



LEAGUE CITY **CLEAR CREEK MASTER PLAN**

ADOPTED SEPTEMBER 2023



ACKNOWLEDGMENTS

PREPARED FOR: City of League City, Texas



CONSULTING TEAM

Louis Cutaia Jr., AICP, Project Manager
Jackson Marvel, Planning Lead
Emily Barker, Planning Lead

CITY PARKS DEPARTMENT TEAM

Chien Wei, Director of Parks and Cultural Services
Bob Duke, Parks Planner/Project Manager

CITY COUNCIL

Nick Long, Mayor
Andy Mann, Mayor Pro Tem
Tommy Cones, Position 2
Tom Crews, Position 3
John Bowen, Position 4
Justin Hicks, Position 5
Chad Tressler, Position 6
Sean Saunders, Position 7

CITY PARKS BOARD

Marcos Jaramillo, Position 1
Ange Mertens, Position 2
Linda Treadway, Position 3
Garet L. Nenninger, Position 4
Don Kappel, Position 5
Fred Growcock, Position 6 Chair
Jay Williams, Position 7 Vice Chair

PREPARED BY: Halff



PARTNER AGENCIES

Houston-Galveston Area Council
U.S. Army Corps of Engineers
Harris County Flood Control District
Galveston County Parks and Cultural Services
Galveston County Drainage District
Galveston Bay Foundation
Texas Commission on Environmental Quality
U.S. Fish and Wildlife Service

CITY STAFF FOCUS GROUP MEMBERS

Cameron Parker, Park Operations Manager
Christopher Sims, Executive Director of Development Services
Kenny Walsh, Assistant Director, Parks and Cultural Services
Jody Hooks, Public Works Director
Mark Linenschmidt, Senior Planner
Pat Self, Public Works Supervisor
Kris Carpenter, Director of Planning
David Tickell, Public Works Manager

The Clear Creek Master Plan was Approved by the League City Parks Board on July 6th 2023
The Clear Creek Master Plan was Approved by the League City City Council on September 12th 2023

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INTRODUCTION

PLAN PURPOSE

The Clear Creek Master Plan builds on strategies and initiatives defined in the 2017 Parks, Trails, and Open Space Master Plan to explore opportunities to create natural areas, including wetlands, prairies, and rain gardens in lieu of traditional development; pursuing partnerships with landowners to expand access to Clear Creek and Clear Lake, and explore the expansion of the Clear Creek Paddle Trail. This Plan is the starting point for the transformation of Clear Creek and will be used to showcase the creek's potential to elected officials, business leaders, neighborhood leaders, and stakeholders. It serves as the foundation for future projects that can be implemented by a variety of entities, organizations, and funding sources. The Master Plan serves as a policy guide for the future land use, development character, multi-modal connectivity, and recreation and ecotourism opportunities along Clear Creek.

SITE OVERVIEW

The Clear Creek Watershed is located in the upper Texas Gulf Coast and flows through 16 cities including Houston, Pearland, Friendswood, and League City. The watershed includes two primary streams – Clear Creek and Turkey Creek – and encompasses approximately 150 square miles through portions of Harris, Galveston, and Brazoria Counties. Clear Creek is one of six major watersheds in the Galveston Bay estuarine complex and is a tidally influenced bayou, meaning the water is subject to the ebb and flow of the ocean tides. Tidal river dynamics affect wetland restoration efforts, river and coastal sedimentation, changes in delta structure, and saltwater intrusion into fresh aquifers, which increases as sea level rises.

Clear Creek officially terminates as it enters Clear Lake, which eventually empties into the Galveston Bay. The Clear Creek watershed supports floodplain forests, which include riparian corridors, bottomland, and wetlands, as well as coastal salt marsh habitats.

