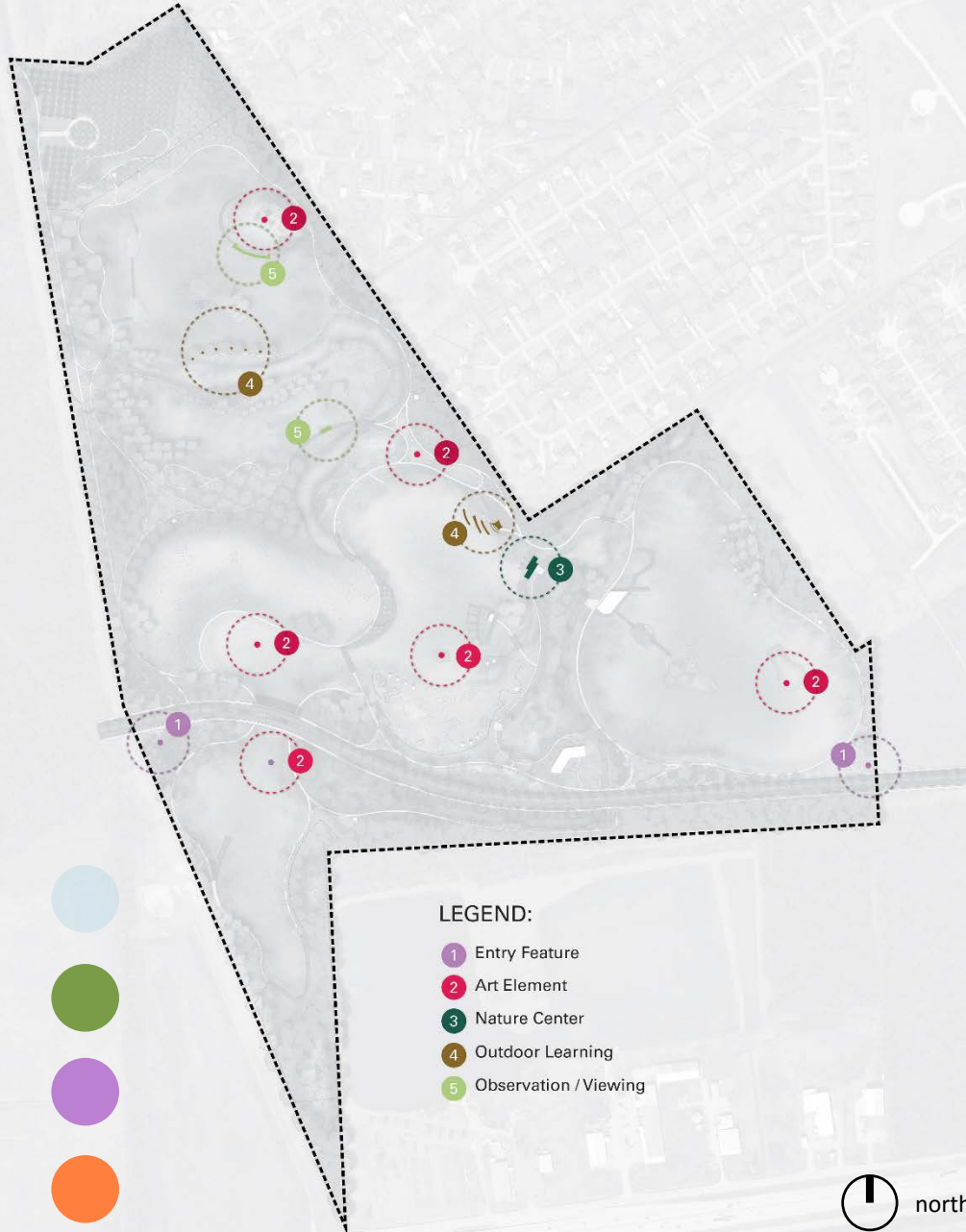
160 total parking spaces



