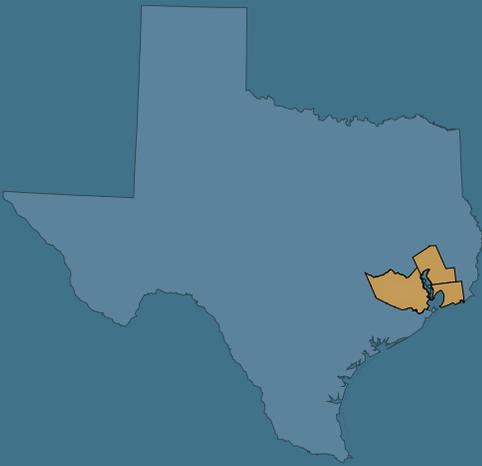
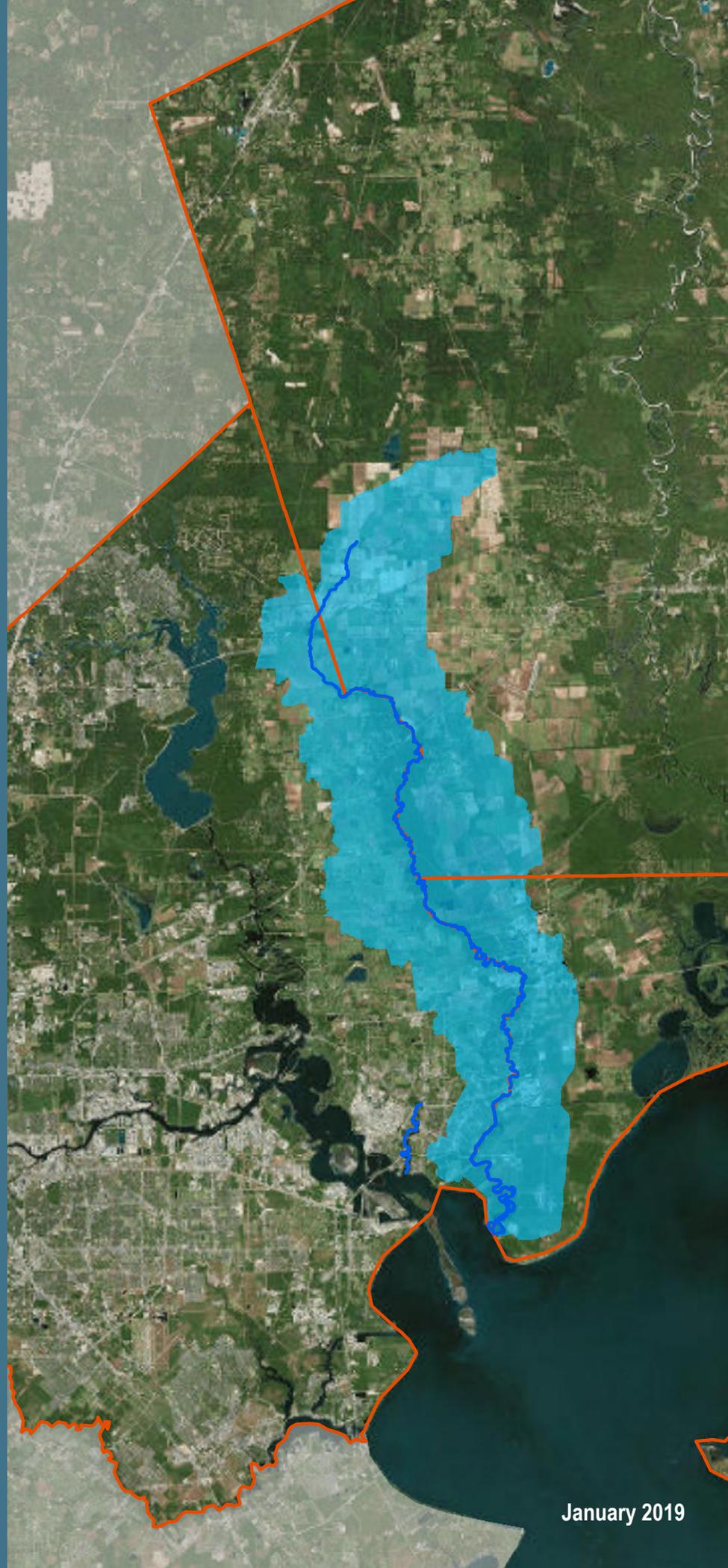


