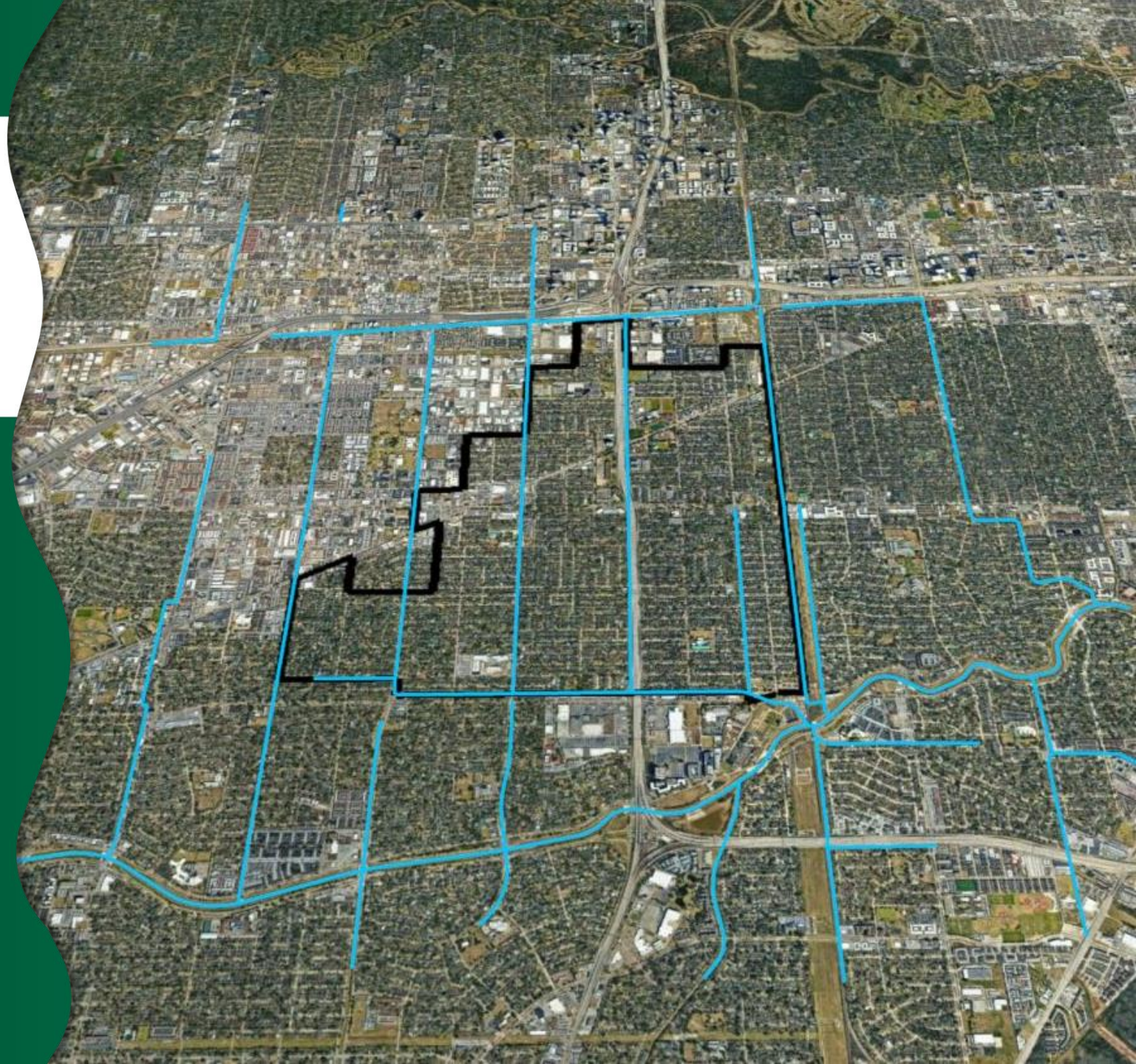


City of Bellaire

REGIONAL DRAINAGE IMPROVEMENT PROGRAM

Public Open House

August 20, 2024



TEAM

AGENCIES & STAKEHOLDERS:

- City of Bellaire
- Harris County
- Harris County Flood Control District
- TxDOT
- City of Houston
- Flood Hazard Mitigation Task Force (Bellaire)