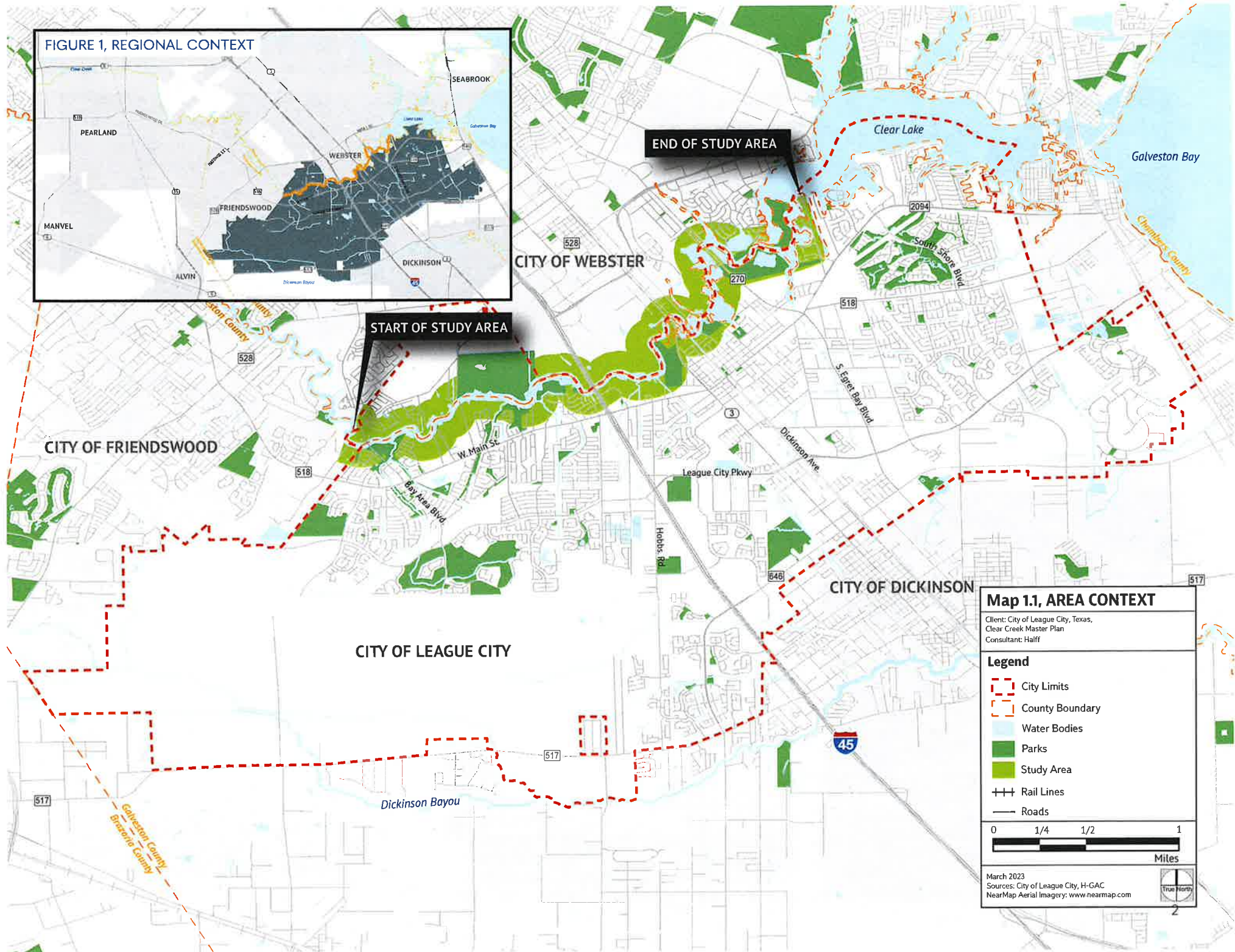
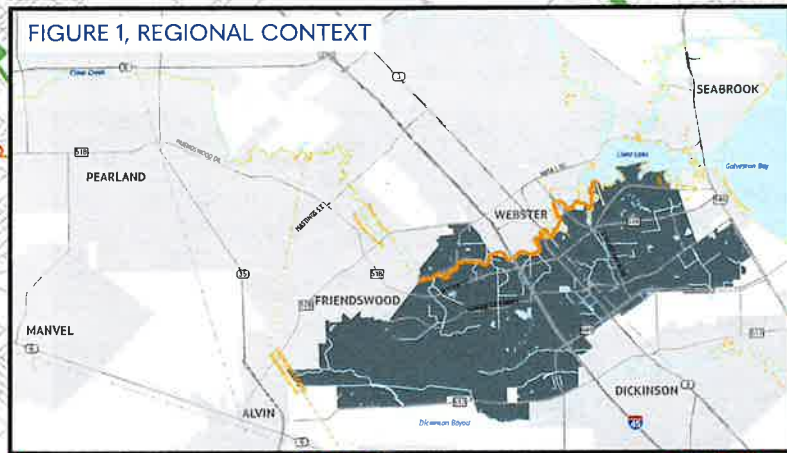
As depicted in Map 1.1, *Area Context*, for the purposes of this Master Plan, the Study Area is a half-mile on either side of Clear Creek between League City's western limits (near Bay Area Blvd.), and Davis Road.