# CEDAR BAYOU INITIATIVE



## Partners:

Baytown - West Chambers County Economic Development Foundation  
Chambers County  
Cedar Bayou Navigation District  
Chambers-Liberty County Navigation District  
Chevron Phillips Chemical  
Cedar Bayou Watershed Partnership  
City of Baytown  
City of Mont Belvieu  
Harris County Flood Control District  
Harris County Precinct 2  
Houston-Galveston Area Council  
Liberty County  
Texas Department of Transportation  
Trans-Global Solutions, Inc.  
Union Pacific Railroad



January 2019

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*Cedar Bayou is a tributary to the Galveston Bay system and runs through Chambers, Liberty, and Harris Counties. Maintaining economic vibrancy, responding to flood related challenges, becoming more resilient, and protecting the productive waterways is important to the thousands of individuals that live, work, and play in the Cedar Bayou watershed. The Cedar Bayou Initiative emerged when a group of key partners came together to examine and promote the watershed's resiliency.*

# INTRODUCTION

*The purpose of the Cedar Bayou Initiative is to identify shared priorities of local partners engaged in managing the resiliency of Cedar Bayou and its watershed.*

The Cedar Bayou Initiative is a partnership of public and private sector stakeholders in the Cedar Bayou watershed. Its purpose is to identify and pursue priority projects to reduce flooding and enhance resiliency throughout the watershed and its communities.

This report summarizes the priority projects identified by the Cedar Bayou Initiative and lays out action steps to be taken by the partners towards project implementation.

The identified projects can generally be grouped into the following categories:

- Dredging and other improvements to the main channel of Cedar Bayou and its tributaries and drainage channels.
- Stormwater infrastructure, detention, and runoff quality improvement.
- Improvements to transportation infrastructure to reduce flooding and improve evacuation capacity.

The current status of each project was assessed and summarized in the Project Overview. The report also outlines action steps and implementation roles of local entities necessary to move these projects forward. The partners of the Cedar Bayou Initiative support the implementation of these projects to insure the long-term resiliency of the communities and businesses within the watershed. The project partners will continue to meet to coordinate implementation efforts. Timing and scale of implementation projects will be subject to the priorities, funding, and capacities of each individual partner.



# PROJECT OVERVIEW

## Cedar Bayou Watershed



### SUPPORT & MONITORING

The following projects are well defined, currently managed, and are waiting on approval and/or funding to be realized. Continued support and monitoring is required to maintain momentum.

- CEDAR BAYOU NAVIGATION CHANNEL IMPROVEMENTS\*
- CEDAR BAYOU DREDGING
- CEDAR BAYOU WATERSHED PROTECTION PLAN



### ACTIVE & ONGOING

The following projects have a defined lead agency and have determined clear project goals. Further defining of actionable tasks and project specifics, development of partnerships, and/or obtaining funding are the next steps.

