



MAY 15 2025 | DENVER
RESILIENCE SUMMIT

RESILIENT BY REGULATION

How Texas's New Rules are Preparing Mixed-Use Campuses for Bigger Storms

Audience Poll

How many 500-year flood events has Houston region had in the last 10 years?

- a. 1*
- b. 2*
- c. 3*
- d. 4*

PROJECT GREEN

Headquarters Building



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Denver // May 12-14, 2025





Flood Damage



Hurricane Harvey 2017



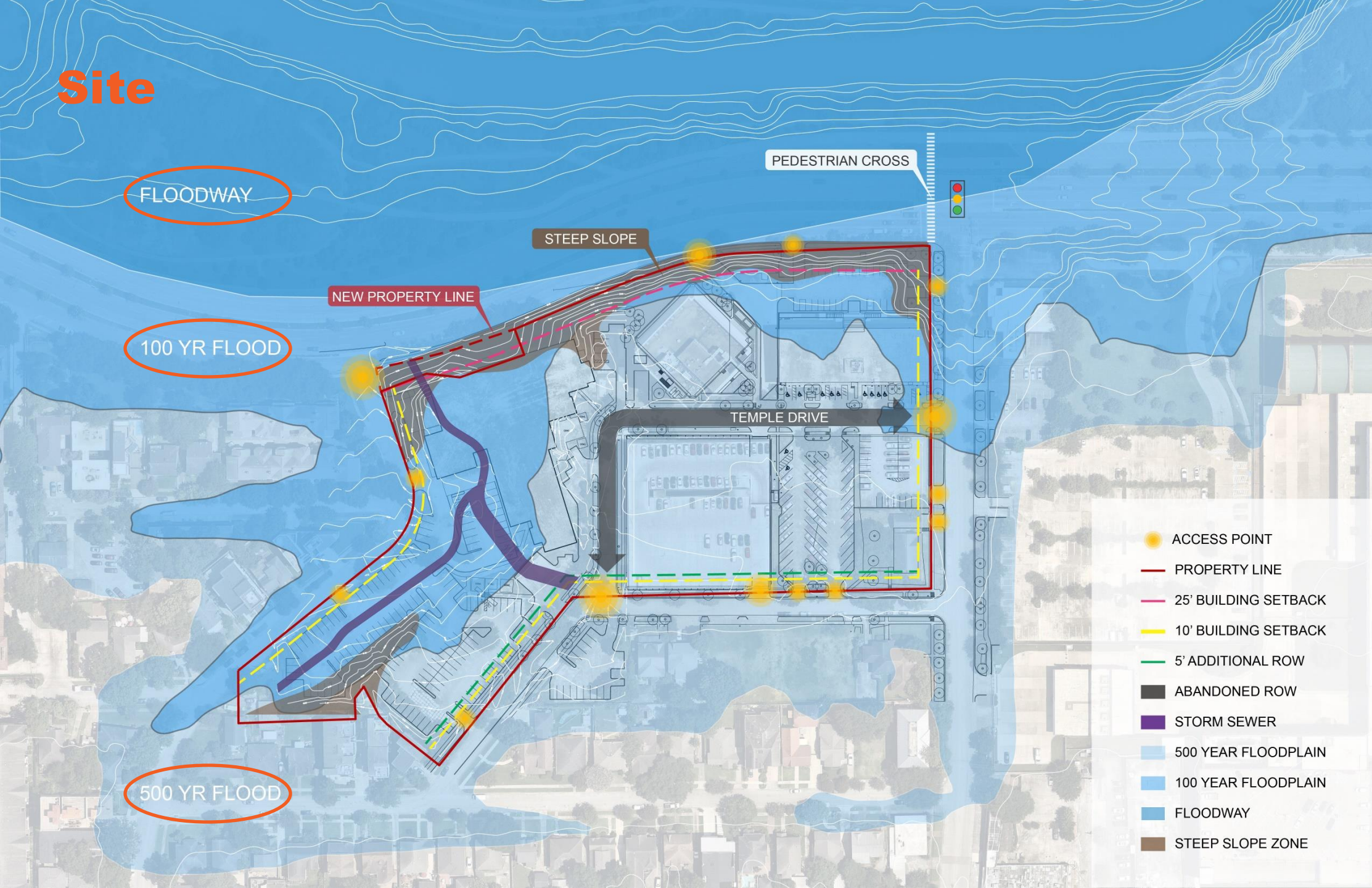
Flood Damage



Tropical Storm Allison 2001



Site



Governing Rules

- No net fill in floodplain
- Extreme event (100-yr Storm) street sheet flow to remain within the right-of-way
- No increase in flow into receiving streams due to development
- Storm water detention for new impervious cover at 0.75 to 0.98 acre feet per acre
- Storm water detention may not be required where the receiving system has 100-year capacity to receive the developed flow



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City of Houston Houston Public Works