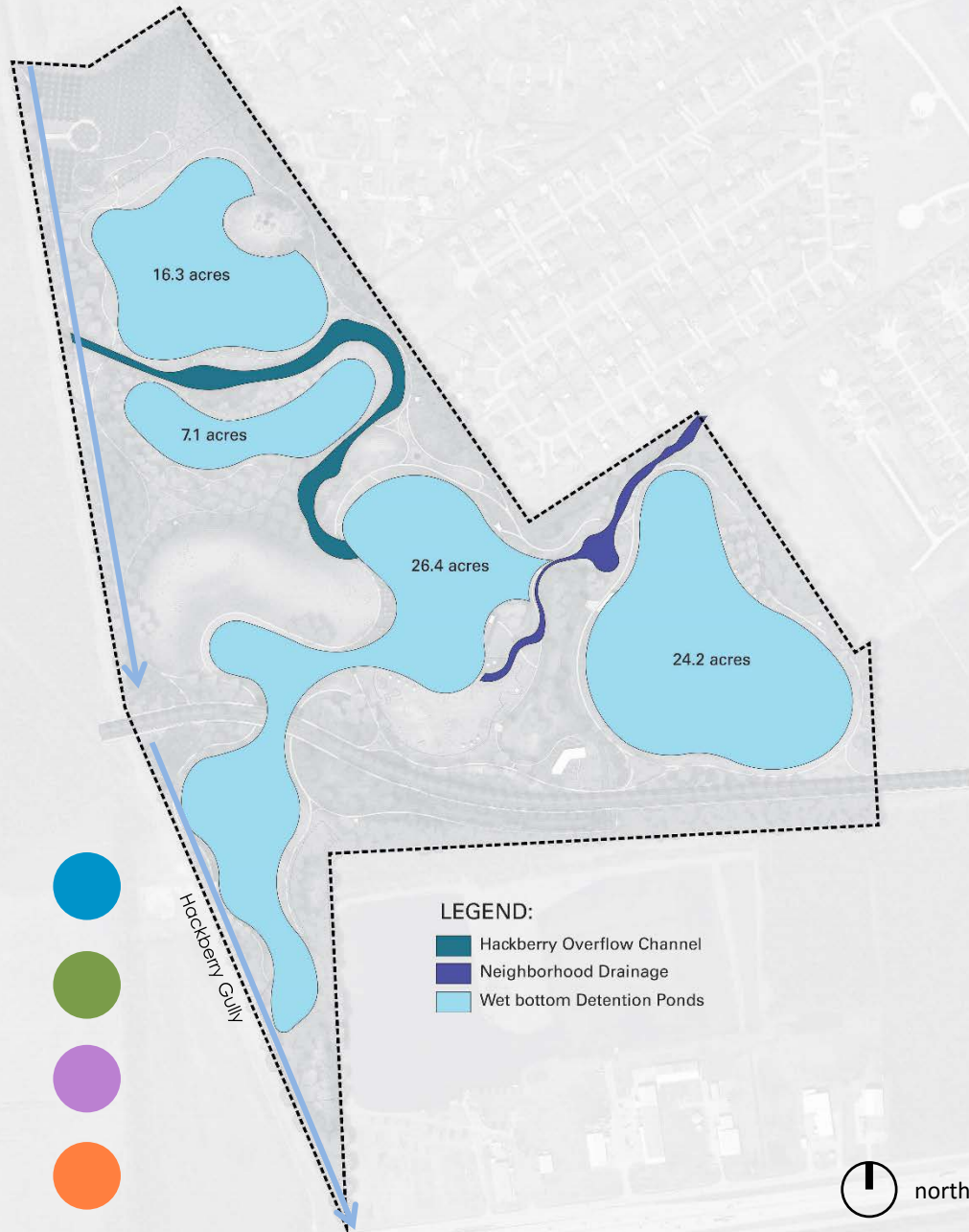
HACKBERRY GULLY REGIONAL PARK | Trails