- CEDAR BAYOU FLOOD RISK REDUCTION STUDY
- CITY OF BAYTOWN SUB-REGIONAL DETENTION



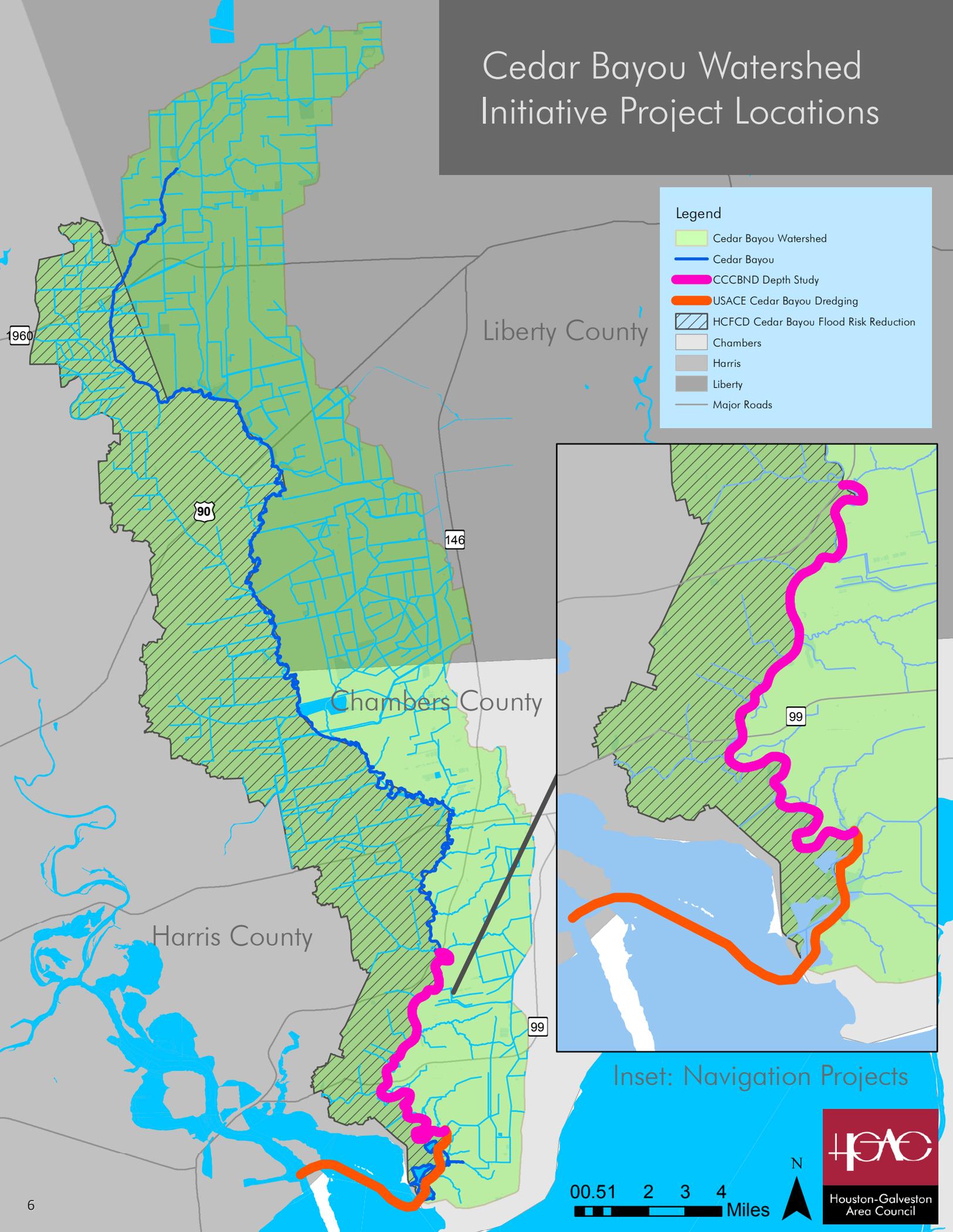
### NEEDS GUIDANCE

Some projects need additional consideration to generate momentum and move the project forward. Determination of leadership roles, research, and funding are the primary barrier to the following projects:

- TRANSPORTATION IMPROVEMENTS
- NRG "CUT CHANNEL"
- NEIGHBORHOOD FLOODING
- IMPROVE BAYOU & CREEK DRAINAGE CHANNELS

\*Phase 1 of initial funding was received by Cedar Bayou Navigation District in November 2018.

# Cedar Bayou Watershed Initiative Project Locations



## Legend

- Cedar Bayou Watershed
- Cedar Bayou
- CCCBND Depth Study
- USACE Cedar Bayou Dredging
- HCFCF Cedar Bayou Flood Risk Reduction
- Chambers
- Harris
- Liberty
- Major Roads

Inset: Navigation Projects

00.51 2 3 4 Miles

N



# CEDAR BAYOU NAVIGATION CHANNEL IMPROVEMENTS

Cedar Bayou Navigation District



**PROJECT SUMMARY:** The Cedar Bayou Navigation District (CBND) conducted a feasibility study to support a plan for dredging and modification along a stretch of Cedar Bayou channel below Highway 146 to maintain the bayou's viability as a navigable waterway. After Hurricane Harvey, an additional depth survey study was completed to evaluate changes to the channel. The CBND is currently working with the U.S. Army Corps of Engineers (USACE) to analyze the results and make any necessary modifications to the navigation channel improvements project. Initial USACE funding under the 2019 Work Plan for the first phase of Construction was received in November, 2018.

## Next Steps:

- USACE and CBND will work to refine the project based on study results.
- Develop program to advocate for federal funding and secure local matching funds.

## Implementation Roles & Partners:

- Continue unified expression of support (e.g., resolutions, letters) from all Cedar Bayou Initiative partners to share with appropriate elected officials stressing the importance of this project.



# CEDAR BAYOU DREDGING PROJECT

US Army Corp of Engineers, Chambers-Liberty Counties Navigation District



**PROJECT SUMMARY:** The Cedar Bayou shallow draft navigation project consists of a 11-ft deep by 100-ft wide by approximately 5-mile long channel. The channel extends from the junction with the Houston Ship Channel to a point 3-miles upstream Cedar Bayou. The channel supports barge traffic to local industrial facilities, with a total commercial tonnage of approximately 0.75 million tons in 2016.

During 2017, activities included preparation of contract documents and environmental review coordination for planned maintenance dredging. The project entails complete maintenance dredging of the channel where the heaviest shoaling has been identified. Inability to perform maintenance dredging will produce shoaling to critical depths of 7 feet, diminishing level of service, creating navigation hazards, and causing draft restrictions, possible channel closures, loss of commerce, and increased maintenance costs.