ENGINEERING

- Ardurra

City of Bellaire



City of Bellaire

FLOOD HAZARD MITIGATION
TASK FORCE





Program Introduction and Goals



Current Program Status



Cypress Ditch Improvements



Funding Opportunities

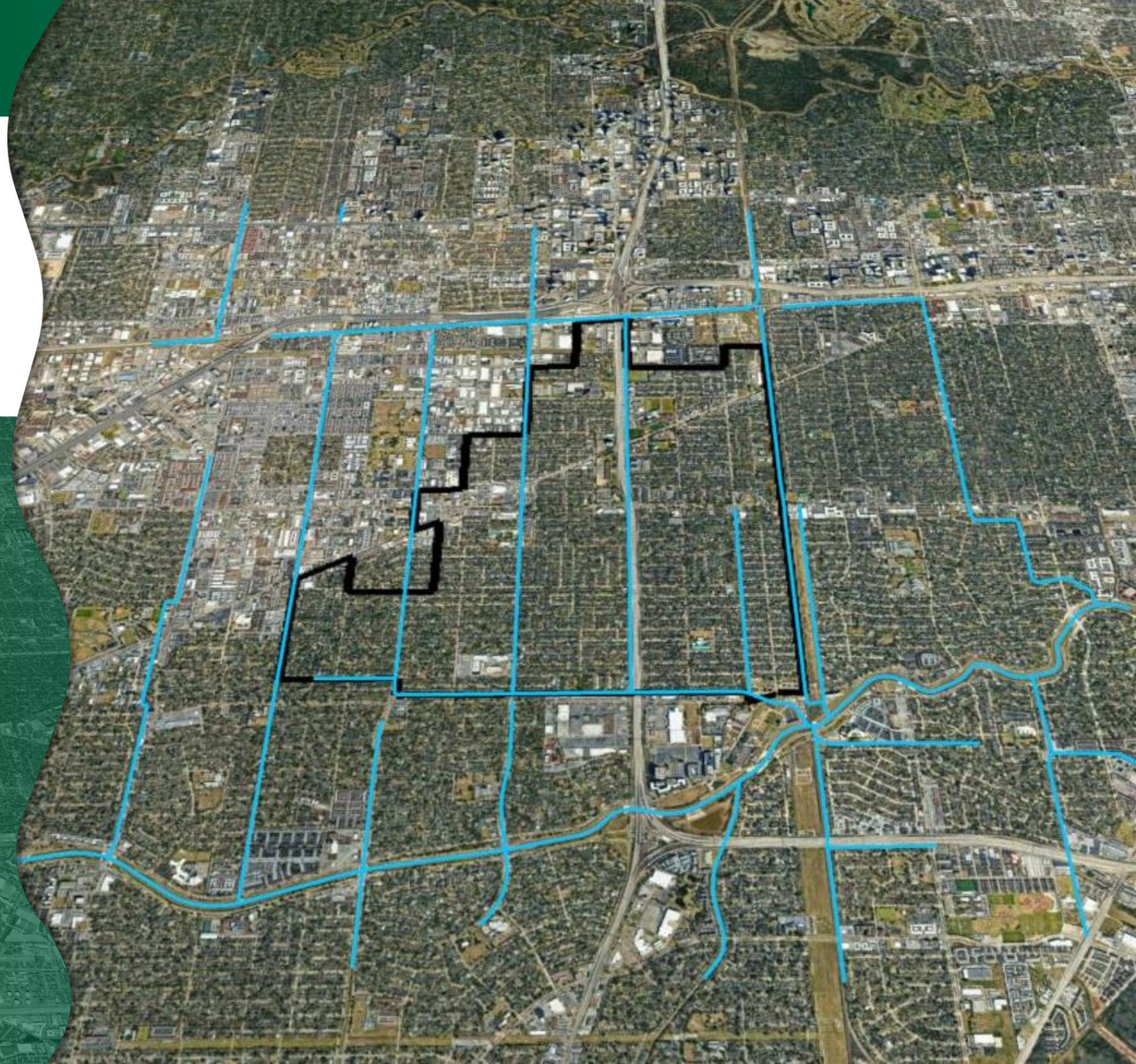


Resident Engagement



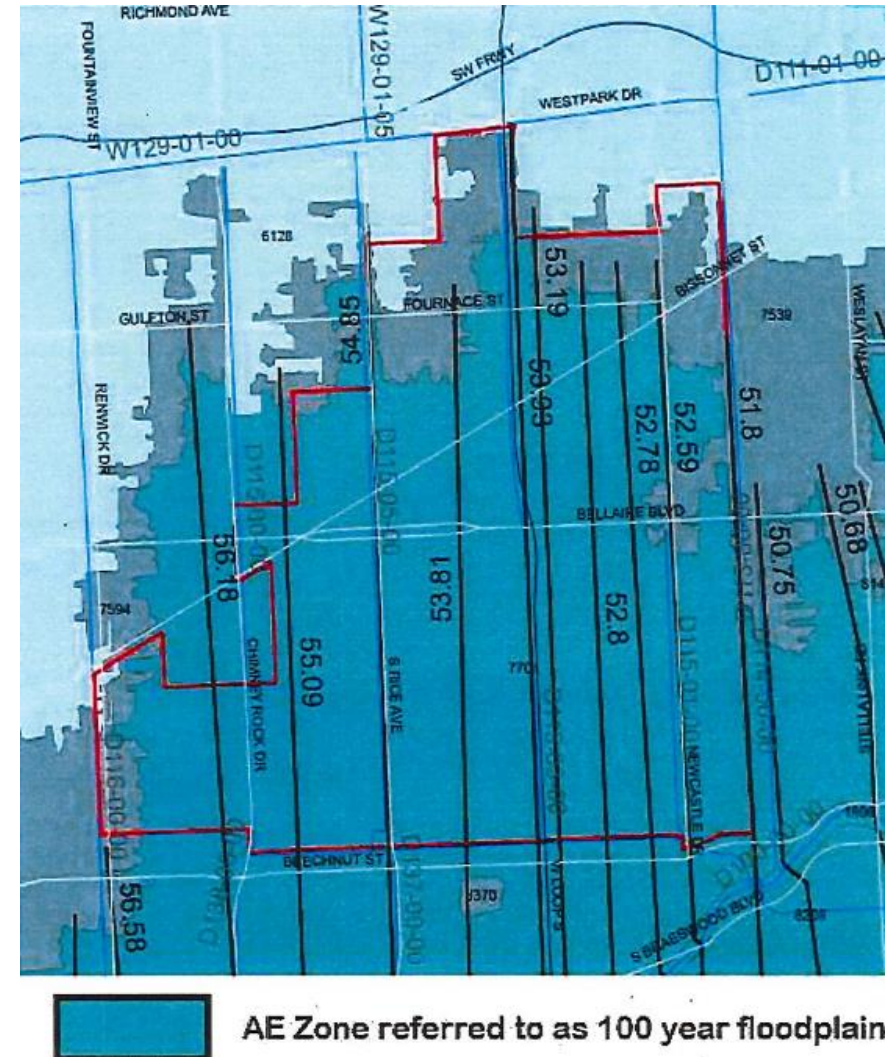
Open Discussion

PROGRAM INTRODUCTION AND GOALS



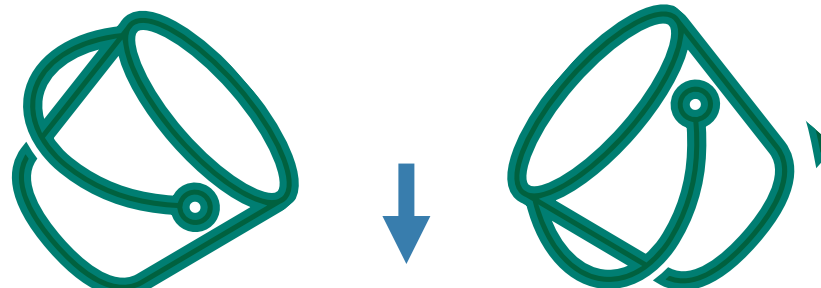
DRAINAGE INFRASTRUCTURE – HOW IT WORKS

- Storm drainage system comprises local systems (neighborhood streets and storm sewers or ditches), regional collectors and trunklines, outfall channels, and detention

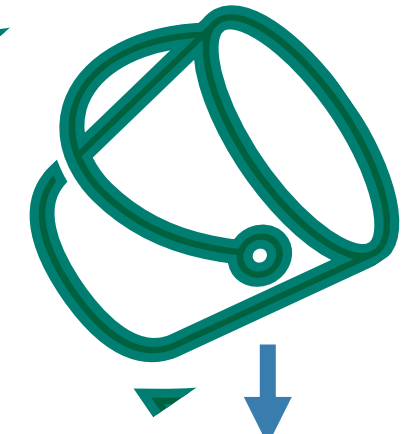




Collectors, local systems



Trunklines – IH610, S Rice Ave, Newcastle



Cypress Ditch



Brays Bayou

THE EPICENTER OF A CHANGING CLIMATE

NOAA ATLAS 14

Previous TP-40
100-yr Rainfall

13"/24 hours

New ATLAS 14
100-yr Rainfall

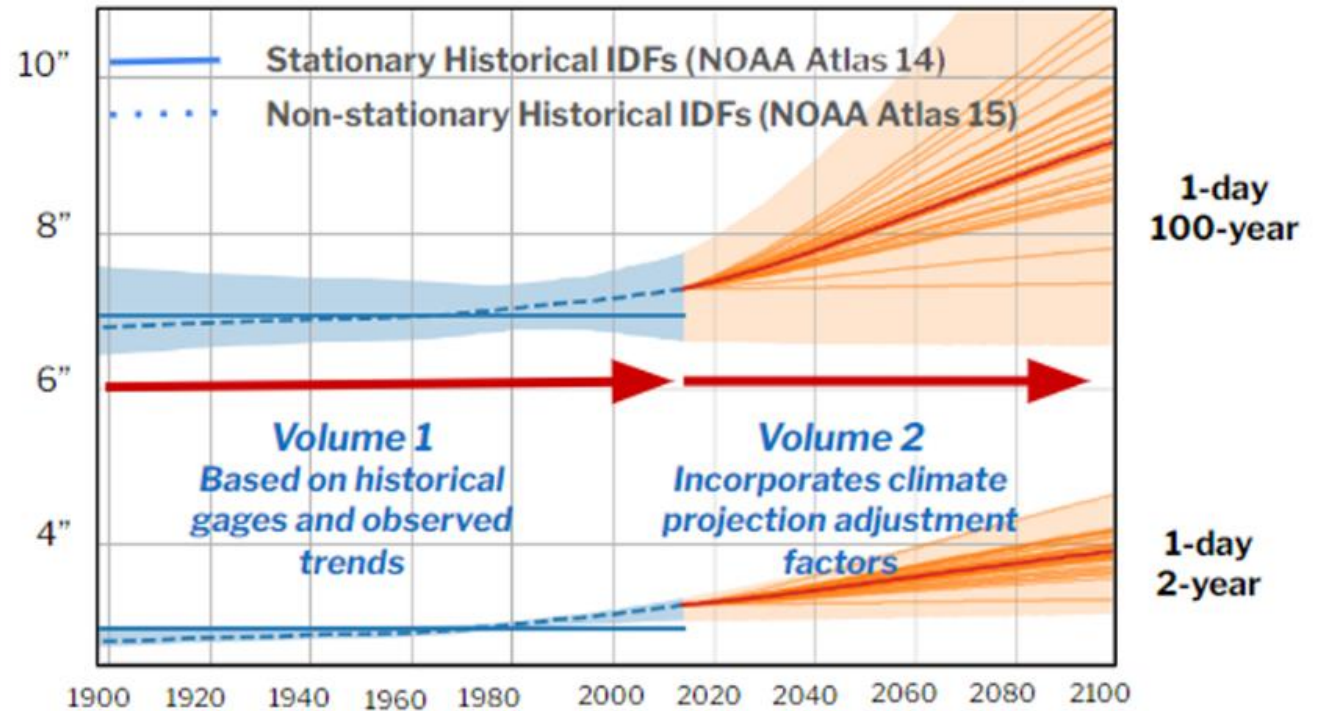
17"/24 hours

30%
INCREASE

First Street Foundation (June 2023):

“Looking at highly populated cities such as Houston, Texas, the initial Atlas 14 correction is pronounced, increasing the likelihood of Houston’s 1-in-100-year flood event by 335% to a 1-in-23-year event. As the climate continues to warm, that same event will become a **1-in-11-year event by 2053, an 809% increase in likelihood.**”

NOAA ATLAS 15 (FUTURE)



PROGRAM PURPOSE AND GOALS

A foundation for a more resilient Bellaire

Design infrastructure, guide development to safely withstand future floods

Be a progressive model for living with water and cost-effectively adapting to a changing climate

An integrated, incremental approach

Design improvements such that all properties in the City see a significant reduction in flood risk

Develop a strategy to implement improvements in a cost-effective, phased manner over the long-term

An opportunity for regional partnerships

Develop projects that are mutually beneficial for multiple stakeholders

Identify opportunities for grant funding

Implement strategic plan to work with City of Houston to secure property and other benefits necessary to facilitate the first phase of the Program

FLOOD RISK REDUCTION STRATEGY



Development Codes

Passed Chapter 9 changes on 11/21/23

- Sets FFE at 500-year + 1 foot
- Codifies non-residential drainage criteria



Brays Bayou Improvements

Project Brays completed Summer 2023

- FIRM changes to be incorporated into MAAPnext
- Significant reduction in WSE, extents of 100-yr, 500-yr floodplains



Regional Drainage Solutions

Improvements in Development

- First Phase: Regional detention, Cypress Ditch, IH-610 storm sewers
- Future Phases: S. Rice, Chimney Rock, Newcastle/Kilmarnock trunklines
- Westpark Corridor: being studied by HCTRA
- Richmond Plaza: under construction by COH



Local Drainage Solutions

Five CDBG-DR streets completed in 2023

- Developing local street and storm sewer drainage design criteria
- Programming local street improvements in 2024

Codes, Standards, and Design Criteria

- Establish flood risk reduction standard to be implemented City-wide
- Develop cost-effective codes and design criteria to guide development, infrastructure improvements

Brays Bayou Improvements

- Complete Project Brays to reduce Bayou water surface elevations
- Support partners in the identification and delivery of additional Brays Bayou improvements

Regional Drainage Solutions

- Develop trunkline improvements to meet the flood risk reduction standard
- Determine mitigation requirements necessary to accommodate trunkline improvements
- Develop phasing plan for trunkline improvements
- Identify opportunities partnerships and external funding