REGIONAL CONNECTIVITY

The Clear Creek study area is located along the northern border of League City, Texas, and is approximately 30 miles south of Downtown Houston, with proximity to Galveston Bay and the Gulf of Mexico. As shown in Figure 1, *Regional Context*, neighboring communities include the cities of Webster, Nassau Bay, Friendswood, and Dickinson. Major roadways connecting to League City across Clear Creek include Interstate 45, State Highway (SH) 3, Farm to Market (FM) Road 518, FM 517, and FM 646. These thoroughfares connect major regional destinations such as Challenger Seven Park, NASA Johnson Space Center, and Kemah boardwalk.



FIGURE 1, REGIONAL CONTEXT

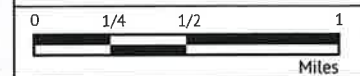


Map 1.1, AREA CONTEXT

Client: City of League City, Texas,
Clear Creek Master Plan
Consultant: Half

Legend

- City Limits
- County Boundary
- Water Bodies
- Parks
- Study Area
- Rail Lines
- Roads



March 2023
Sources: City of League City, H-GAC
NearMap Aerial Imagery: www.nearmap.com



STUDY AREA

For the purposes of this Plan, the study area is defined as the westernmost segment of Clear Creek within the city limits of League City, Texas, and Davis Road to the east.