## Next Steps:

- The USACE will award a contract for maintenance dredging (September 2018).
- The USACE and District Determine new solutions or placement areas to hold dredged materials removed from channel.
- Secure funding to complete original project.

## Implementation Roles & Partners:

- Develop unified expression of support (e.g., resolutions, letters) from all Cedar Bayou Initiative partners to share with appropriate elected officials stressing the importance of this project.



# CEDAR BAYOU WATERSHED PROTECTION PLAN

Cedar Bayou Watershed Partnership



**PROJECT SUMMARY:** The Cedar Bayou Watershed Protection Plan (WPP) addresses water quality issues and other local concerns in the drainage area of Cedar Bayou. Elevated levels of fecal waste and other contaminants in the bayou can impact public health, economic activity, and the environment. A partnership of local stakeholders, H-GAC, and the Texas State Soil and Water Conservation Board developed the plan and has been moving forward with implementation since 2016.

Several of the recommendations of the WPP can also produce flood reduction benefits, including employing riparian buffers zones through voluntary conservation easements or agricultural best management practices, stormwater runoff management, and low-impact development practices.

## Next Steps:

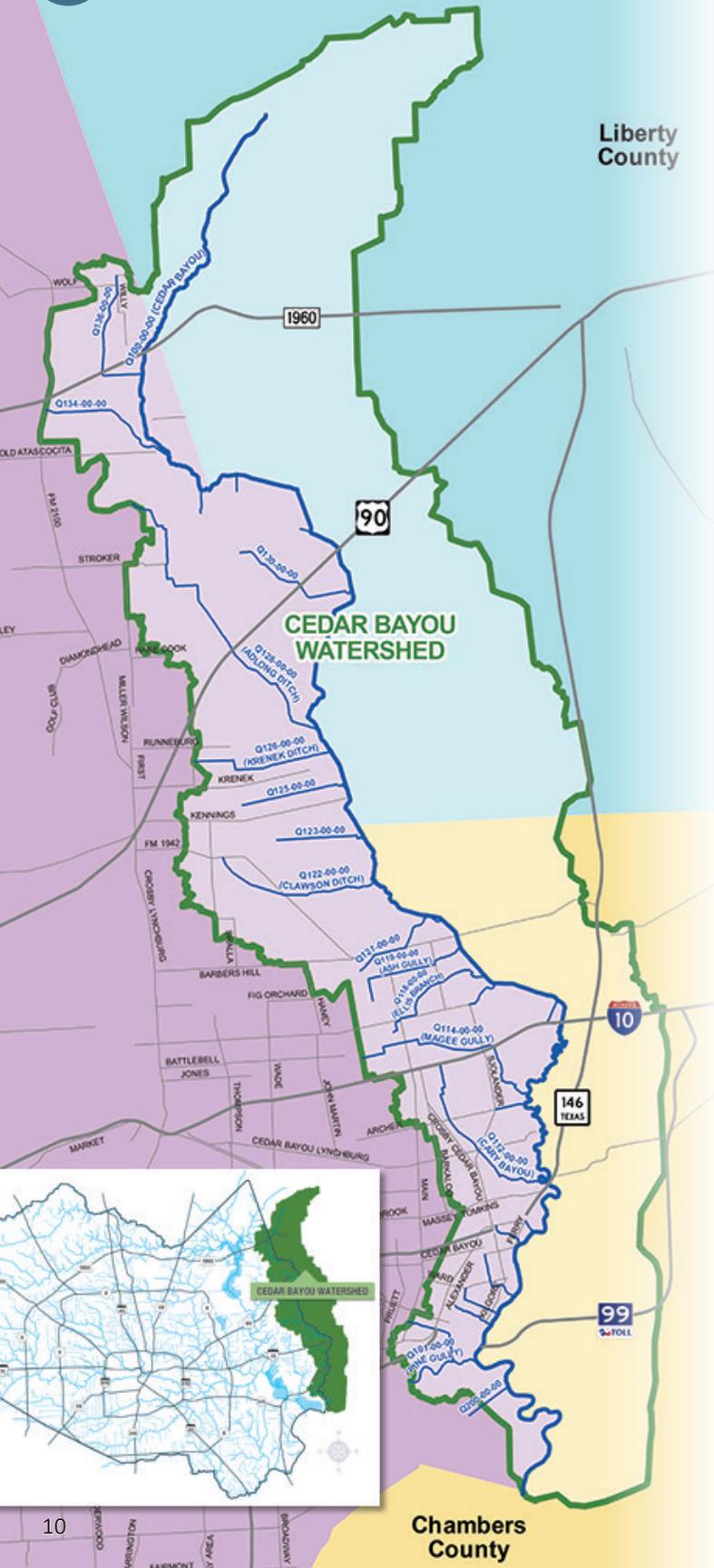
- The Partnership will continue the existing implementation program, including promotion of riparian buffers through voluntary conservation easements and agricultural best management practices, and Baytown's Watershed Protection Ordinance.
- Coordinate with flood reduction and municipal stormwater management efforts to promote solutions of mutual benefit.
- Local partners will seek additional implementation funding for future efforts identified in the WPP.