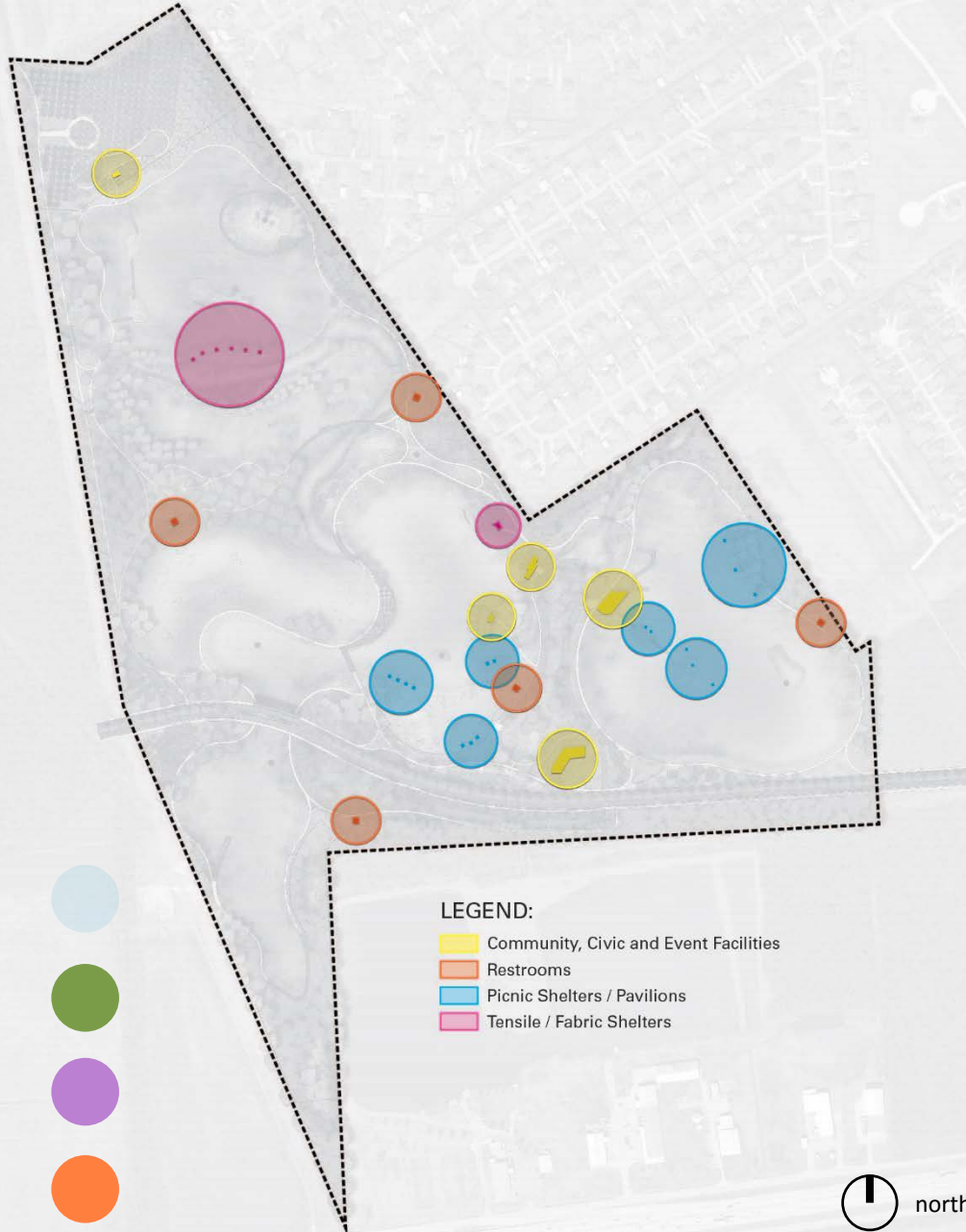
HACKBERRY GULLY REGIONAL PARK | Arts and Education