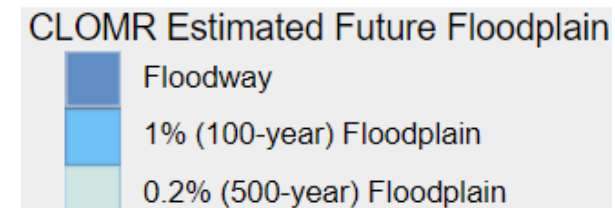
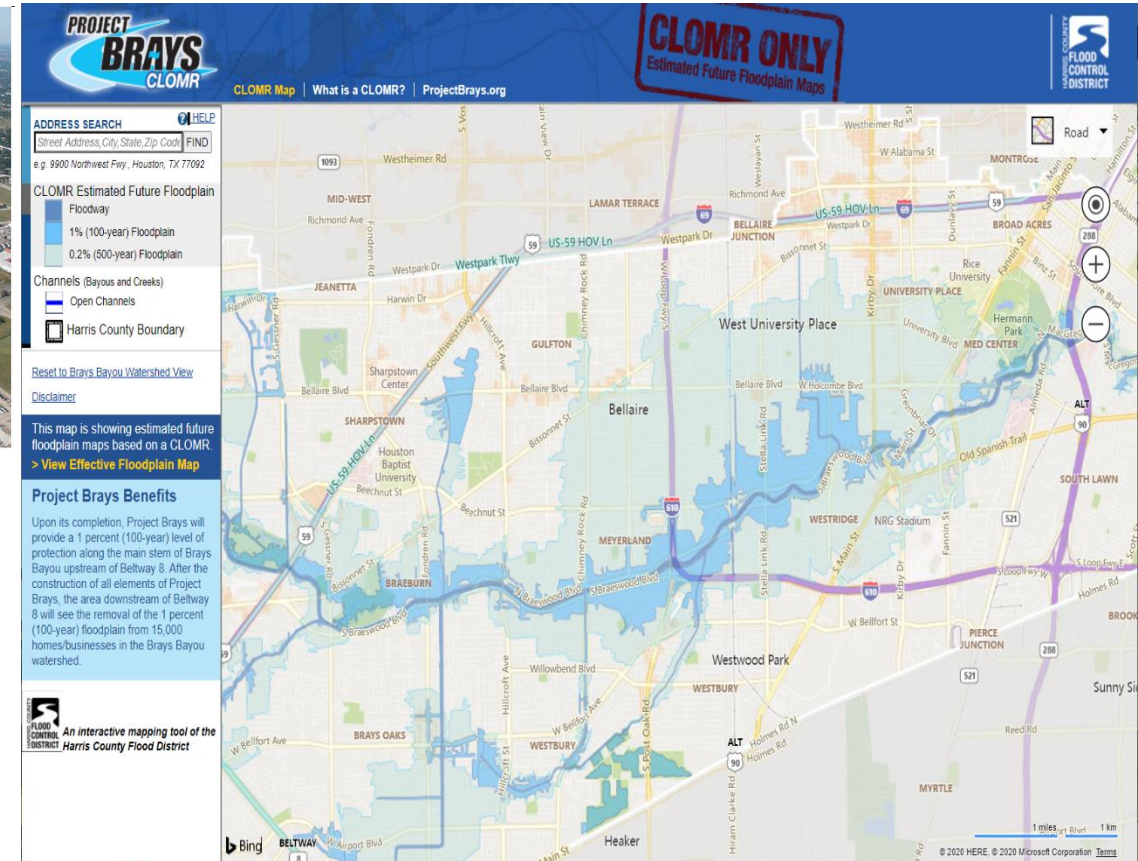
Local Drainage Solutions

- Develop phasing plan for improvements to local drainage (streets and storm sewers)
- Develop funding strategies to facilitate long-term implementation and O&M

LARGE REGIONAL IMPACTS FROM PROJECT BRAYS IMPROVEMENTS



- Project Completion-2022/2023
- Project Brays was designed to provide Pre-ATLAS 14 – 100 Year LOS
- Estimated future floodplain map is based on Pre-ATLAS 14 data
- HCFCDD MAAPNEXT updates will include ATLAS 14 data. Will be available in 2024

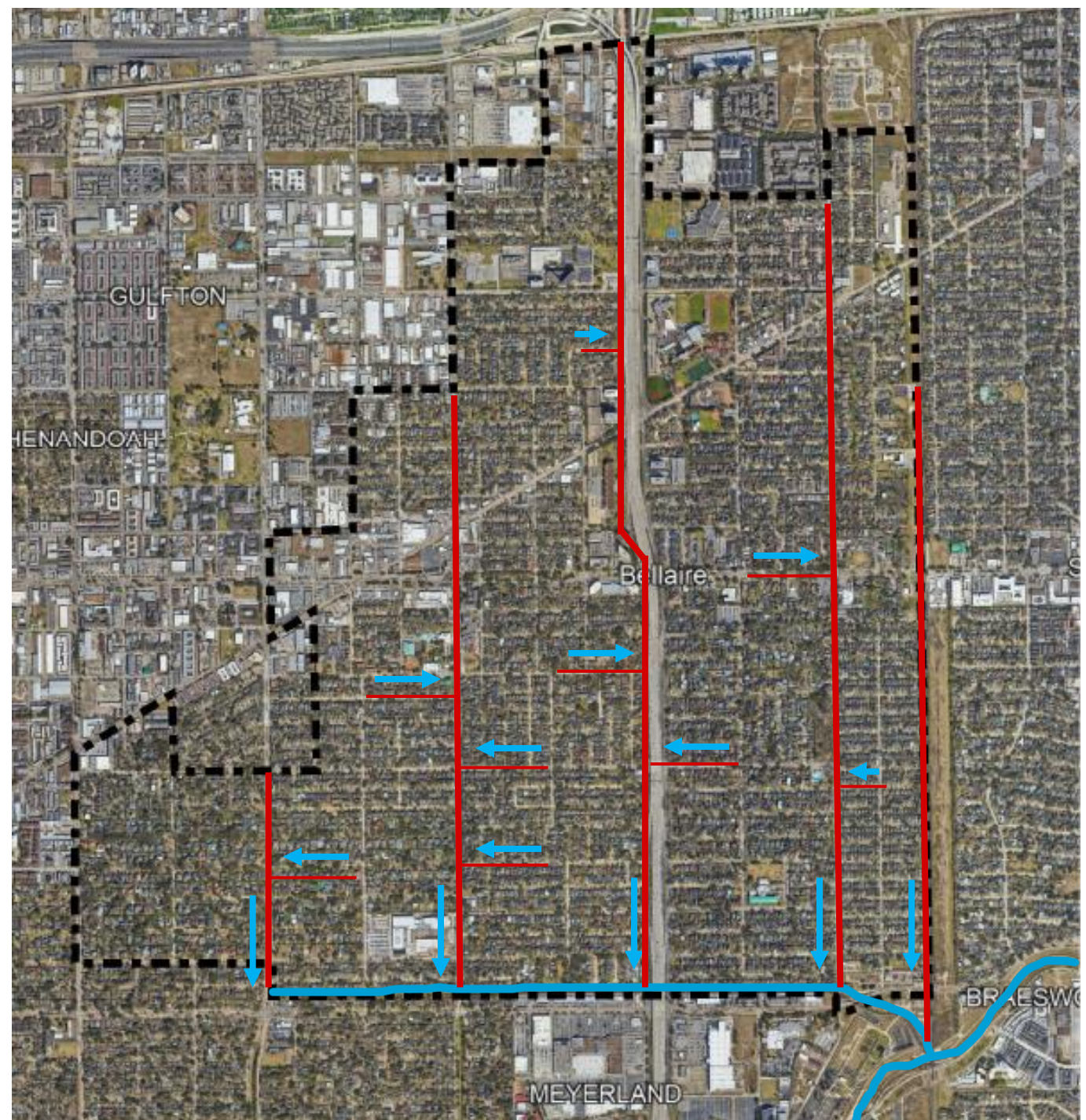


Goal: Implement flood risk reduction improvements across the City to minimize the risk of structural flooding and improve mobility during major storm events