## Implementation Roles & Partners:

- Continued support and cooperation from other local partners.
- The Partnership and local partners will seek additional implementation funding.

# CEDAR BAYOU FLOOD RISK REDUCTION STUDY

Harris County Flood Control District



**PROJECT SUMMARY:** The Harris County Flood Control District (HCFCD), in partnership with the Texas Water Development Board, completed a Cedar Bayou Flood Risk Reduction Study<sup>1</sup>. Resulting projects recommendations are summarized in a Flood Risk Reduction Plan, including the need for channel modification of tributaries and as much as 8,000 acres of detention needed to meet the 100-year storm protection level. As part of the study, HCFCD coordinated with local municipalities, the public, and other stakeholders.

The 2018 HCFCD bond initiative includes 14 projects in Cedar Bayou, ranging from buyouts, channel improvements, detention basins, and a wetlands mitigation bank. HCFCD will move ahead with select projects in the short term, but does not have projected dates for all Cedar Bayou projects yet.

## Next Steps:

- HCFCD to begin preliminary planning on Cedar Bayou bond projects.

## Implementation Roles & Partners:

- HCFCD will manage the activities under their Flood Risk Reduction Study and coordinate with local partners as appropriate.

<sup>1</sup> Harris County Flood Control District; 2018. <https://www.hcfdc.org/projects-studies/cedar-bayou/cedar-bayou-flood-risk-reduction-study/>

# CITY OF BAYTOWN SUB-REGIONAL DETENTION

City of Baytown



**PROJECT SUMMARY:** The City of Baytown’s Drainage Master Plan has a component to developing sub-regional detention as a supplement on-site detention requirements. Opportunities exist for coordination of this effort with the Sub-Regional detention being planned by the Harris County Flood Control District (HCFCD).

## Next Steps:

- Continue to implement Baytown’s Drainage Master Plan strategy for sub-regional detention, in coordination with H-GAC.
- Baytown continue integrating local street drainage improvements with sub-regional detention and other infrastructure improvements planned by HCFCD.

## Implementation Roles & Partners:

- The City of Baytown will coordinate with HCFCD and other local jurisdictions to seek ways to mesh Baytown’s sub-regional detention goals with regional detention and flood management projects like HCFCD’s Cedar Bayou Flood Risk Reduction Study projects.