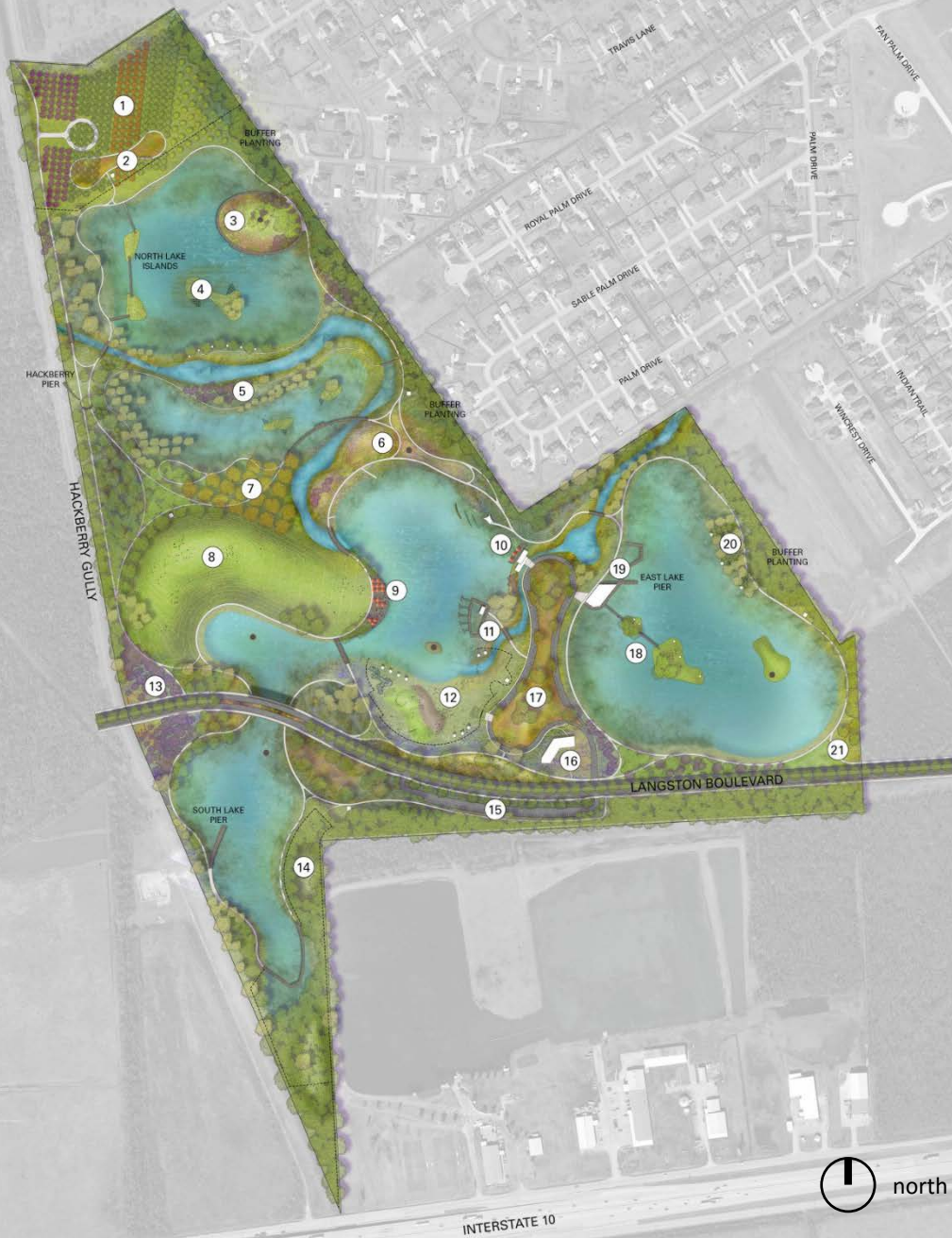
HACKBERRY GULLY REGIONAL PARK | Stormwater