Infrastructure Design Manual

**Carol Ellinger Haddock, P.E.,
Director**

**Suhail Kanwar, P.E.,
City Engineer**

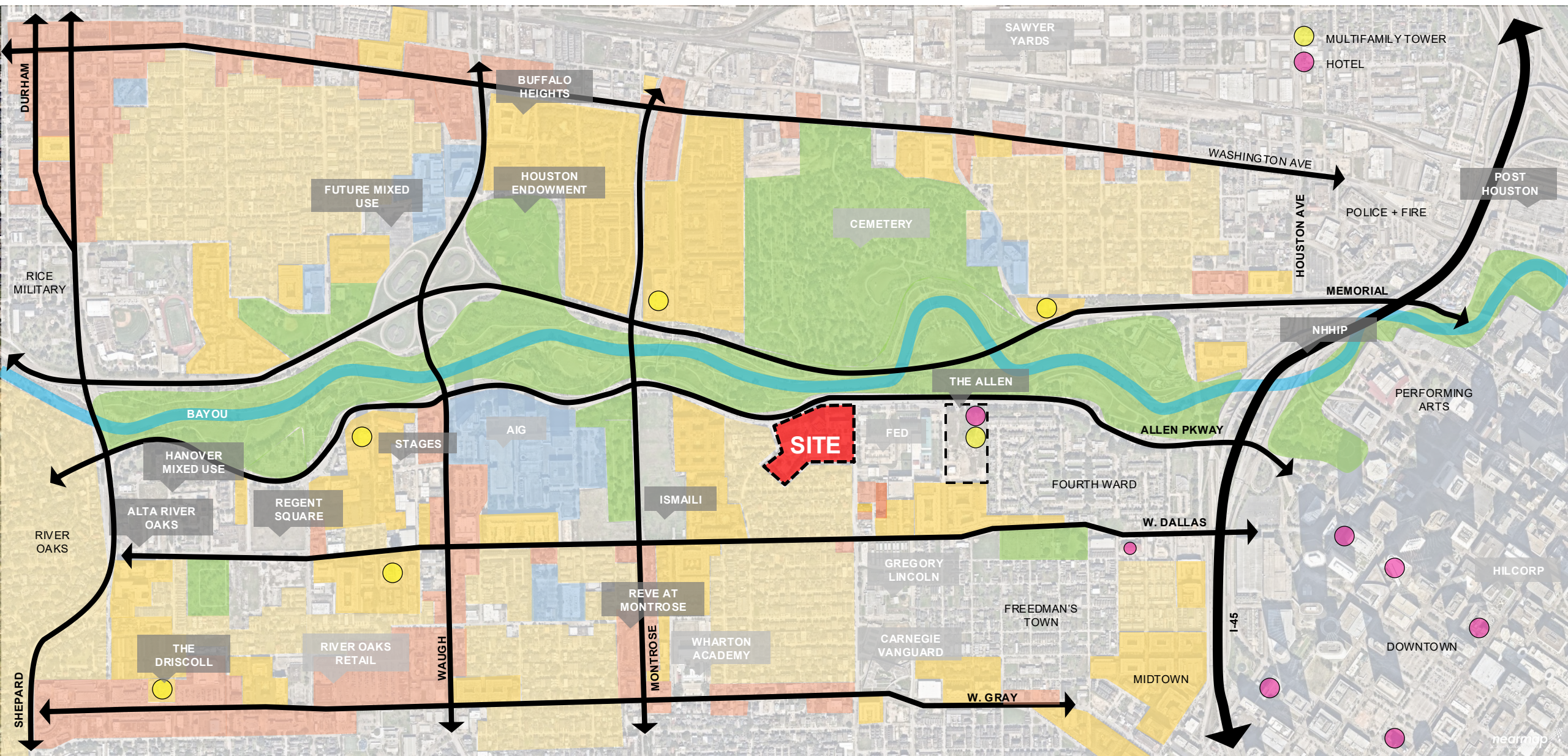


**HOUSTON
PUBLIC WORKS**

**HOUSTON
PERMITTING CENTER**

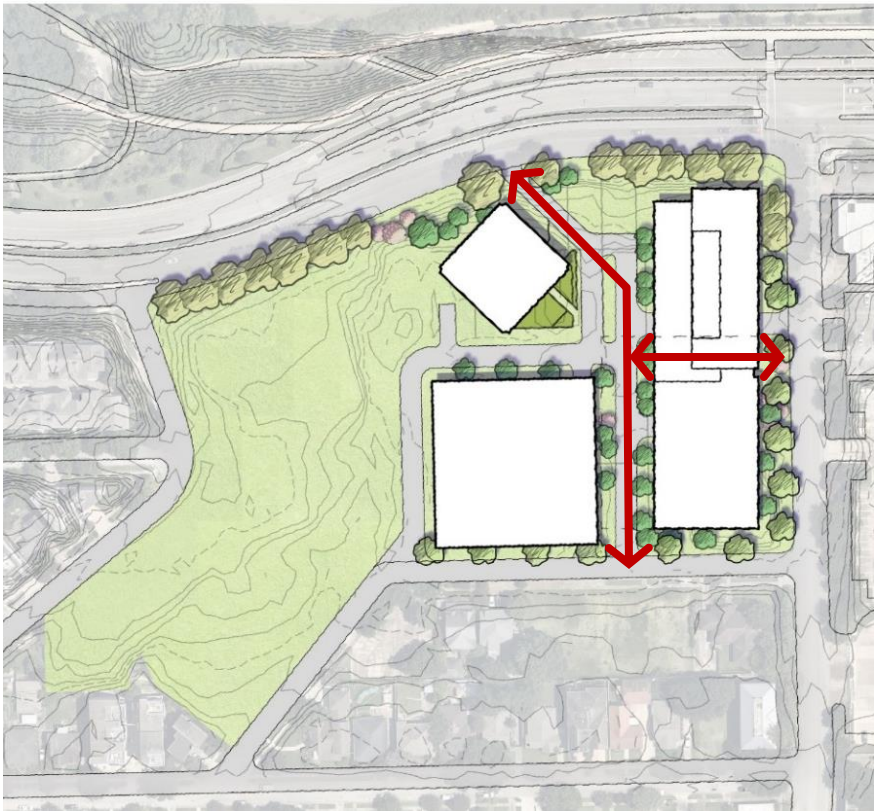
November 2023