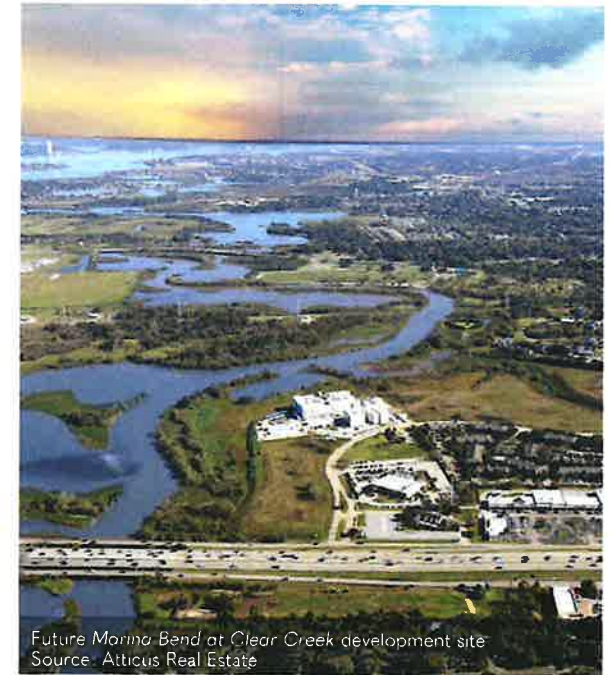
LAND USE

Shown in Table 1, *Land Use by Type of Adjacent Parcels*, and Map 1.2, *Land Use*, the study area contains numerous types of land use, with single family residential being predominant, especially on the south and east sides of Clear Creek. There are 839 acres of private and public access parks and open space land uses adjacent to Clear Creek; These include Lynn Gripon Park, Challenger Seven Memorial Park, Walter Hall Park, Heritage Park, and the Dr. Ned and Fay Dudley Clear Creek Nature Center. Adjacent industrial uses include the Dallas Salmon Wastewater Treatment Plant and Exxon Mobil Pipeline Company. There are approximately 322 acres of vacant developable land that could be utilized for development or conservation uses along Clear Creek.

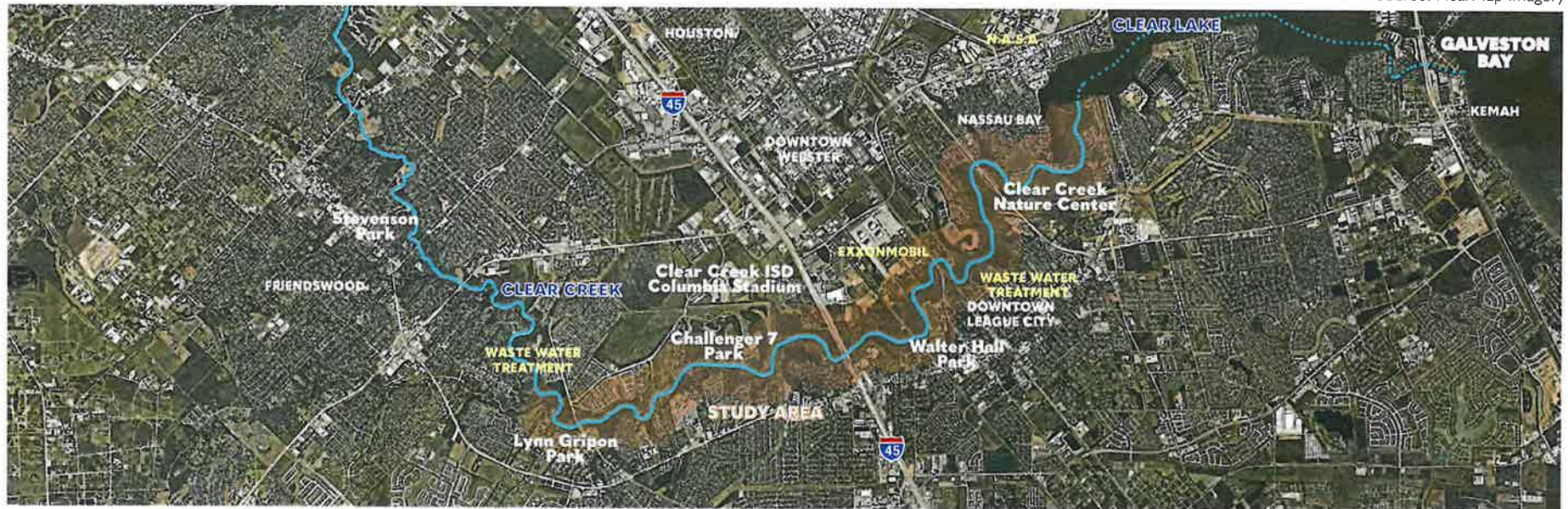
Table 1, Land Use by Type of Adjacent Parcels