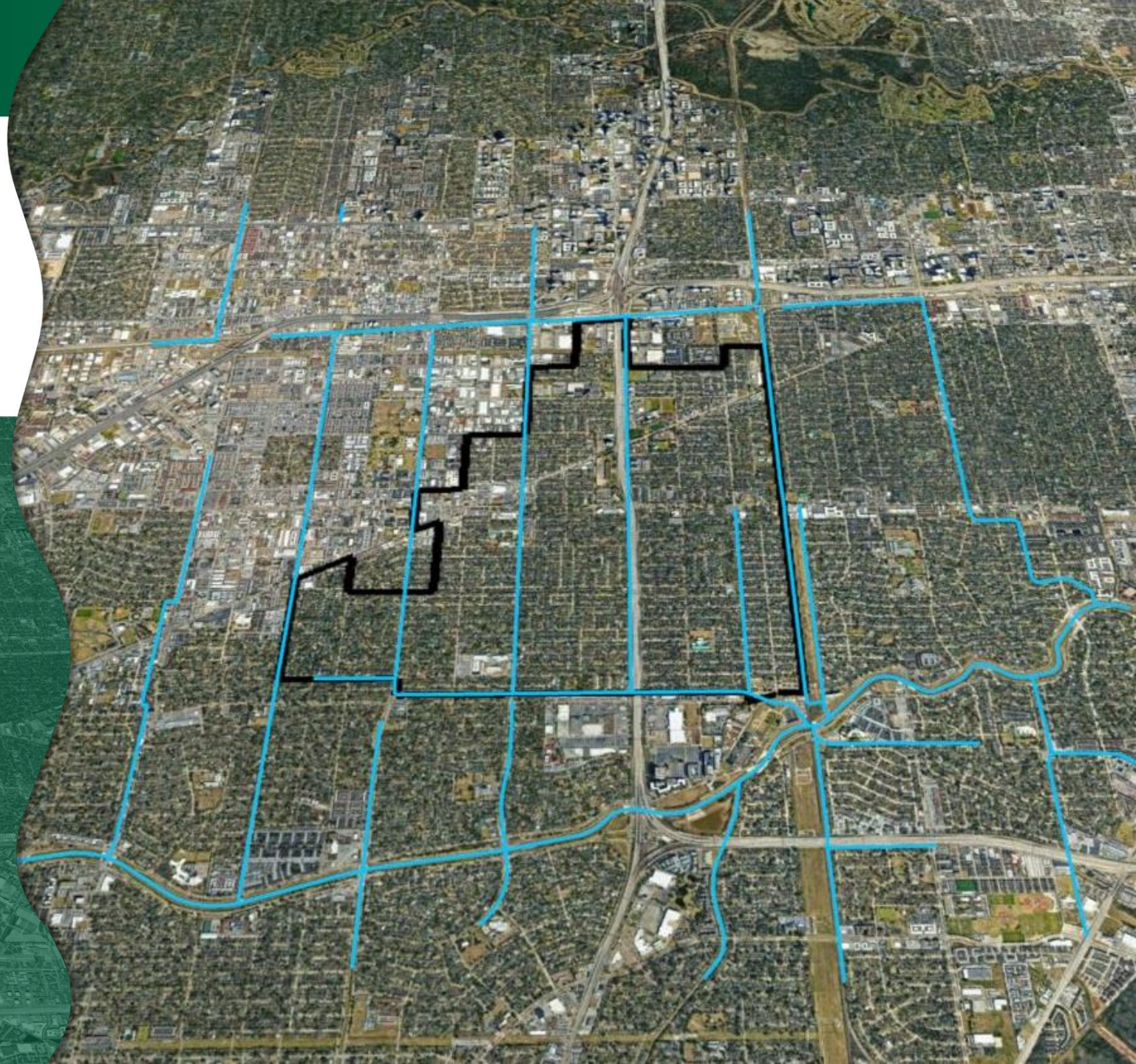
Requires:

- Sizing storm sewers, designing streets to carry water out of neighborhoods
- Sizing trunklines to carry water out of Bellaire
- Creating capacity in Cypress Ditch to accept City stormwater flow without increasing flood risk along the channel
- Providing detention to mitigate impacts to Brays Bayou

Multi-purpose improvements provide regional benefits extending beyond Bellaire City limits



CURRENT PROGRAM STATUS



MAJOR PROGRAM INITIATIVES



1

ESTABLISH
FLOOD RISK
MANAGEMENT
OBJECTIVES

Bellaire will be a city that lives with water

- *Balance new development/redevelopment and infrastructure improvements to manage flood risk*
- *A long-term vision: established best practices for effectively “eating the elephant”*

2

DEVELOP
DRAINAGE
DESIGN CRITERIA
AND
FLOOD ORDINANCE

Established the most progressive flood ordinance in the region

- *Finished floor elevation set at 500-year water surface elevation + 1 foot*

Drainage design criteria balances risk reduction, cost effectiveness

- *Accounts for impacts inside and outside the City ROW*
- *Also considers maintaining mobility during extreme events*

3

DEVELOP
FLOOD RISK
REDUCTION
SOLUTIONS

Completed conceptual analysis for First Phase projects

- *Modifications to increase capacity in Cypress Ditch*
- *Improvements to TxDOT storm sewers along IH-610*
- *Identified potential locations for regional detention to support First Phase projects*

4

PLAN FOR
FLOOD/DRAINAGE
INFRASTRUCTURE
CAPITAL
IMPROVEMENTS

Establishing foundations for future CIP projects

- *Identified emergency access and evacuation routes that may require higher standard for flood reduction*
- *Developing a heat map of infrastructure needs to further define implementation strategy*

5

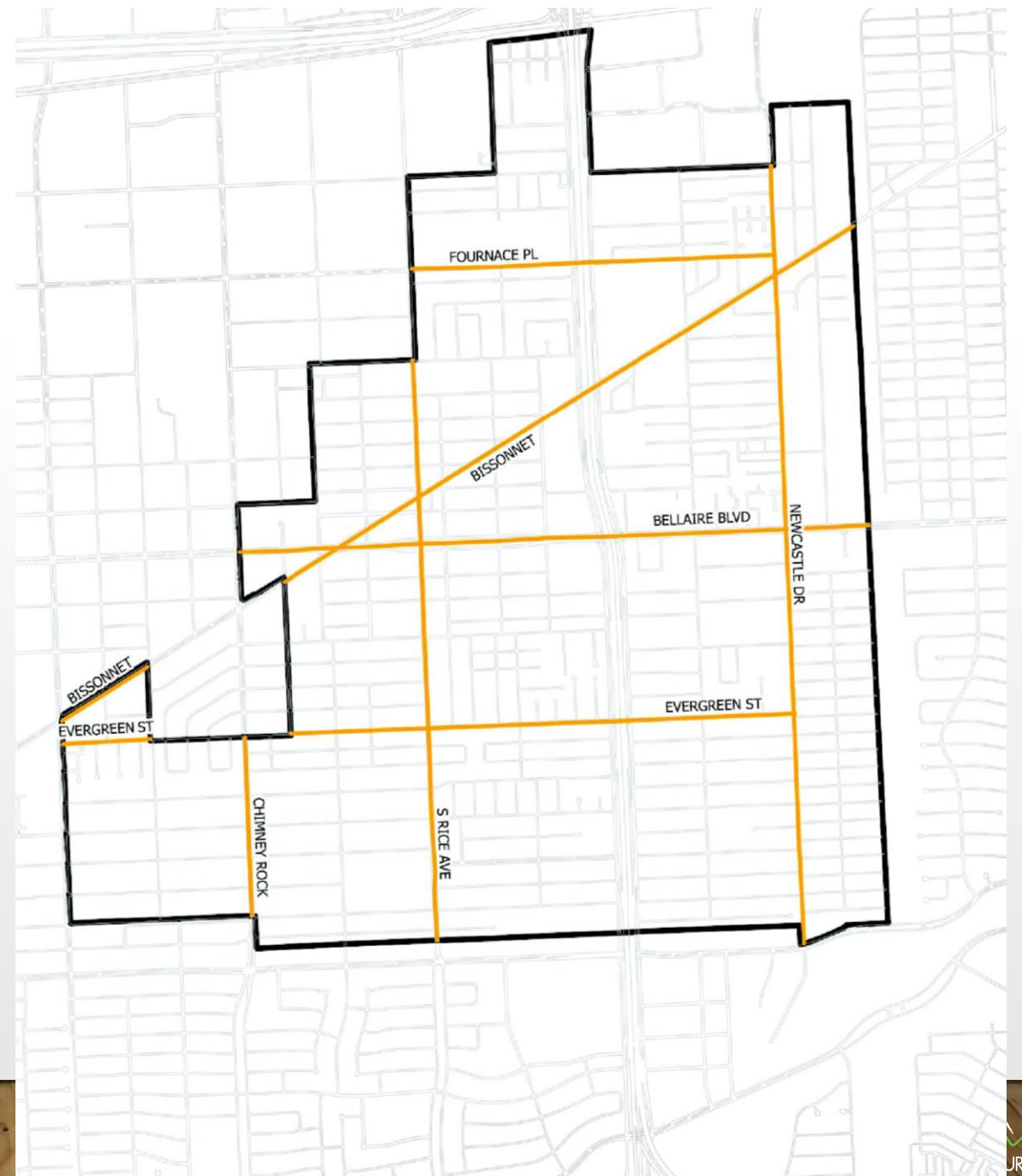
STRATEGIZE
LONG-TERM
PROJECT FUNDING
AND DELIVERY

Continue to strategize project funding

- *Position projects to compete successfully for state and federal funding opportunities*
- *Opportunities for local City funding – Drainage Utility Fee and Bonds*
- *Continue to seek partnerships*