At the Heart of an Emerging Park Amenity

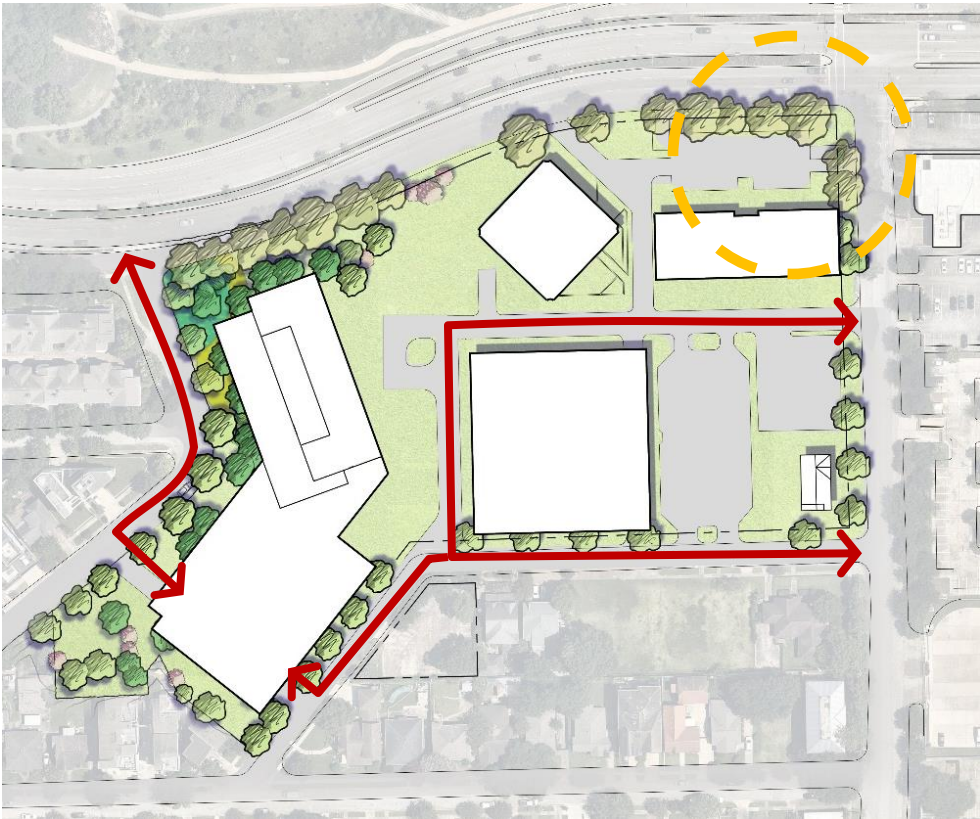


Location Options

East



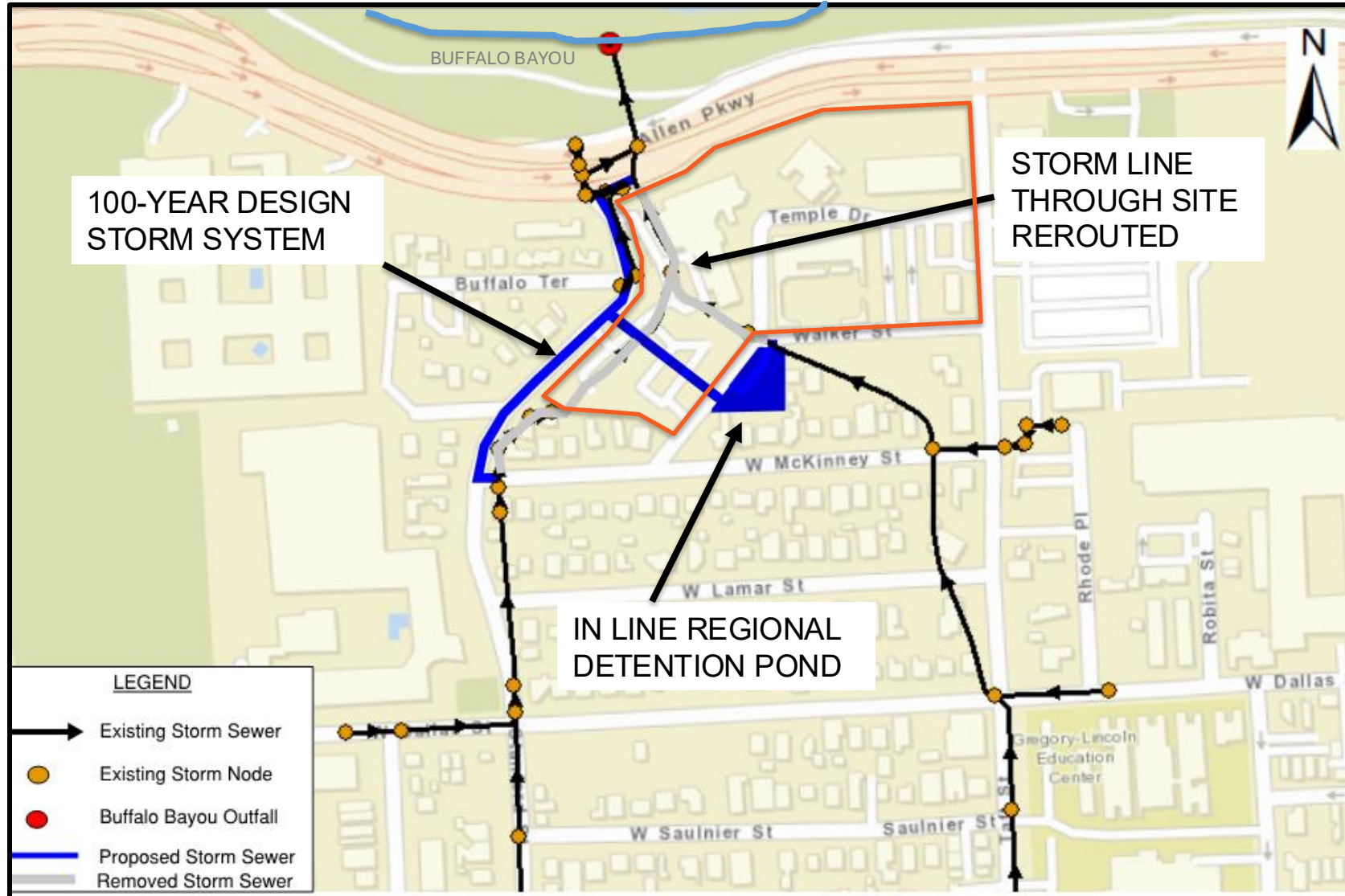
West



Opportunity

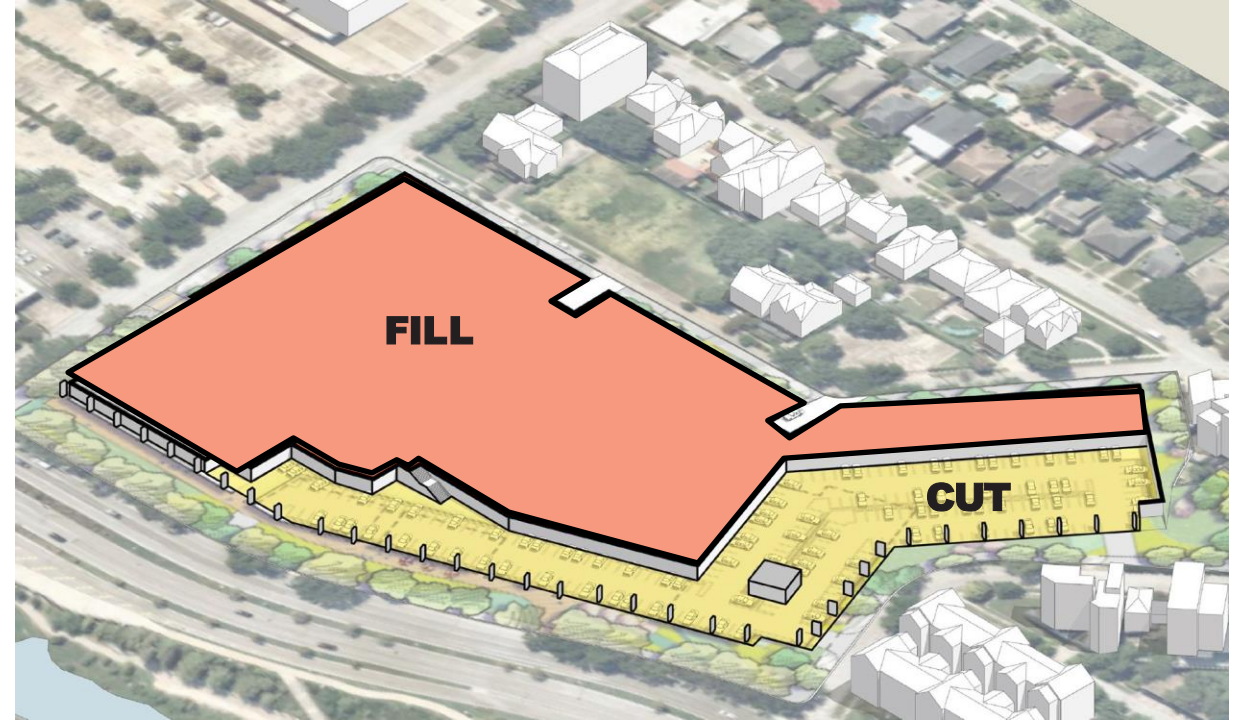
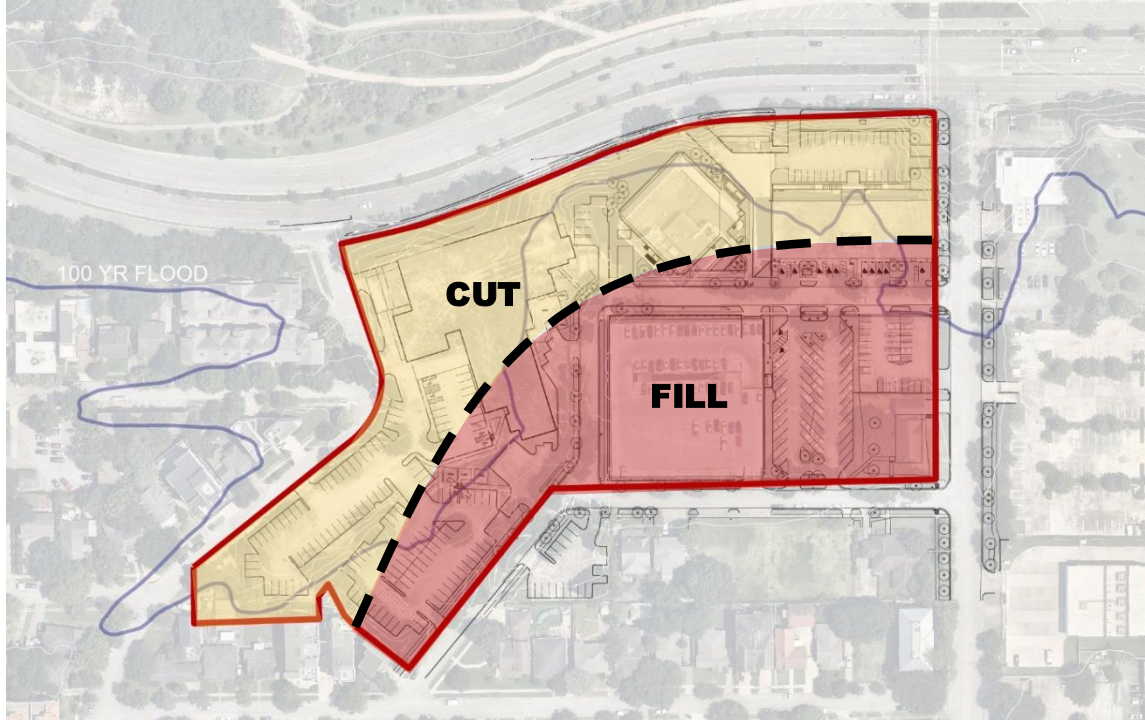