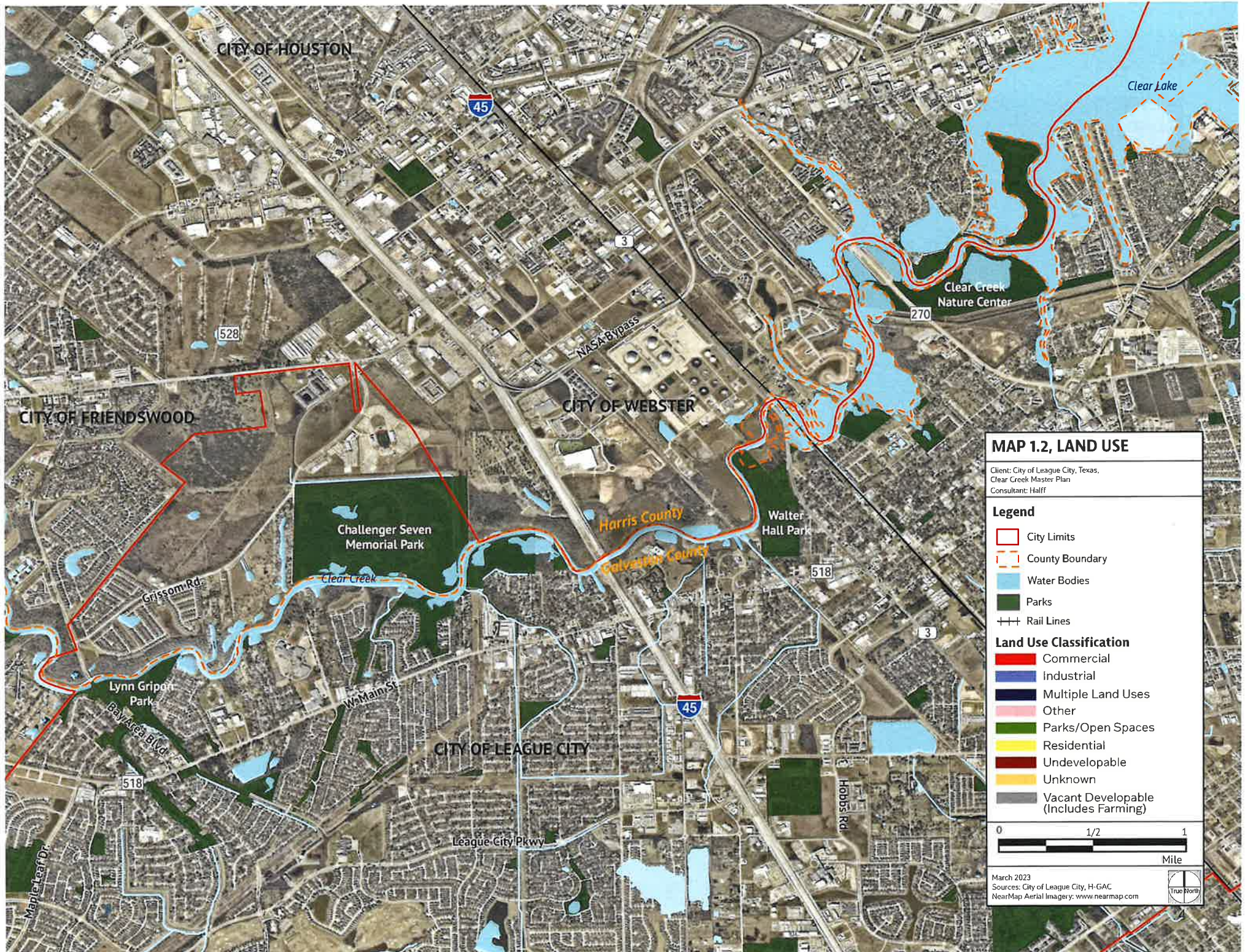
Land Use Type*	% of Total Acreage	Acreage
Commercial	2%	44.0
Industrial	8%	221.8
Multiple	8%	239.7
Other	4%	120.6
Parks/Open Spaces	29%	839.4
Residential	30%	891.8
Undevelopable	6%	162.2
Unknown	3%	83.9
Vacant Developable (includes Farming)	11%	321.7
Total	100%	2,925.1