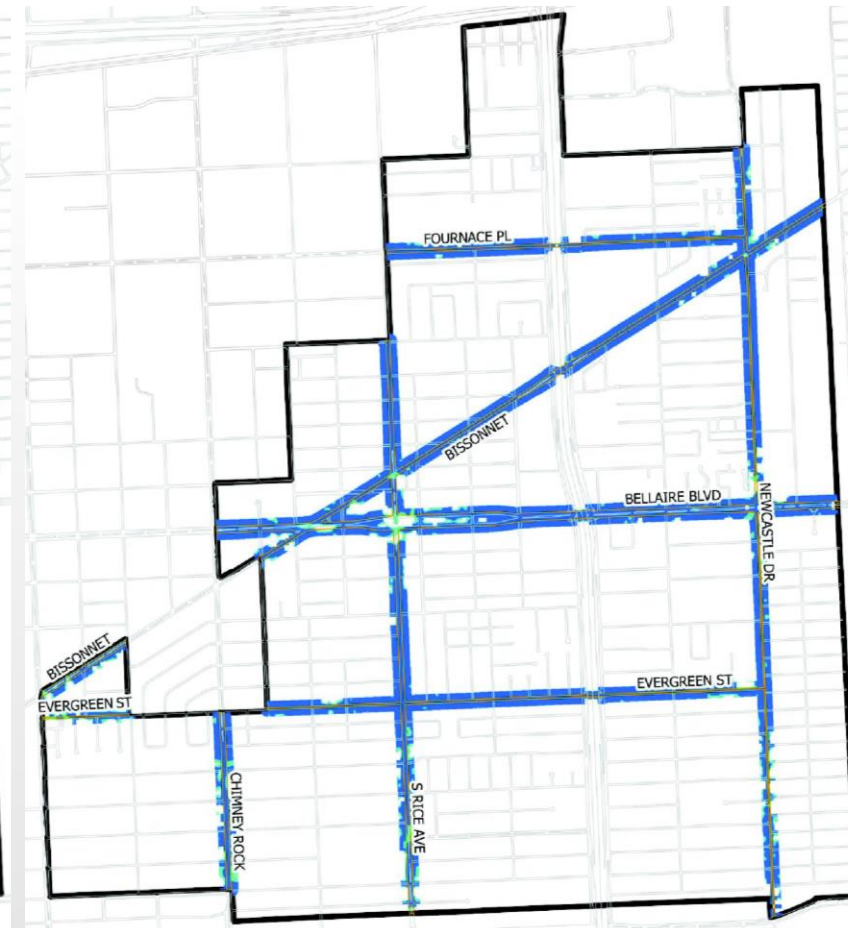
EMERGENCY ACCESS ROUTES

- Delineate routes to serve as emergency access and evacuation routes
- Connections to critical City facilities
 - Fire Department, Police Department, City Hall, WWTP, hospitals near Bissonnet/IH-610
- Connections to major roadways
 - IH-610, I-69/US-59, Beltway 8, Westpark Tollway

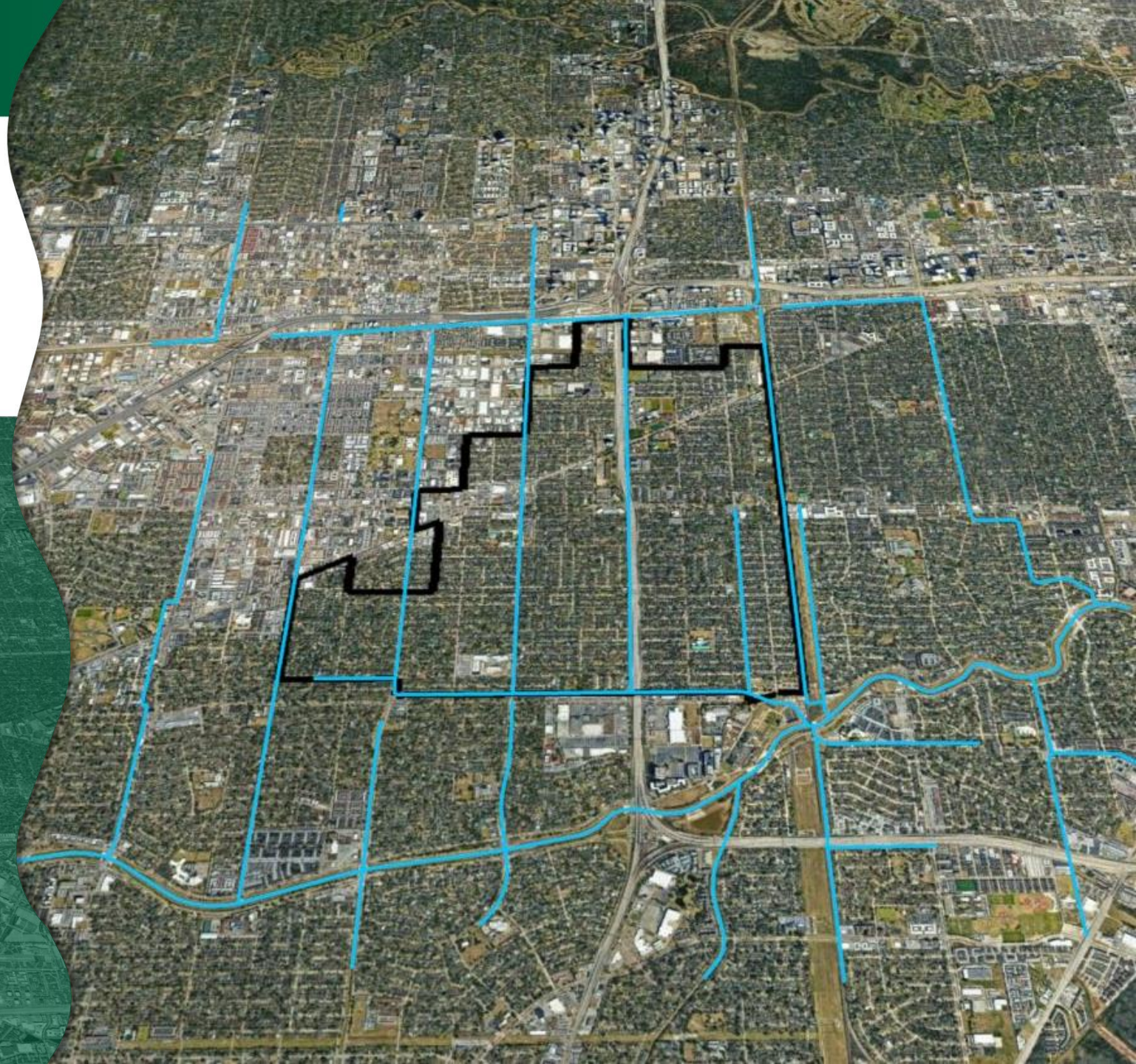


Legend

- Bellaire City Limits
- COH_EdgeOfPavement
- EMERGENCY ACCESS ROUTES
- DepthExist_500Y100YTW_REV_ROUTES
- Max Water Depth (FT)
- 3-6 IN.
- > 6 IN.



CYPRESS DITCH IMPROVEMENTS

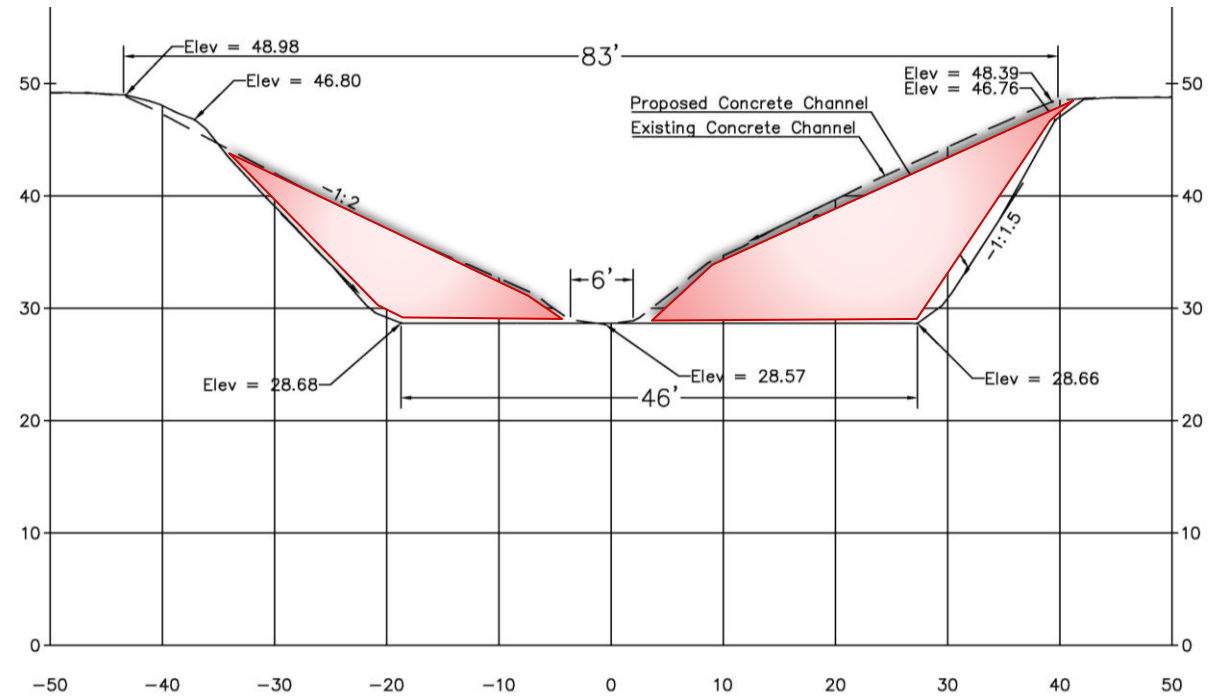
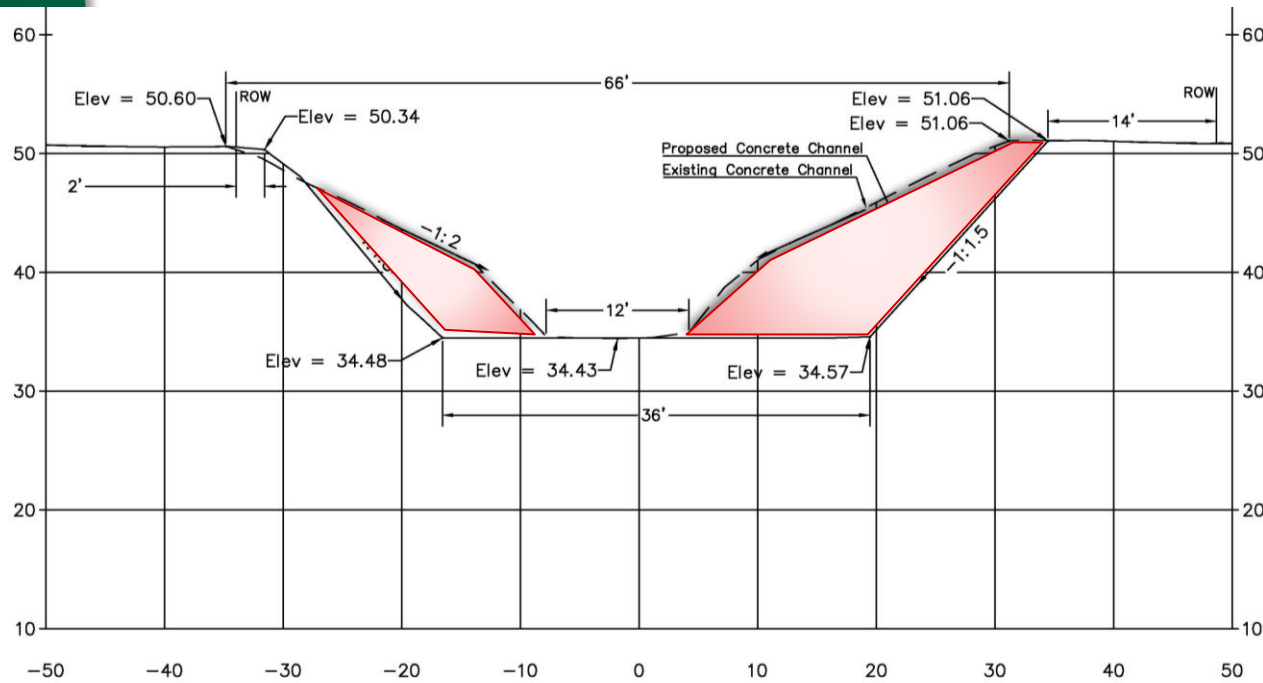