# NRG “CUT CHANNEL”



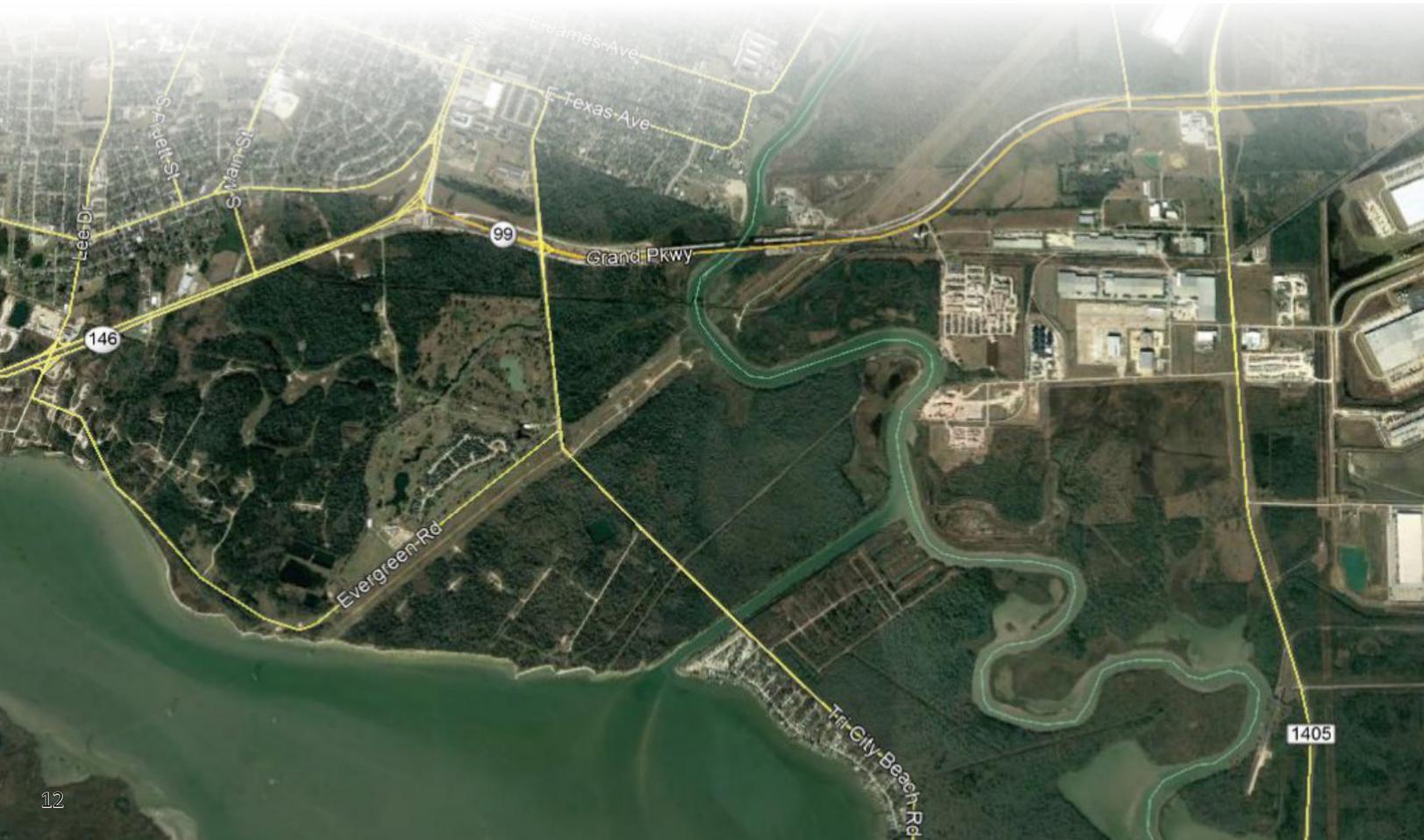
**PROJECT SUMMARY:** The “Cut Channel” forms a secondary diversion above the mouth of Cedar Bayou and Tabbs Bay/Upper Galveston Bay. In recent years, the channel has begun to silt in. The land adjacent to and under the channel is privately owned, leaving responsibility for its future maintenance unclear. Local partners have indicated a need for a solution for the cut channel that maintains its ability to divert storm flows.

## Next Steps:

- Gain consensus among HCFCF, the CBND, and other local jurisdictions the degree of the channel’s importance to flood conveyance.
- Identify property ownership, easement status, responsibility and funding options for maintaining the channel.

## Implementation Roles & Partners:

- Convene working group including USACE, HCFCF, CBND, and property owners to determine path forward on this project.



# TRANSPORTATION IMPROVEMENTS

## TXDOT and Local Jurisdictions



**NEEDS STATEMENT:** Severe flooding, as was seen with Hurricane Harvey, can severely disrupt passenger and freight traffic flows across the region, including in the Cedar Bayou watershed. In fact, every road within the watershed experienced some level of inundation or extreme flooding during the Hurricane Harvey flooding event. The most serious flooding was recorded at US 90, SH 146, FM 1413, IH 10, FM 1942, and FM 565. In all, 92 Liberty and Chambers County roadway sections were closed during the event. To mitigate future flood risk and disruption levels, a number of transportation-related projects have been recommended including pavement elevation, bridge replacement, and pavement improvements. All identified project types and sites require additional study.

### Bridge Replacements

The Harris County Flood Control District (HCFCD) has identified a number of candidates for bridge replacements. These include bridges at Ramsey Rd, FM 1942, U.S. 90 and Rail Road Bridge, and Crosby Eastgate Road.

### McGee's Gully

Stakeholders have identified seven projects to mitigate the flooding in McGee's Gully where it intersects I-10. The project improvements focus on stormwater infrastructure and maintenance.

### Pavement Improvements

Pavement type is a good indicator of how quickly a road section can resume operability following a flooding event. For instance, Pavement Type 05, is less vulnerable to flood damage than Pavement Types 06 and 10. Road sections using pavement types 06 and 10 in areas with high flood risk should be prioritized for replacement during TxDOT's annual maintenance funding round or through the next H-GAC Call for Projects.