*Land Use Types follow the Houston-Galveston Area Council land use categories, and do not follow the City of League City's land use or other municipal land use categories



Clear Creek Regional Context and Study Area (below)
Source: NearMap Imagery





MAP 1.2, LAND USE

Client: City of League City, Texas,
Clear Creek Master Plan
Consultant: Half

Legend

- City Limits
- County Boundary
- Water Bodies
- Parks
- Rail Lines

Land Use Classification

- Commercial
- Industrial
- Multiple Land Uses
- Other
- Parks/Open Spaces
- Residential
- Undevelopable
- Unknown
- Vacant Developable (Includes Farming)

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Mile

March 2023
Sources: City of League City, H-GAC
NearMap Aerial Imagery; www.nearmap.com

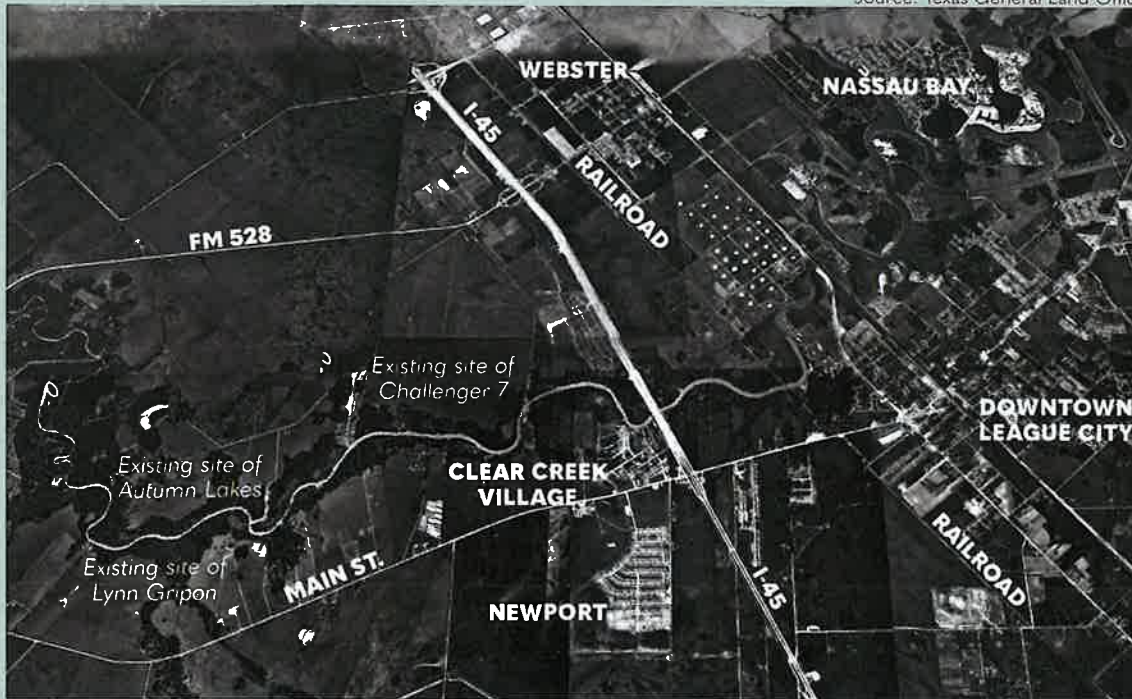
True North

CLEAR CREEK HISTORY

According to the League City Historical Society, human occupation along Clear Creek dates to the Paleo-Indian period beginning around 9000 to 8000 BC. The Clear Creek area was seasonally inhabited by the Akokisa, or Orcoquisac, and Karankawa tribes who used Clear Creek as a means of transportation, fishing, and to trade with French settlers in East Texas. By the early 19th century, however, widespread disease and war decimated the number of indigenous peoples in southeast Texas. In 1839, the fertile grasslands of north Galveston County began beckoning settlers from Louisiana to establish cattle operations, including the Butler, Coward, and Perkins families. The Galveston, Houston and Henderson Railroad