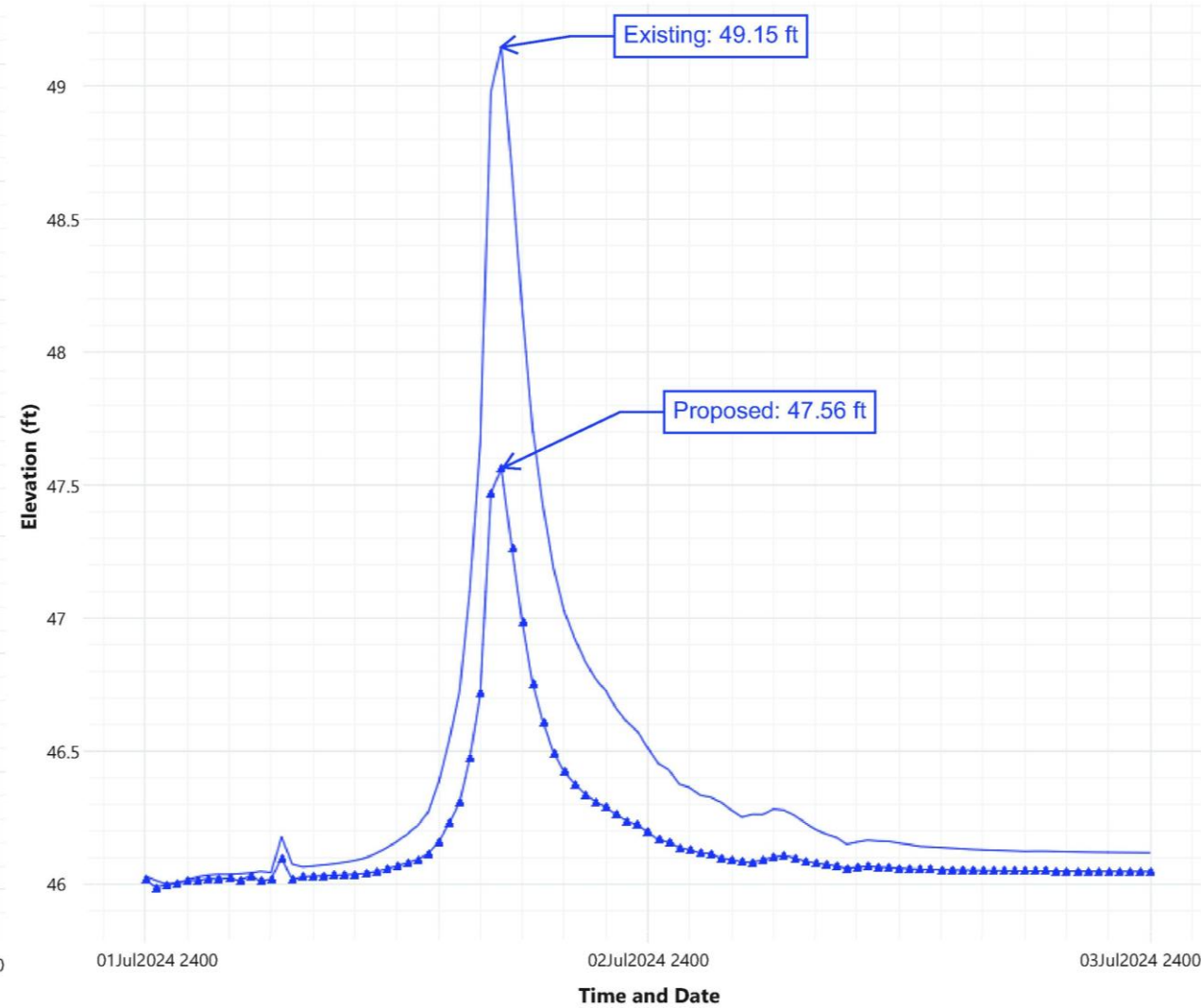
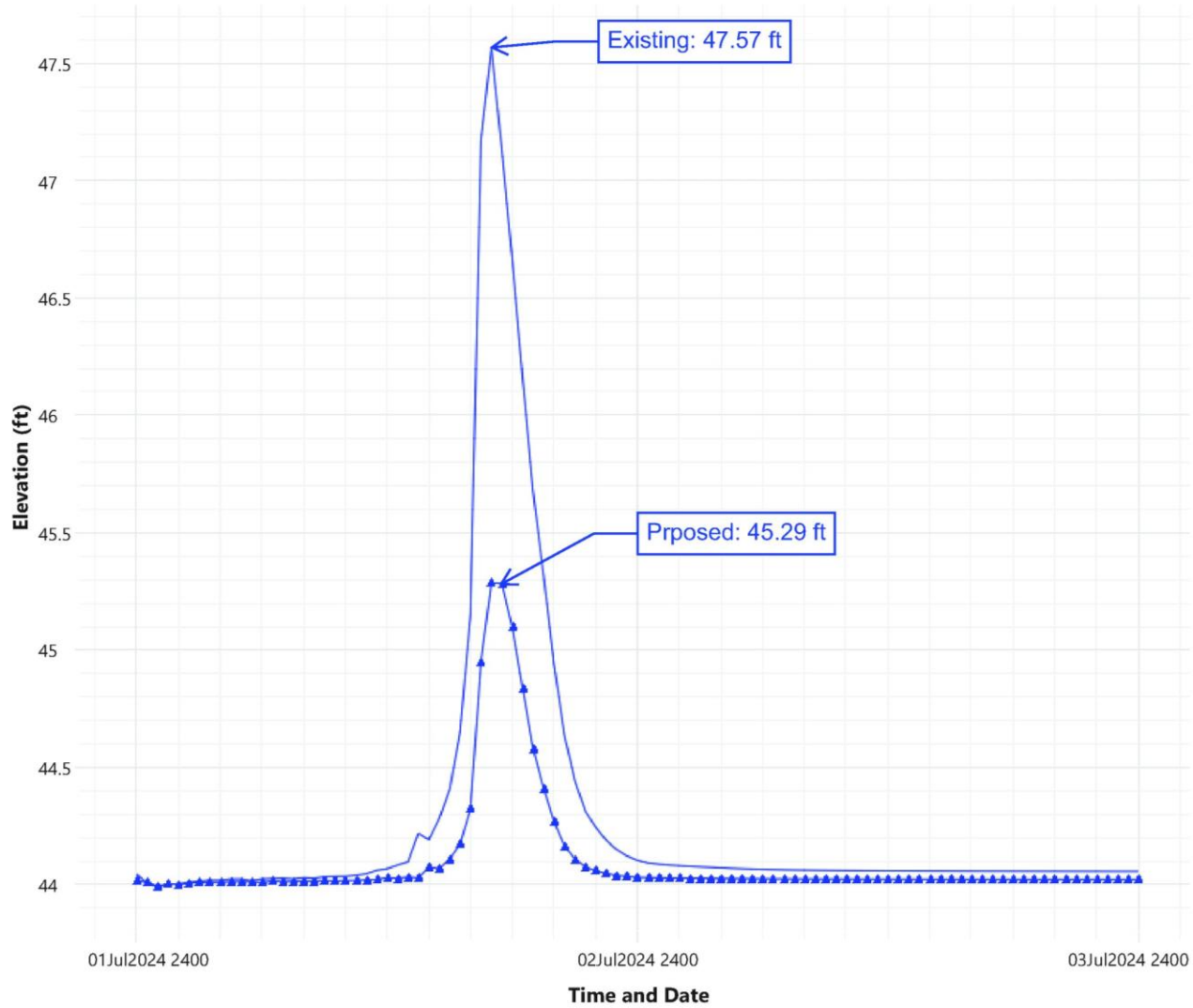
THE NEED