### Project Prioritization and Use of Best Practices

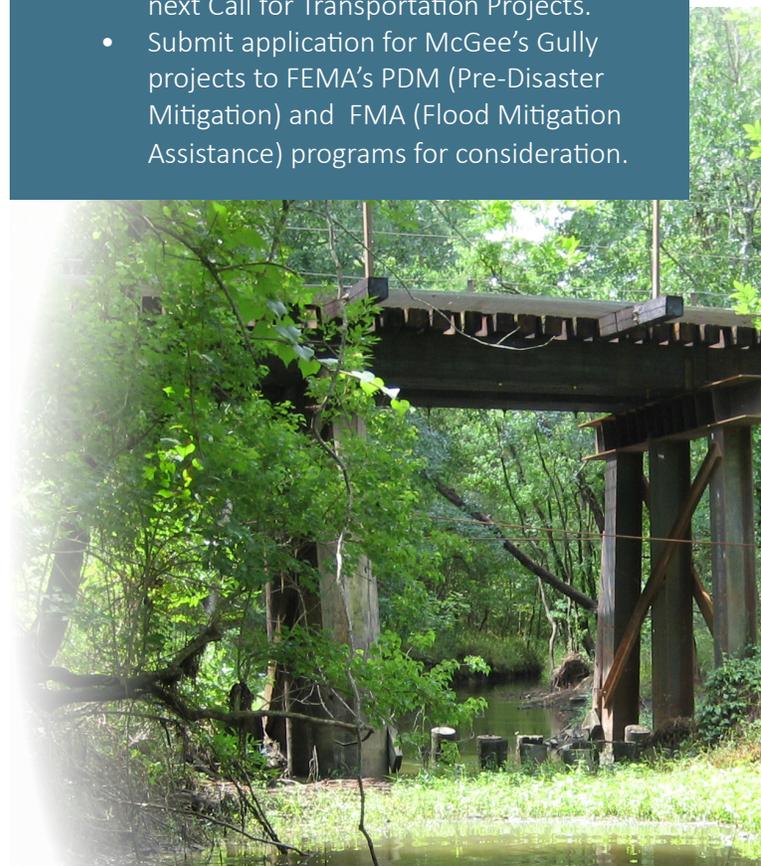
During the H-GAC 2018 Transportation Improvement Program Call for Projects, "Resiliency" and "Flood Control" were included as project selection criteria for the first time, demonstrating the region's commitment to improving the resiliency and durability of the region's transportation assets. However, because these project categories were new, very few of the 194 Call for Projects project submissions targeted resiliency or flood control benefits despite previously identified needs. Greater coordination between H-GAC, TxDOT, and local governments is needed to increase the number of resiliency and flood control type projects submitted in future funding calls, and these projects' chance of receiving funding.

### Next Steps:

- Determine a lead agency or jurisdiction for each proposed project.
- Further refine the details of each project and submit applications to the appropriate funding agencies.

### Implementation Roles & Partners:

- Submit a proposal to H-GAC's next Call for Transportation Projects for the Cedar Bayou Crossing project.
- Submit bridge replacement and road elevation project proposals to H-GAC's next Call for Transportation Projects.
- Submit application for McGee's Gully projects to FEMA's PDM (Pre-Disaster Mitigation) and FMA (Flood Mitigation Assistance) programs for consideration.



# FLOOD MITIGATION PROJECTS

Local Offices of Emergency Management



## IMPROVE CEDAR BAYOU & CREEK DRAINAGE CHANNELS

**PROJECT SUMMARY:** This project proposes to deepen and widen essential drainage channels in Cedar Bayou and its tributaries. To restore adequate drainage, the project will remove tallows trees, debris, and clear obstacles in the bayou and tributary system throughout the watershed.

### Next Steps:

- Chambers County will determine target areas for project and develop a conceptual plan to present to USACE.
- Discuss barriers of project with USACE and identify potential funding agencies.

### Implementation Roles & Partners:

- Convene working group including USACE, HCFCD, and Chambers County to determine a path forward on this project.

## NEIGHBORHOOD FLOODING & HAZARD MITIGATION PLANS

**PROJECT SUMMARY:** The Whispering Pines and Pinehurst neighborhoods of Baytown have been identified as vulnerable to flooding and have suffered repetitive losses. Local and regional coordination is needed to identify the source(s) of flooding issues and coordinate efforts between jurisdictions to address the source problems. These projects must also be included in each jurisdiction's Hazard Mitigation Plans and coordinated through their Offices of Emergency Management.

### Next Steps:

- The City of Baytown will coordinate with local partners to identify opportunities to mitigate flooding in these neighborhoods.

### Implementation Roles & Partners:

- City of Baytown and local partners to propose and develop projects to mitigate the effects of flooding in these neighborhoods.
- After projects have been defined, Baytown and local partners will pursue funding sources and consider the use of CDBG-DR funds.