HACKBERRY GULLY REGIONAL PARK | Park Structures



HACKBERRY GULLY REGIONAL PARK



7.6 MILES
OF TRAILS

74 ACRES
OF SURFACE
POND

90 ACRES
PROGRAM

160
PARKING SPACES

CLOSING



ISLAND SYSTEMS
nature Center
picnic Islands

MONT BELVIEU DRAINAGE STANDARDS

Inlet – Outlet visible



Inlet – Outlet aesthetic



Inlet – Outlet hidden



Inlet – Outlet obscured



MONT BELVIEU DRAINAGE STANDARDS | detention before



MONT BELVIEU DRAINAGE STANDARDS | detention after



CASCADE PARK

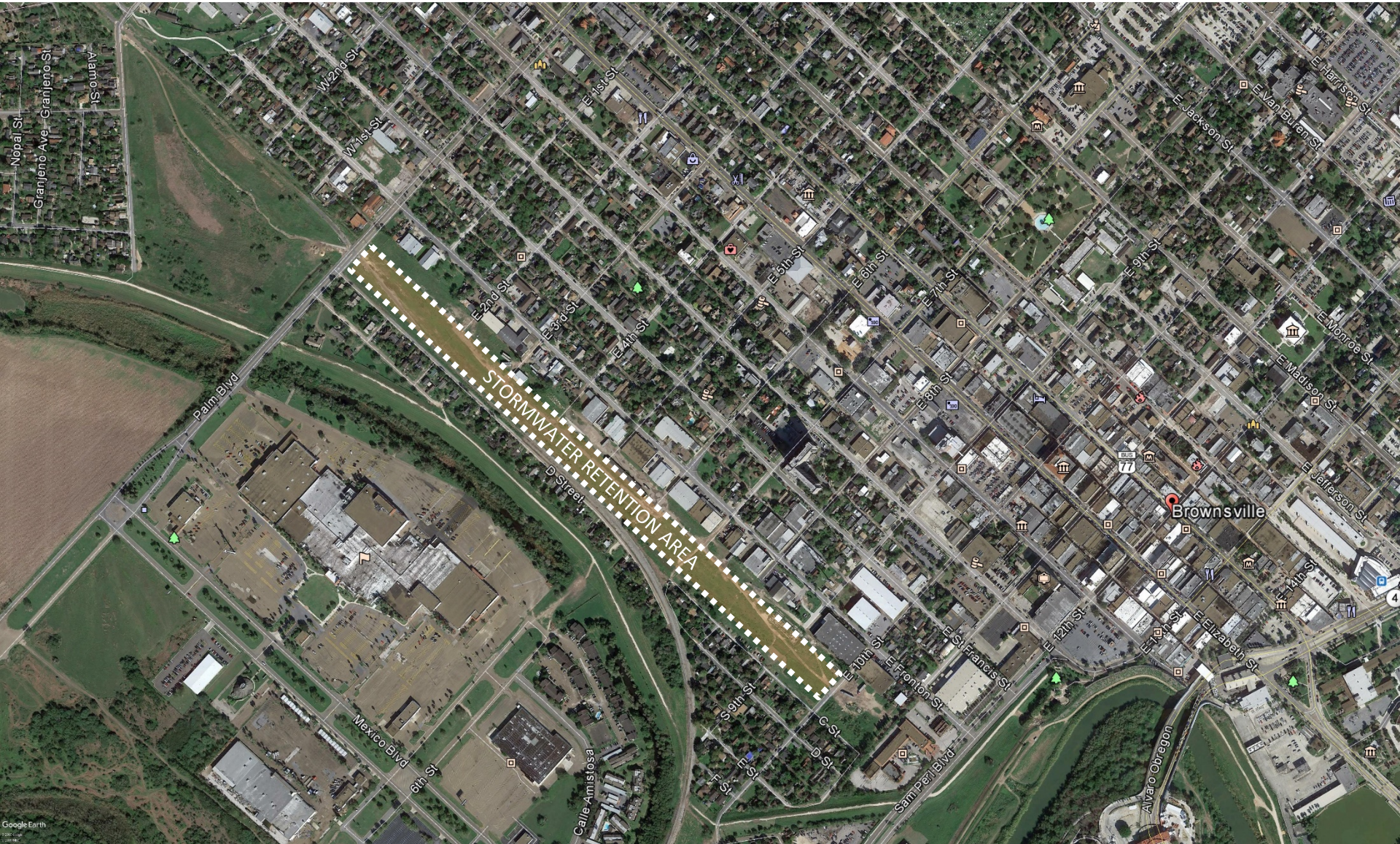


LA HACIENDA CASITAS buildingcommunityWORKSHOP and CDCB



1. Community Green / Play Field
2. BBQ Pavilion
3. Bio-swale (native grasses being established)
4. Accessible Pathway

PROPOSED STORMWATER MANAGEMENT AREAS IN DOWNTOWN BROWNSVILLE



QUESTIONS?



Thank you,
Design Workshop
713-227-0862
www.designworkshop.com