Regional Drainage Improvements Reimbursed by TIRZ



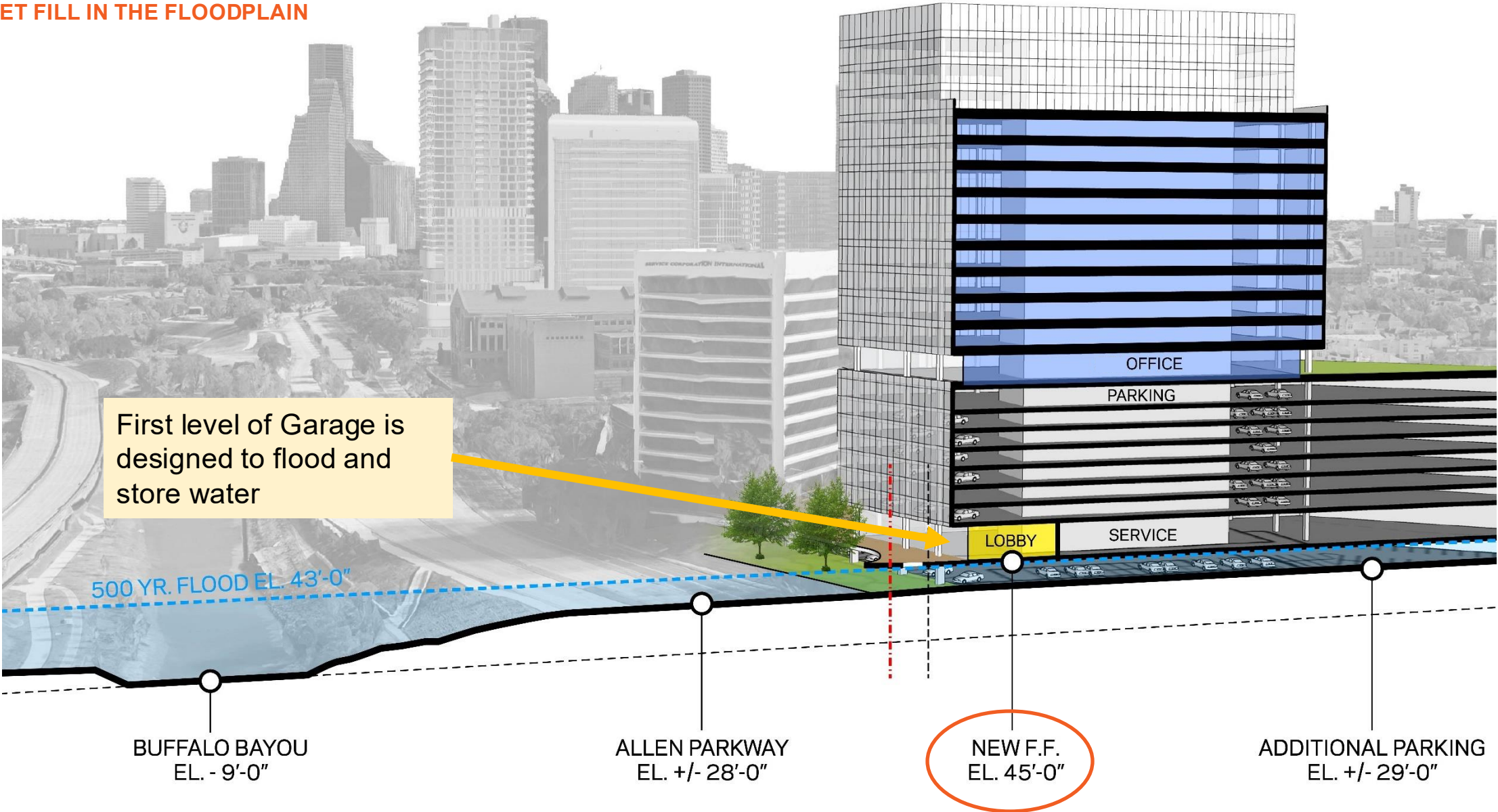
Cut and Fill

NO NET FILL IN THE FLOODPLAIN



Site Resiliency

NO NET FILL IN THE FLOODPLAIN

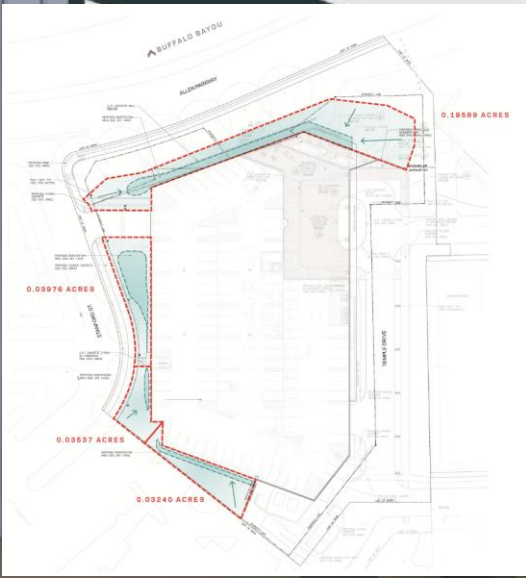


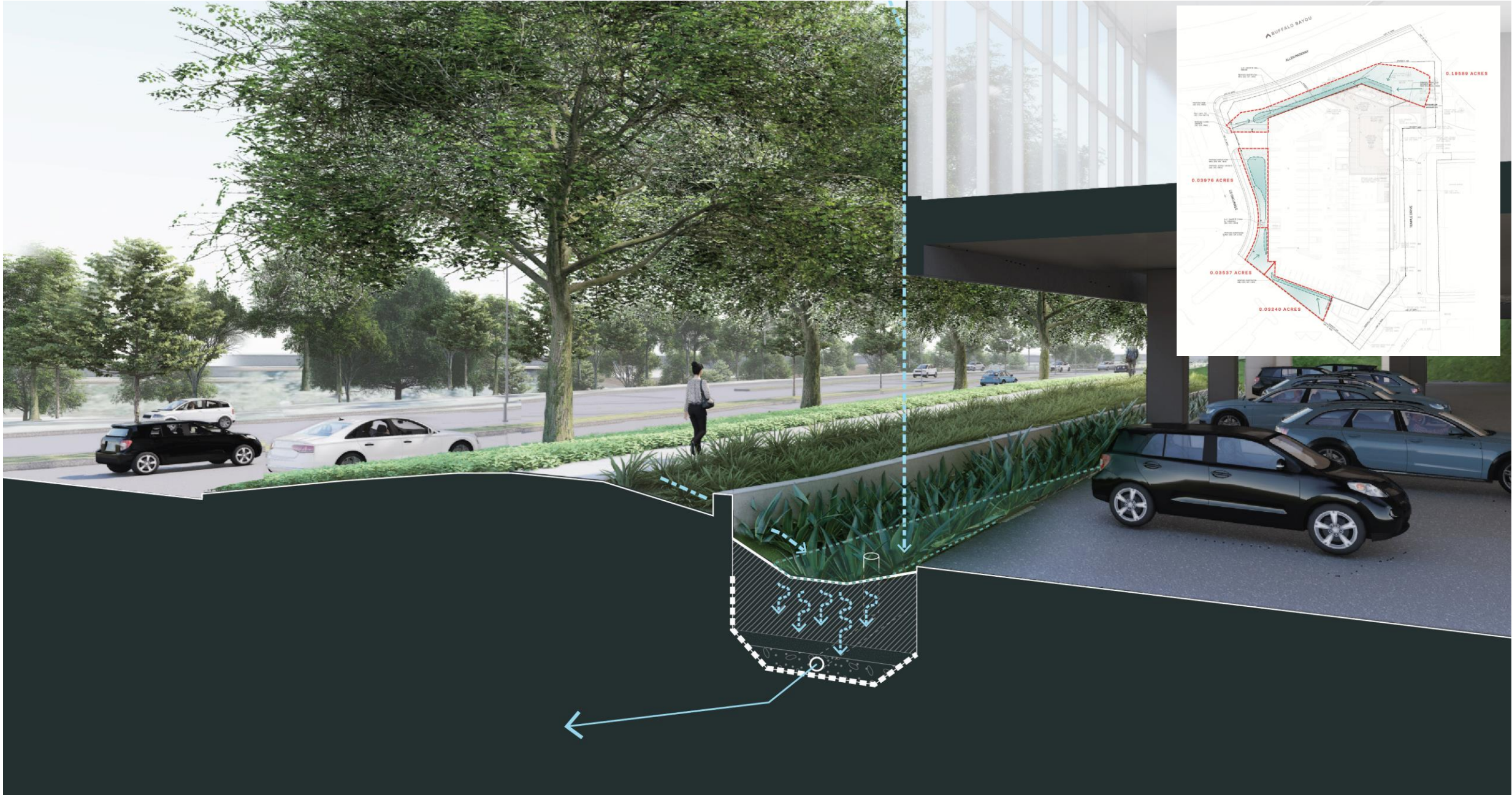


WATER FROM SITE & BUILDING
WASHDOWN DRAINS TO
BIORETENTION POND

WATER PERCOLATES AND GETS
ABSORBED BY BIORETENTION
SOIL MIX & PLANTS

FILTERED EXCESS WATER
GOES INTO PERFORATED PIPE
AND GETS SLOWLY RELEASED
INTO THE STORM WATER LINE











Audience Poll

How might FAA regulations impact the design when it includes ponds?