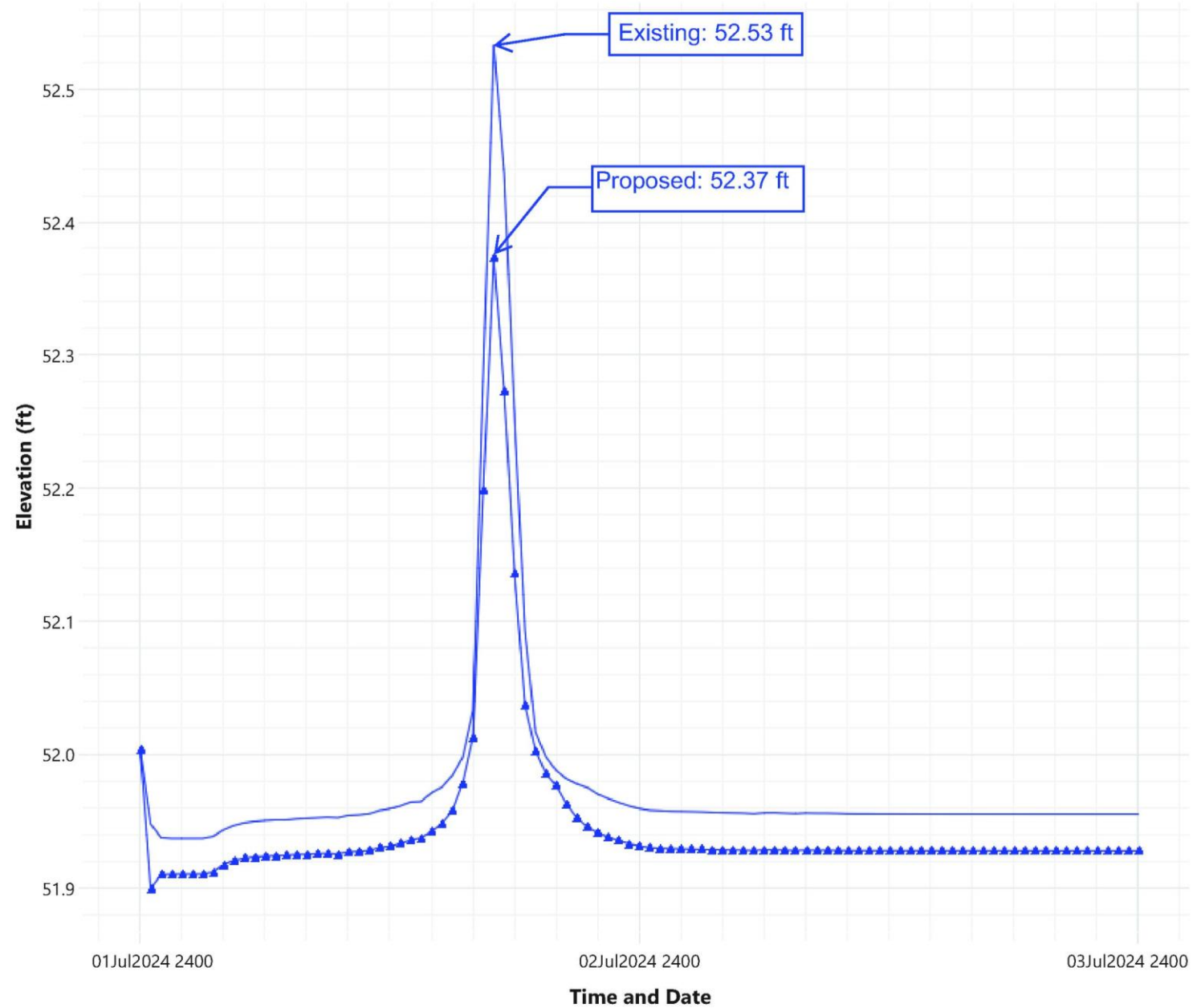
- Cypress Ditch serves as the main outfall for almost all City drainage systems as well as the TxDOT system on IH-610 and some City of Houston systems in Gulfton and Meyerland
- Capacity available in the ditch dictates the performance of the upstream systems, which impacts the level of flood risk across the City
- Current capacity extremely limited, needs maintenance to improve condition of concrete and natural segment
- Owned by the City of Houston, to be transferred to Harris County Flood Control District but requires improvement first

THE PROJECT

- Goal: increase capacity in the ditch to reduce existing flood risk, facilitate future improvements to upstream City systems
- Scope includes analyzing improvements to the entire length of the ditch, from Chimney Rock to Brays Bayou
- Improvements will be contained within the existing ditch ROW
 - *No need to acquire additional ROW/property, except for detention*
 - *Cannot make the channel wider*
 - *Potential improvements limited to modifying the cross section of the channel*
 - *Includes upsizing culverts beneath IH-610*

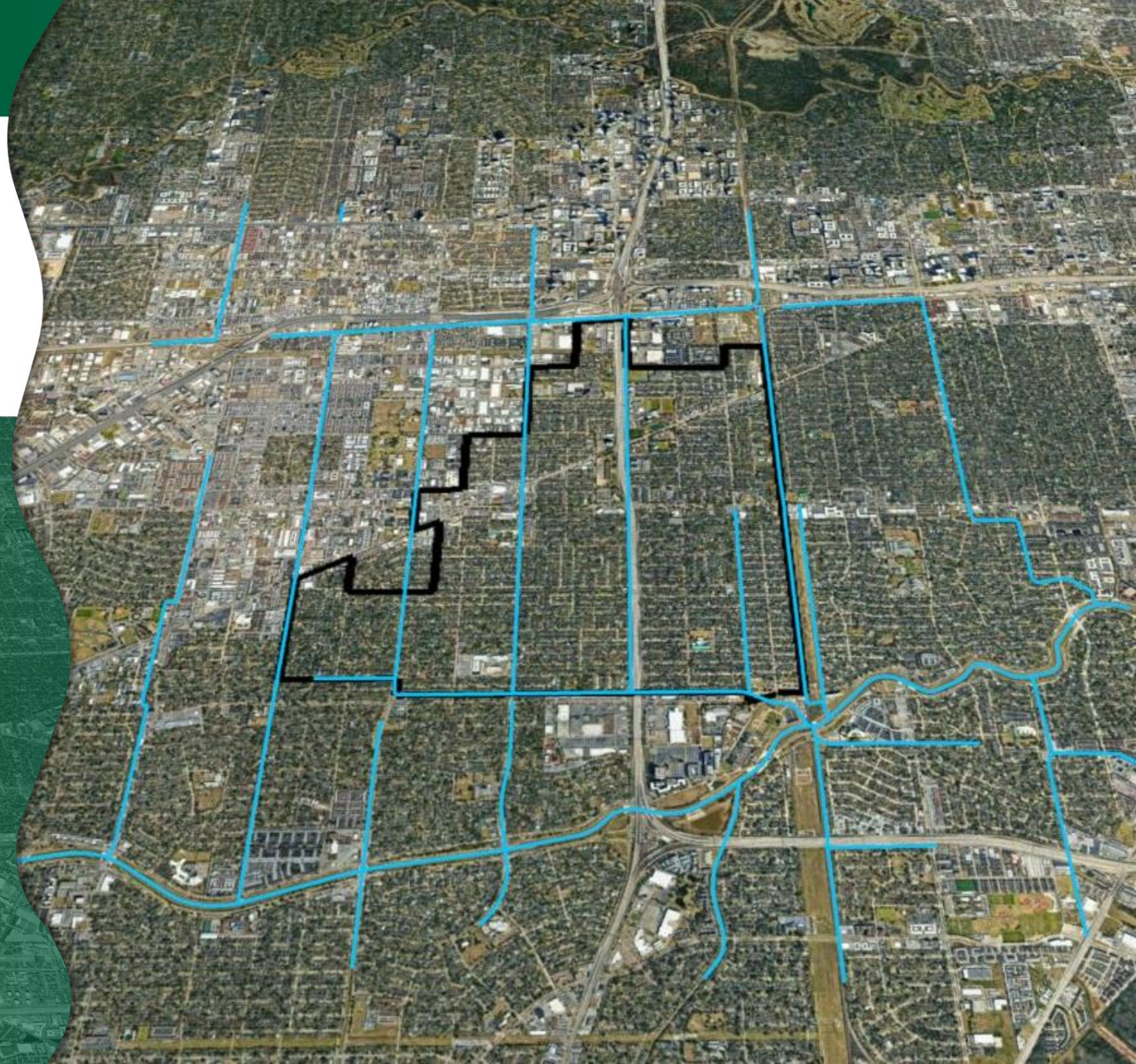








FUNDING OPPORTUNITIES



FUNDING SOURCE	APPLICATION DATE	PROJECT(S) SUBMITTED FOR FUNDING	Status
CDBG-MIT	June 7, 2023	Cypress Ditch Central Portion submitted in 2023	Not awarded
DOT Reconnecting Communities and Neighborhoods (RCN)	September 28, 2023	Cypress Slough Trail	Not awarded
GLO Resilient Communities Program	Open to June 2028	Home Elevation Program	Will be completed as part of the Comprehensive Plan Update
TWDB Flood Mitigation Assistance (FMA)	January 8, 2024	North Bellaire Flood Risk Mitigation and Resiliency Study	Submitted
HGAC Transportation Improvement Program (TIP)	February 13, 2024	Chimney Rock Corridor S Rice Corridor Newcastle Corridor	Submitted
TWDB Flood Infrastructure Fund (FIF)	April 15, 2024	Chimney Rock Area Drainage Improvements Study Newcastle/Kilmarnock Drainage Improvements Study Local Drainage Asset Management Study	Submitted
Community Project Funding (CPF)	May 3, 2024	Cypress Ditch	Submitted
HGAC Water/Wastewater Utility and Flood Mitigation Priority Project Lists	August 14, 2024	Cypress Ditch Regional Detention Wastewater Transfer Project	All 3 placed on the HGAC Regional Priority Project List, with Cypress Ditch listed as a Tier 1 project