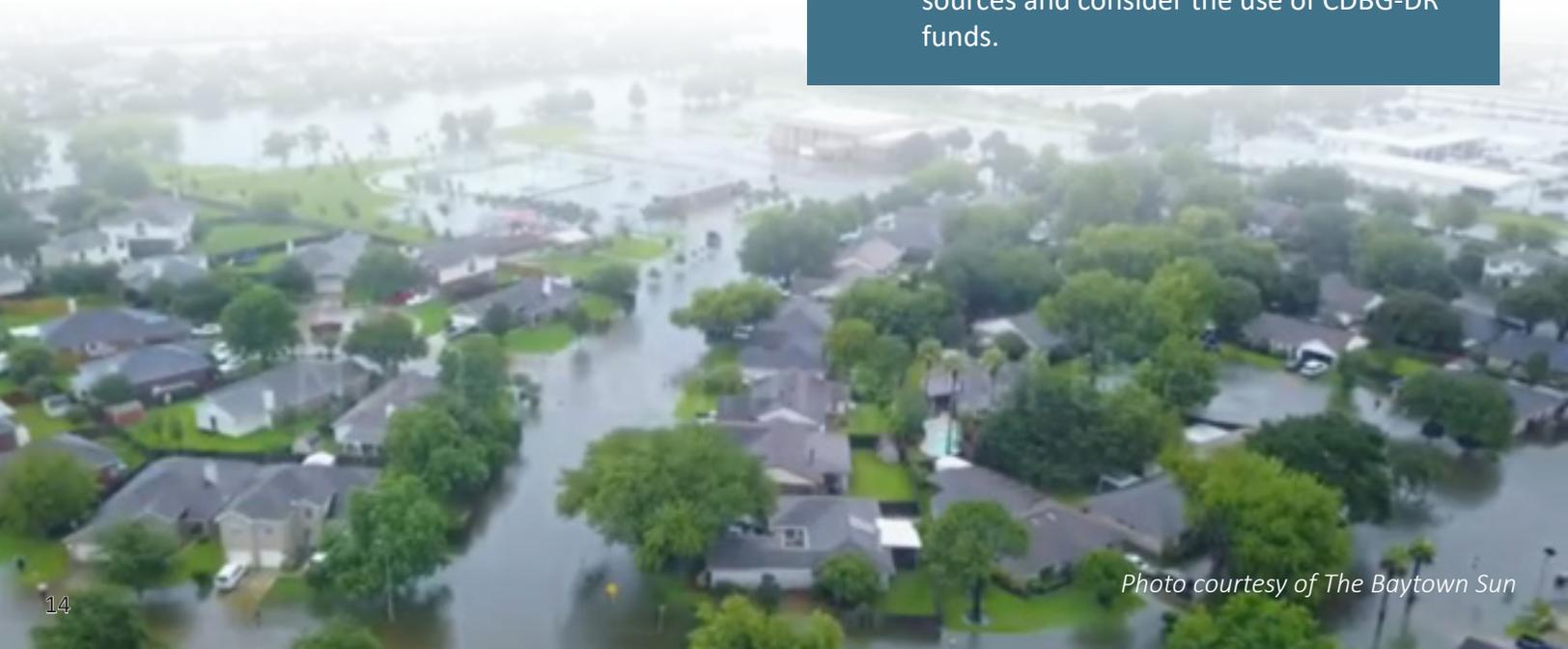


Photo courtesy of The Baytown Sun

# POTENTIAL FUNDING SOURCES

## FLOOD MITIGATION & RECOVERY FUNDING OPPORTUNITIES

EPA (Environmental Protection Agency):

Funds projects to repair wastewater and sewer facilities and joint projects through USACE

FEMA (Federal Emergency Management Agency)

Funds a variety of programs to mitigate the effects of flooding:

- HMGP (Hazard Mitigation Grant Program)
- FMA (Flood Mitigation Assistance)
- PDM (Pre-Disaster Mitigation)

GLO (Texas General Land Office)

Home acquisition and buy-outs

TWDB (Texas Water Development Board)

Home acquisitions, elevations, watershed and drainage studies, flood protection planning, flood early warning systems, and flood response

USDA (US Department of Agriculture)

Provides utilities, housing, and business recovery services

## TRANSPORTATION INFRASTRUCTURE FUNDING

FHWA (Federal Highway Administration)

Sponsors some floodplain protection projects that may be relevant to Cedar Bayou

TXDOT (Texas Department of Transportation)

Provides and incentives program for infrastructure improvements

## LARGE SCALE INFRASTRUCTURE PROJECTS

FEMA (Federal Emergency Management Agency): HMGP (Hazard Mitigation Grant Program)

USACE (US Army Corp or Engineers) – Channel dredging, channel improvements, and infrastructure

Infrastructure Incentives Programs: Temporary administrative funding; administered by TXDOT, USACE, or EPA

USDA Rural Infrastructure Programs; Funds transportation, broadband, water, power, and flood risk management

EPA: Infrastructure Financing; Loan program through the EPA for flood mitigation activities

CEDAR BAYOU  
INITIATIVE