- a. Glare*
- b. Bird strike*
- c. Pilot disorientation*
- d. Water landing*

LEVIT GREEN

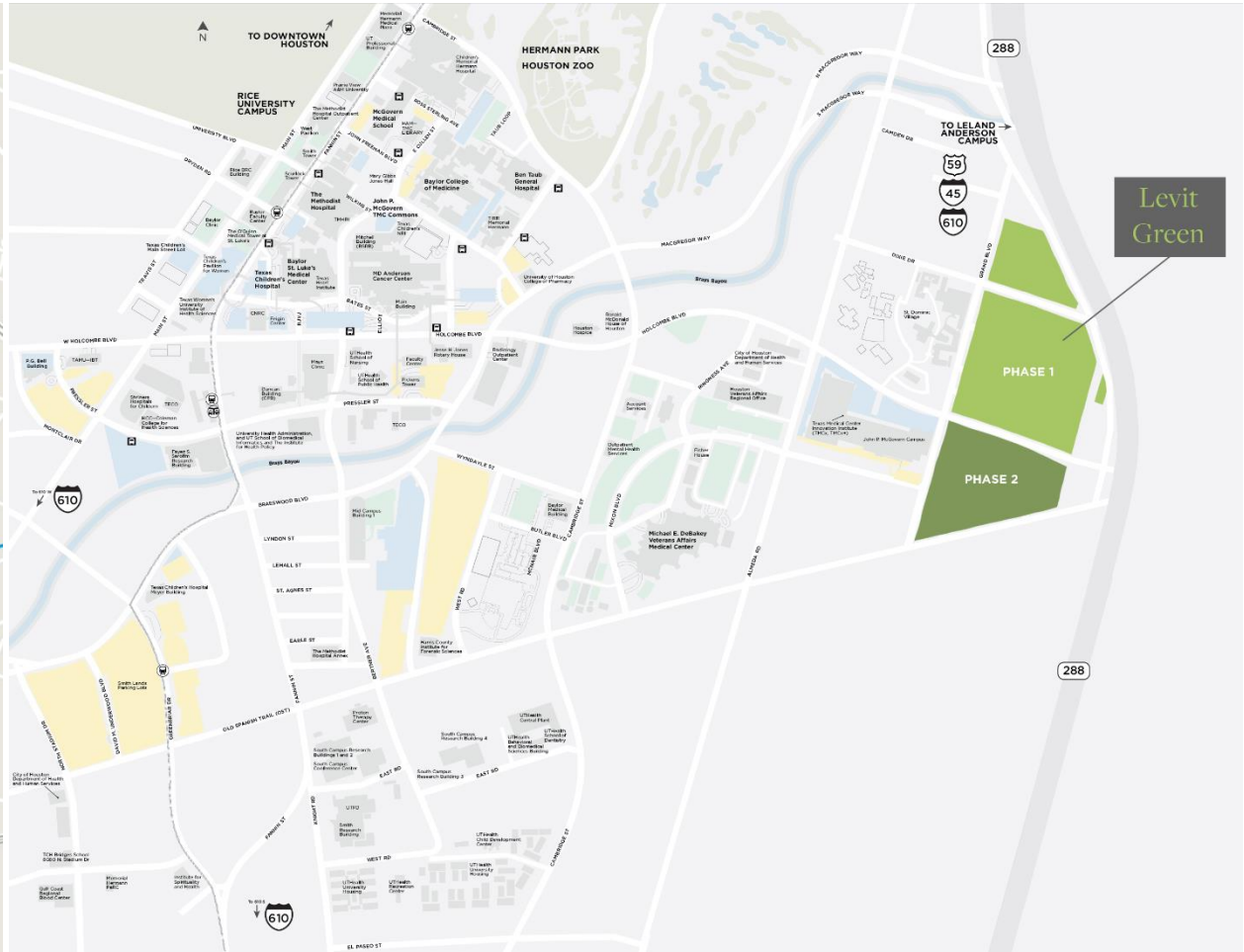
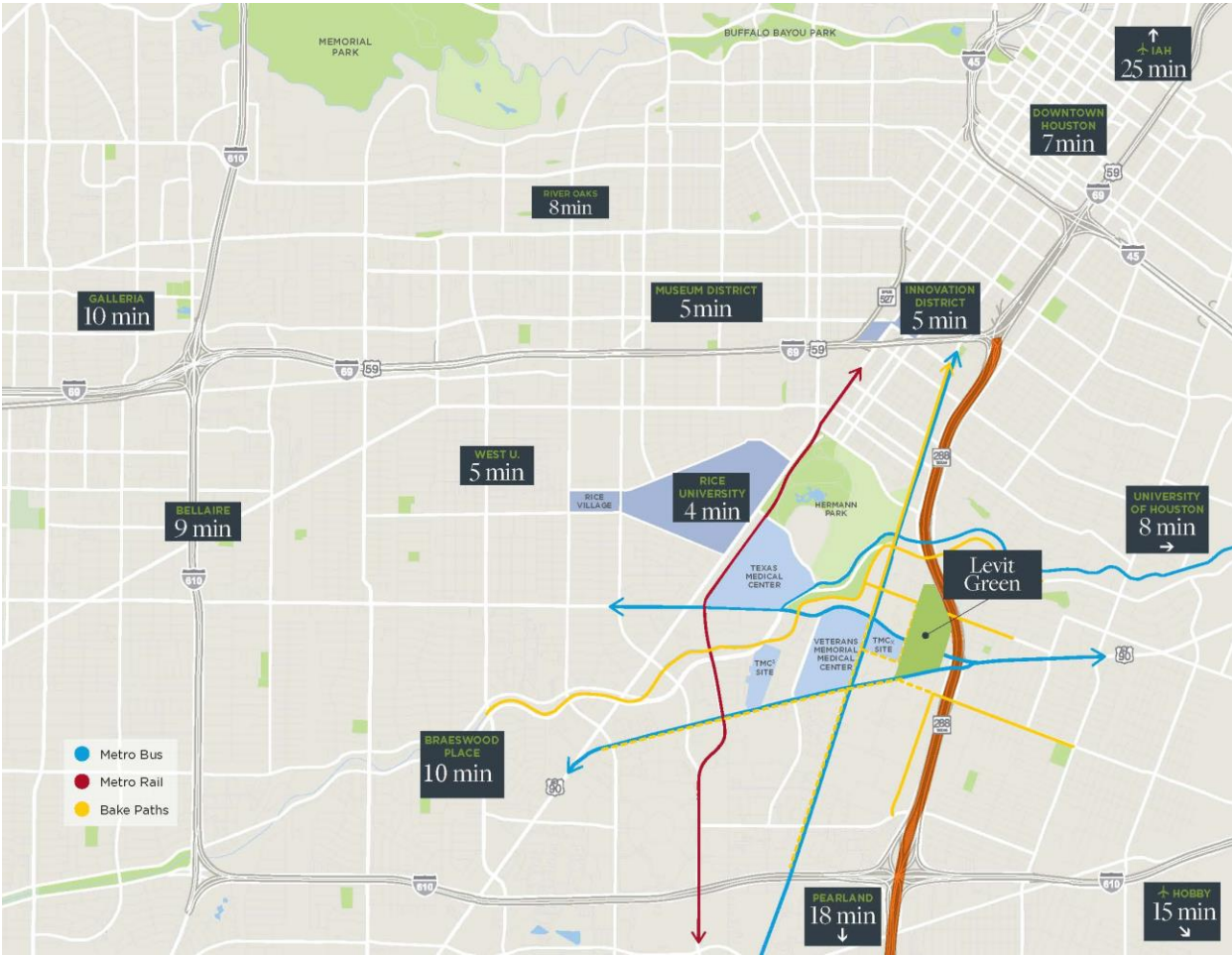
Life Sciences District



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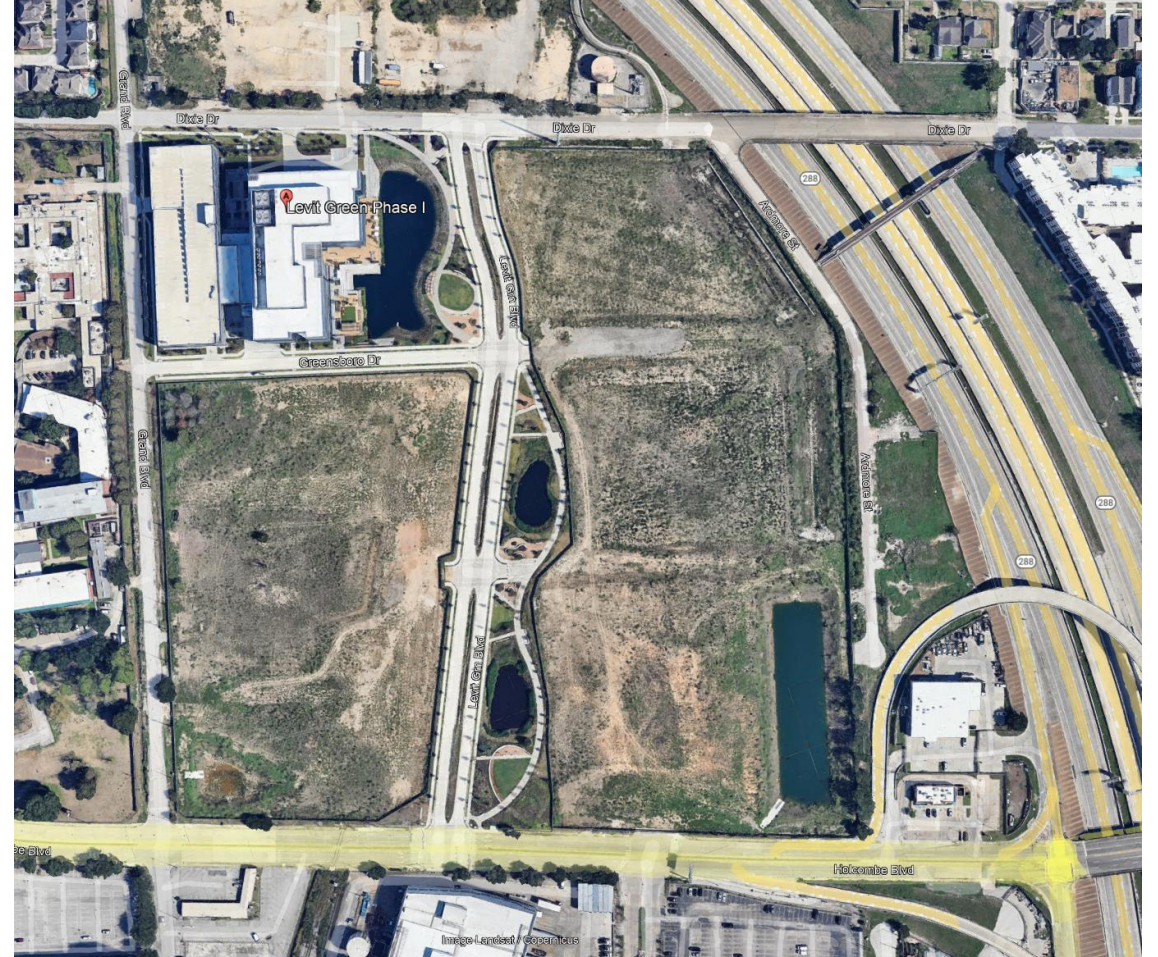