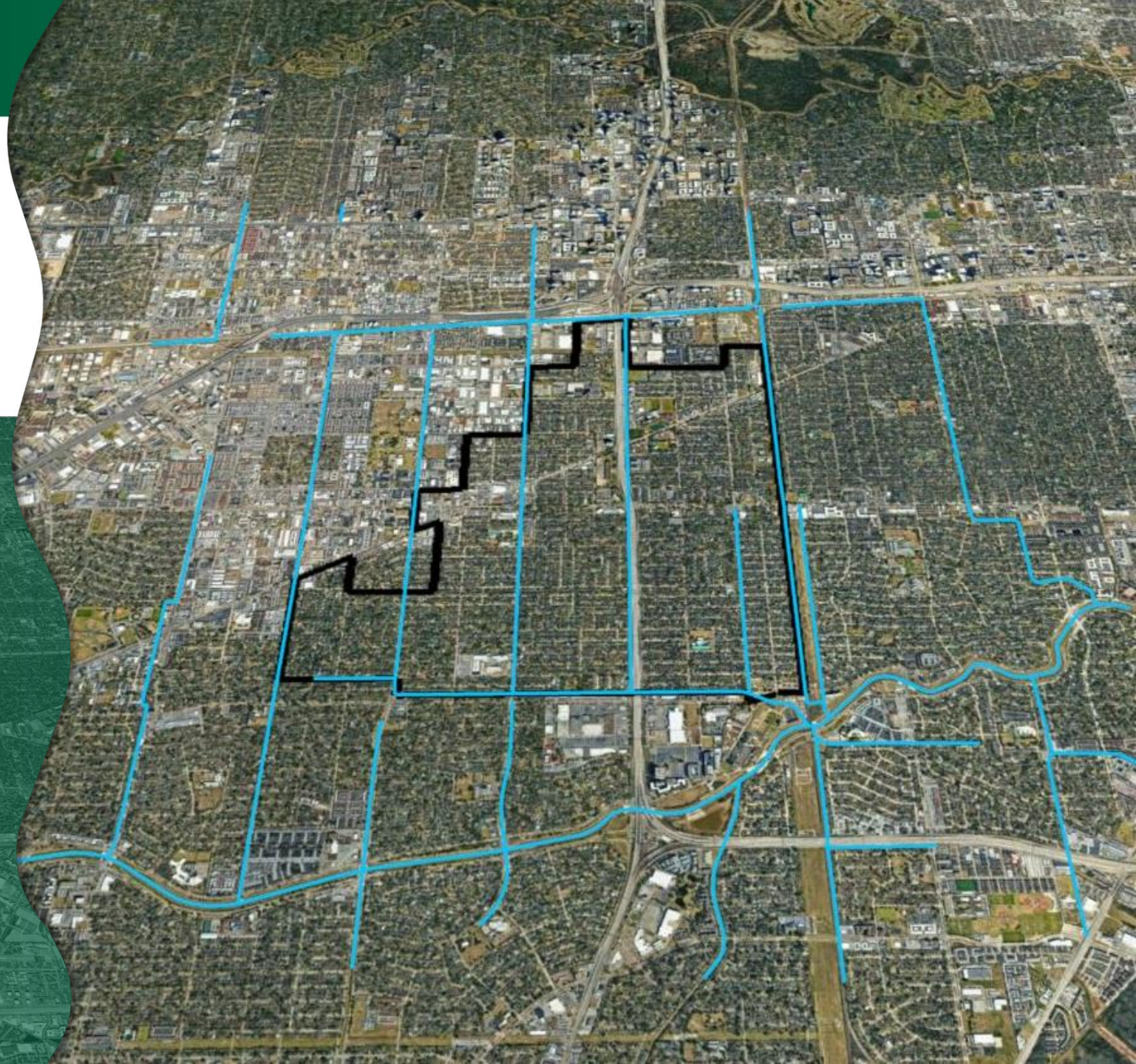
DRAINAGE UTILITY SYSTEM AND FEE

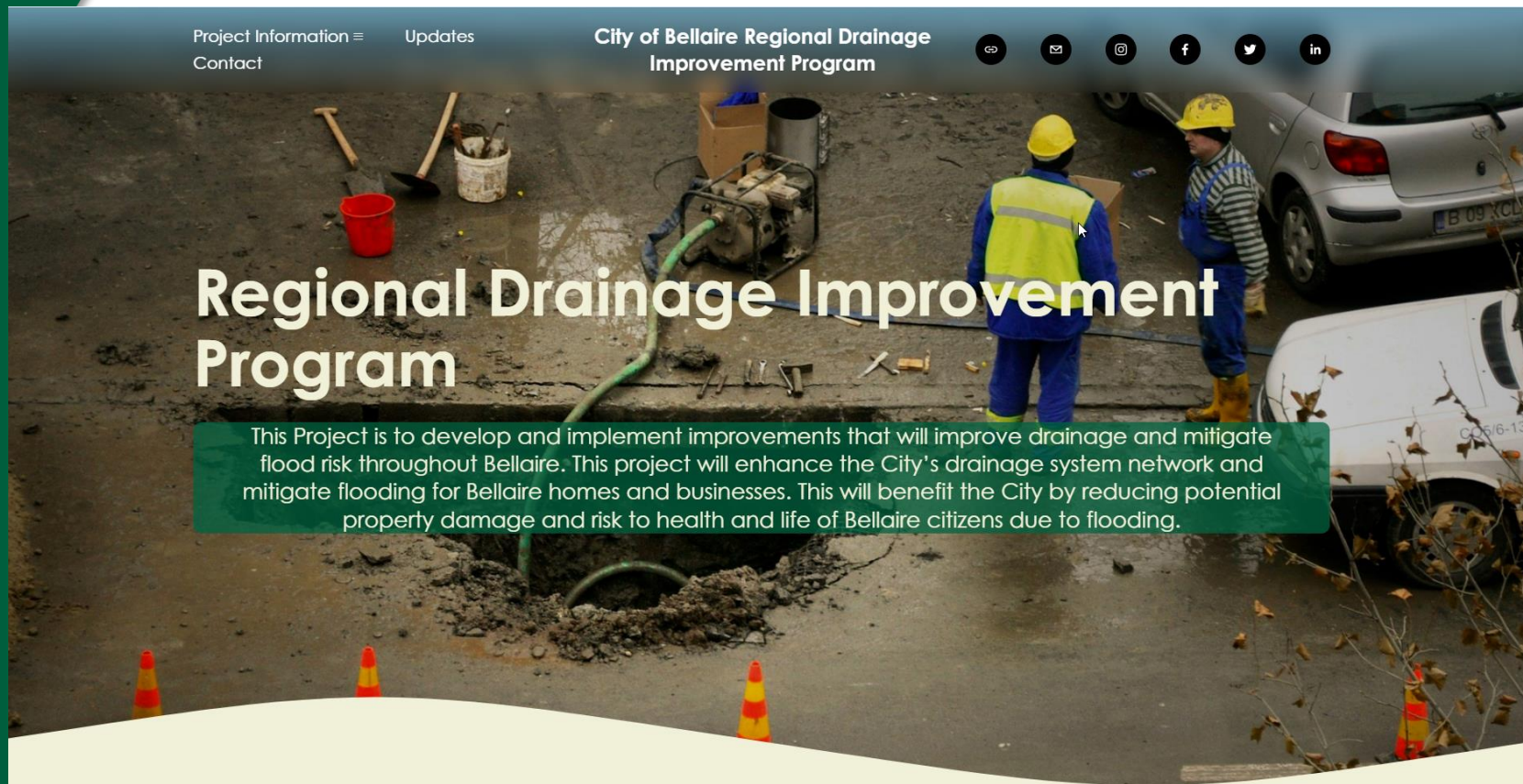
- Texas Local Government Code authorizes cities to establish stormwater drainage utility systems
- Includes the establishment and calculation of drainage utility charges and credits
- Establishing a drainage utility system creates a dedicated, consistent source of revenue for long-term O&M of the City's drainage infrastructure
- City will establish a schedule of drainage charges against property, offer drainage service on non-discriminatory, reasonable, and equitable terms

2024 BOND REFERENDUMS

- Two bond referendums will be on the ballot in November
- Wastewater bond
 - \$30 million bond
 - Fund the decommissioning and demolition of the Bellaire WWTP, connection to the City of Houston Southwest WWTP, impact fees to facilitate the connection
 - Will remove an aging asset that is near the end of service life: requires substantial structural and equipment improvements to continue service and enhance resiliency, continued long-term O&M funding
 - Demolition also frees up additional land for detention to support drainage improvements
 - Project includes a land-swap where Bellaire and COH receive land for detention to support major drainage initiatives
- Drainage infrastructure bond
 - \$40 million
 - Will initiate construction of the first portion of the Cypress Ditch improvements
 - Will supplement other state and federal funding to complete the entire project

RESIDENT ENGAGEMENT





Contact Us

Name (required)
First Name Last Name

Email (required)

Message (required)

Address (Optional)
Country

Address Line 1 (required)

Address Line 2

City (required) State (required) Zip Code (required)

Phone (Optional)

Questions?

Check the program website at <https://bellairedrainageimprovementprogram.org/>

Or email us at drainage@bellairetx.gov



OPEN DISCUSSION