District Transformation

Before

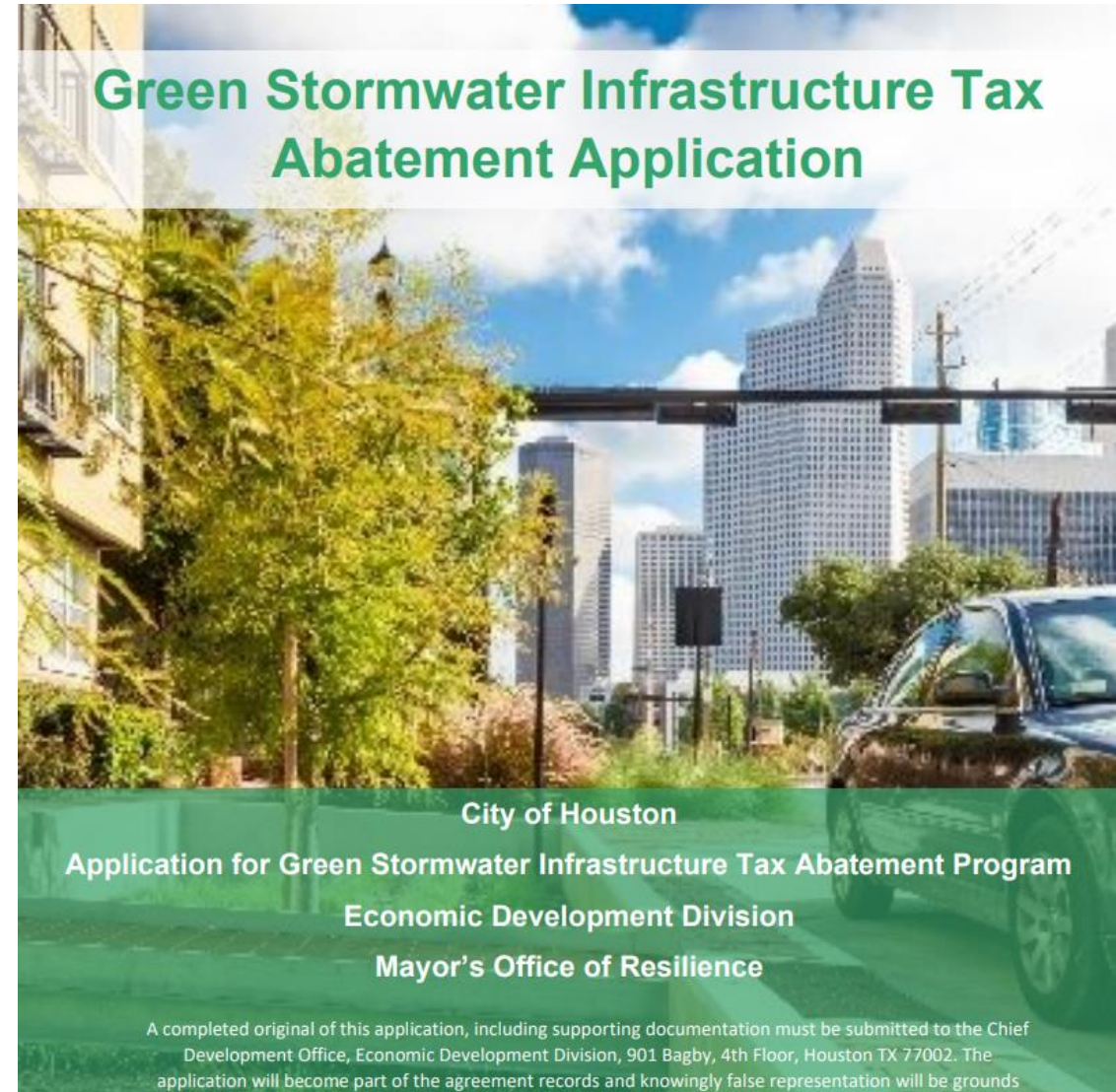


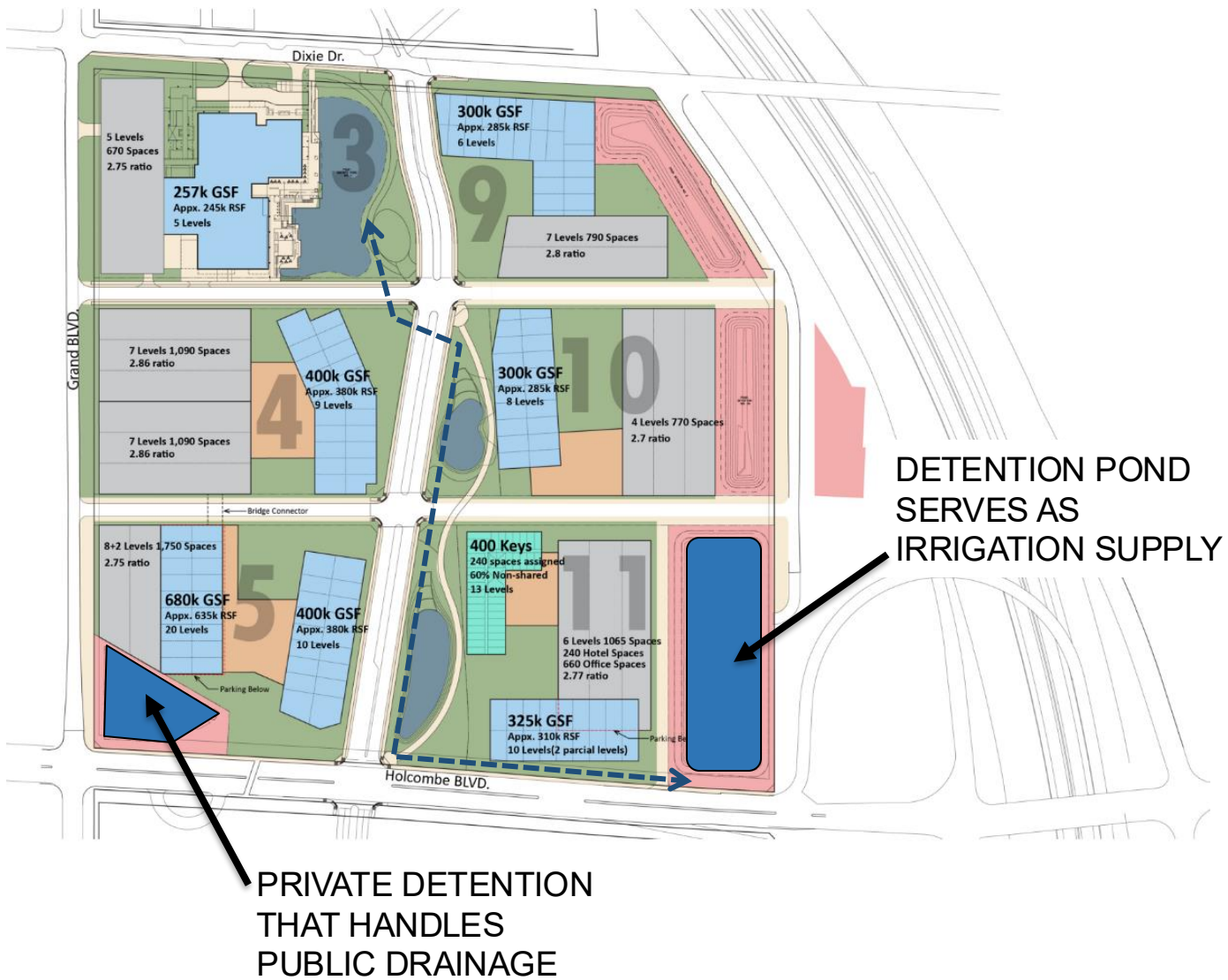
After



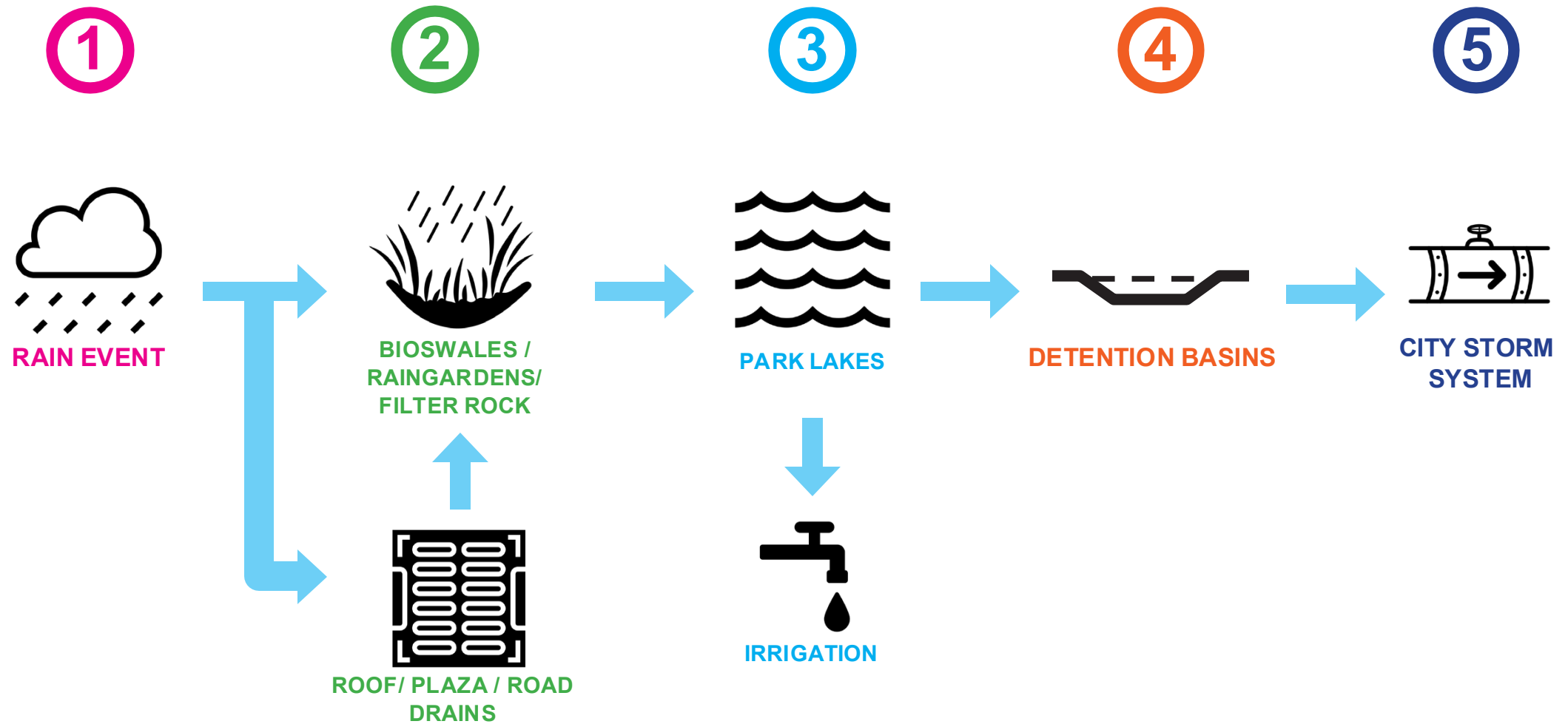
Governing Rules

- Storm Water Detention rate at 0.75 to 0.98 Acre Feet per Acre
- Property detention to be located onsite
- Public Drainage may not drain through a private system
- Low Impact Development is encouraged via potential tax incentives





L.I.D Concept



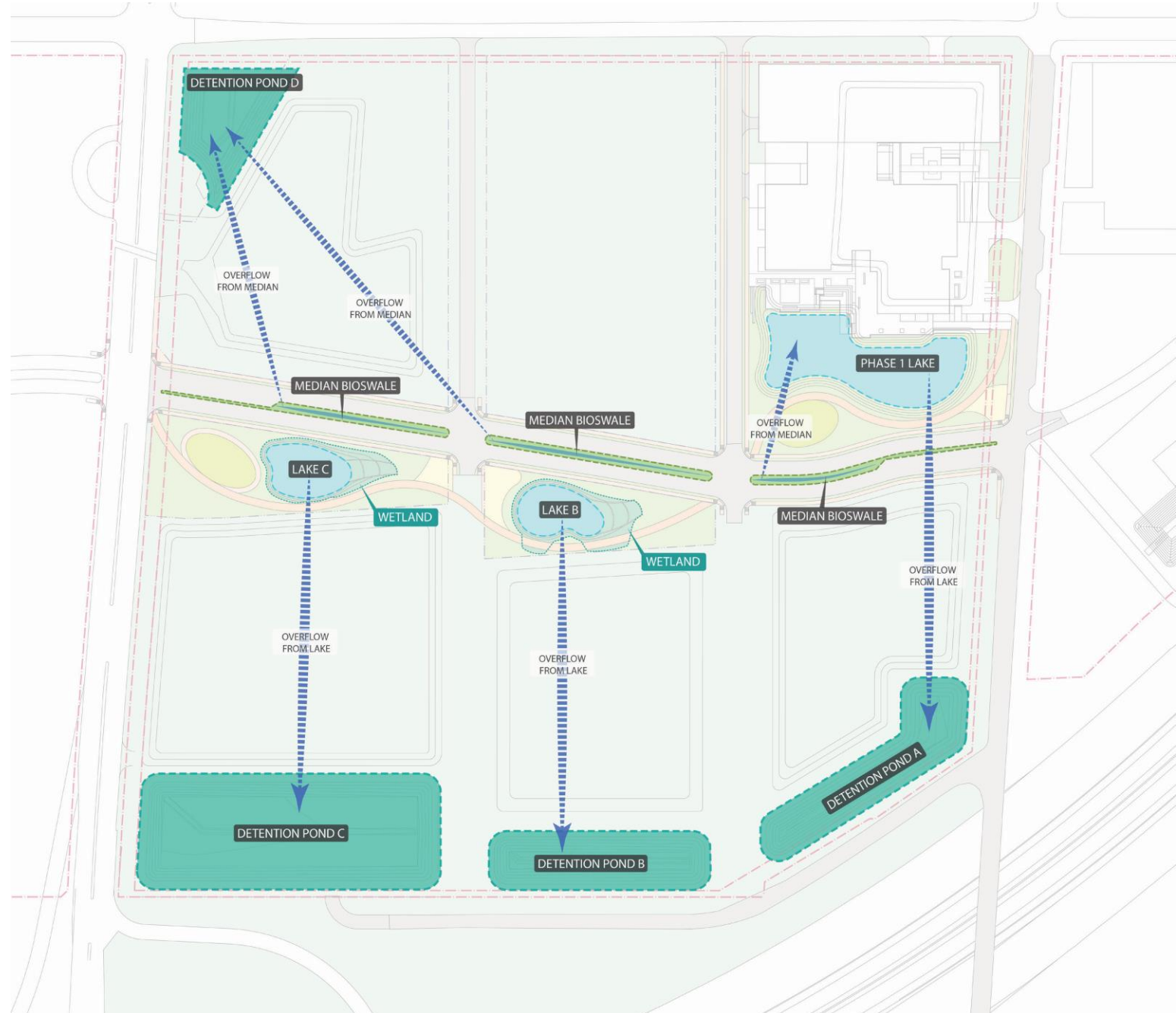
Stormwater Plan

Shaped policy on district detention and private+public stormwater management

Required a management entity to ensure long term maintenance is included

Summary:

- Lakes serve as additional detention to minimize size of east detention basins.
- Lakes will be able to help serve future buildings roof capture as well as site/ parkland irrigation.
- District dry and wet detention basins on edges
- Surrounding roads/ walkways/ landscape drain into park lakes first.
- Connected hydraulically to ensure consistent irrigation supply and reduce likelihood of visible water elevation drop.



Master Plan

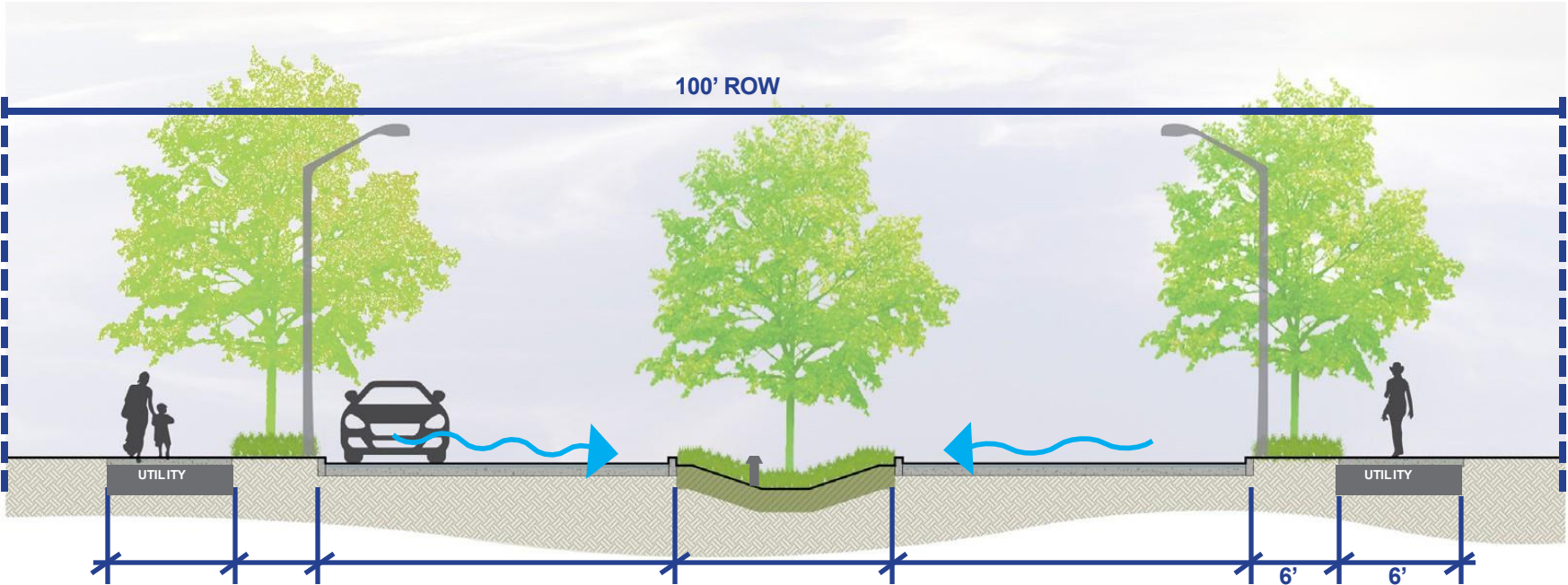
District park that is both amenity and flood storage

Rain garden/ swale in central median.
(Reverse crown)

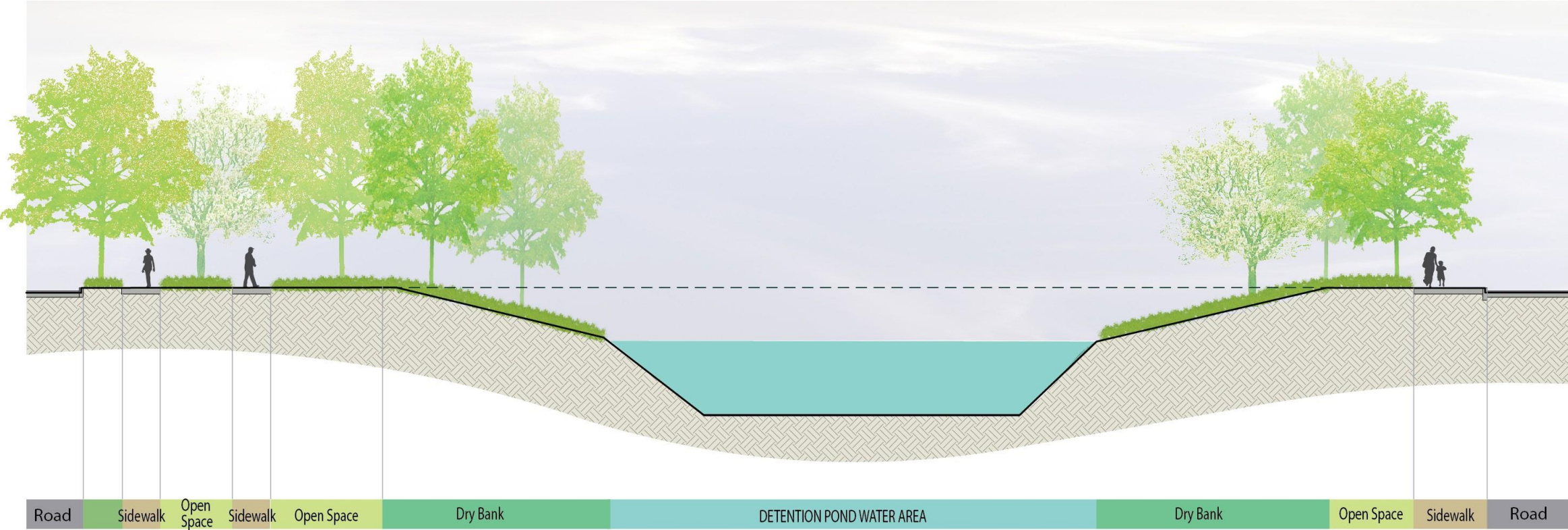


Spine Road

RAIN GARDEN/ SWALE IN CENTRAL MEDIAN. (REVERSE CROWN)



Lake Section

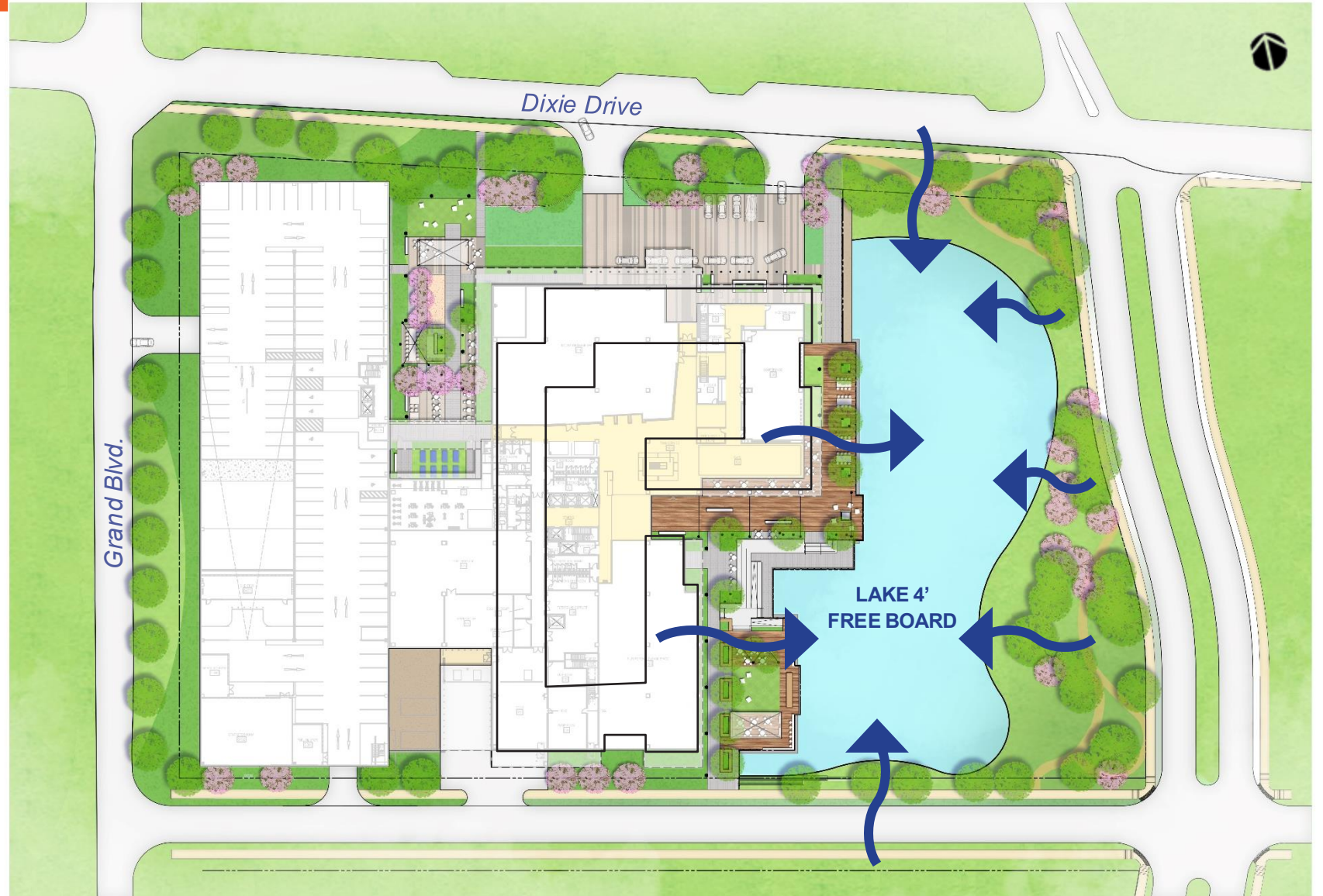


Phase 1 Site Plan

Roof stormwater roof drain piped to lake

Surrounding walkways & landscape surface drain into lake

Lake serves for detention (3'-4' of freeboard) & irrigation source for landscape









Q&A



SHARE & WIN

Share your feedback on today's event and be entered to win a complimentary registration to the 2026 Resilience Summit!