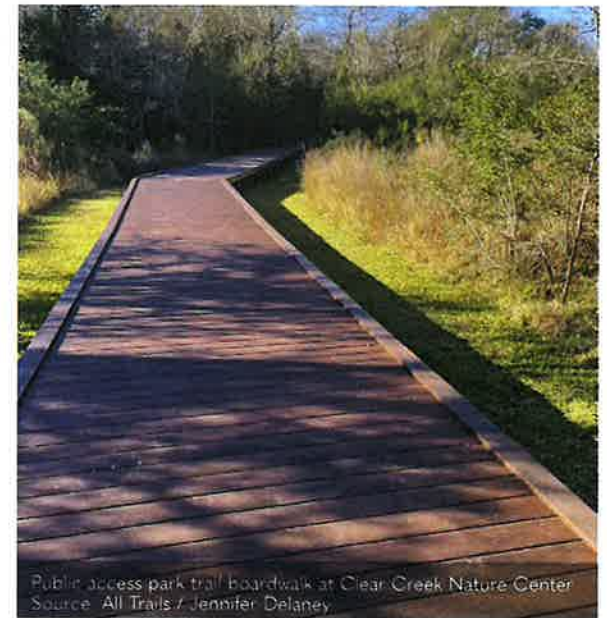
completed construction in 1858 with service from Galveston Island to Houston, connecting the settlements of South Houston, Webster, League City, and Dickinson. In 1890, John C. League purchased land and established the town of Clear Creek. Due to the railroad the town began to grow, and changed its name to League City and became a center for railroad shops and oil tank farms. The construction of Interstate 45, connecting to NASA in 1970 and Galveston in 1976, along with Houston sprawl, spurred the largest growth in League City's history. By 2000, the population of League City was 45,400 and residents resided in neighborhoods along Clear Creek and commuted to nearby cities or worked on the Humble Pipeline or at NASA facilities.

League City in 1969 (below)
Source: Texas General Land Office



PUBLIC VS. PRIVATE OWNERSHIP

As shown in the Map 1.3, *Parcel Ownership*, the majority of land fronting Clear Creek is owned by private entities, creating challenges for public access to the creek. However, many parcels along the creek are vacant or undeveloped and used as a buffer between Clear Creek and residential neighborhoods, creating opportunities to partner with homeowner's associations (HOAs) to allow public access points to the creek and potential preservation and conservation initiatives.



EXISTING FACILITIES

Existing public facilities along Clear Creek include the Clear Creek Paddle Trail, a 6.1-mile kayaking trail along Clear Creek. The Clear Creek Paddle Trail begins at Lynn Gripon Park and ends at Heritage Park, with a proposed extension to the Dr. Ned and Fay Dudney Clear Creek Nature Center. current proposed improvements include the construction of two accessible kayak launches and wayfinding signage.

ACCESS TO CLEAR CREEK

Public access to Clear Creek is currently limited to five boat ramp or kayak launch locations: Lynn Gripon Park at Countryside, Challenger Seven Memorial Park, Walter Hall Park, Heritage Park, and FM 270. The kayak launch at Lynn Gripon Park has space for one kayak to enter the water and is the starting point for the Clear Creek Paddle Trail. The boat ramp Challenger Seven Memorial Park is currently closed and will remain closed, but a new kayak launch is set to be constructed at the ramps as part of the Harris County Precinct 2 Challenger Seven Master Plan. Walter Hall Park provides access to Clear Creek with kayak and boat launches, as well as raised boardwalks for wildlife and environmental observation. Additional public access opportunities include a kayak rental and launch site at Heritage Park and public boat ramp at FM 270. Map 1.4, *Clear Creek Connectivity*, shows existing and proposed facilities that could provide connectivity to Clear Creek.

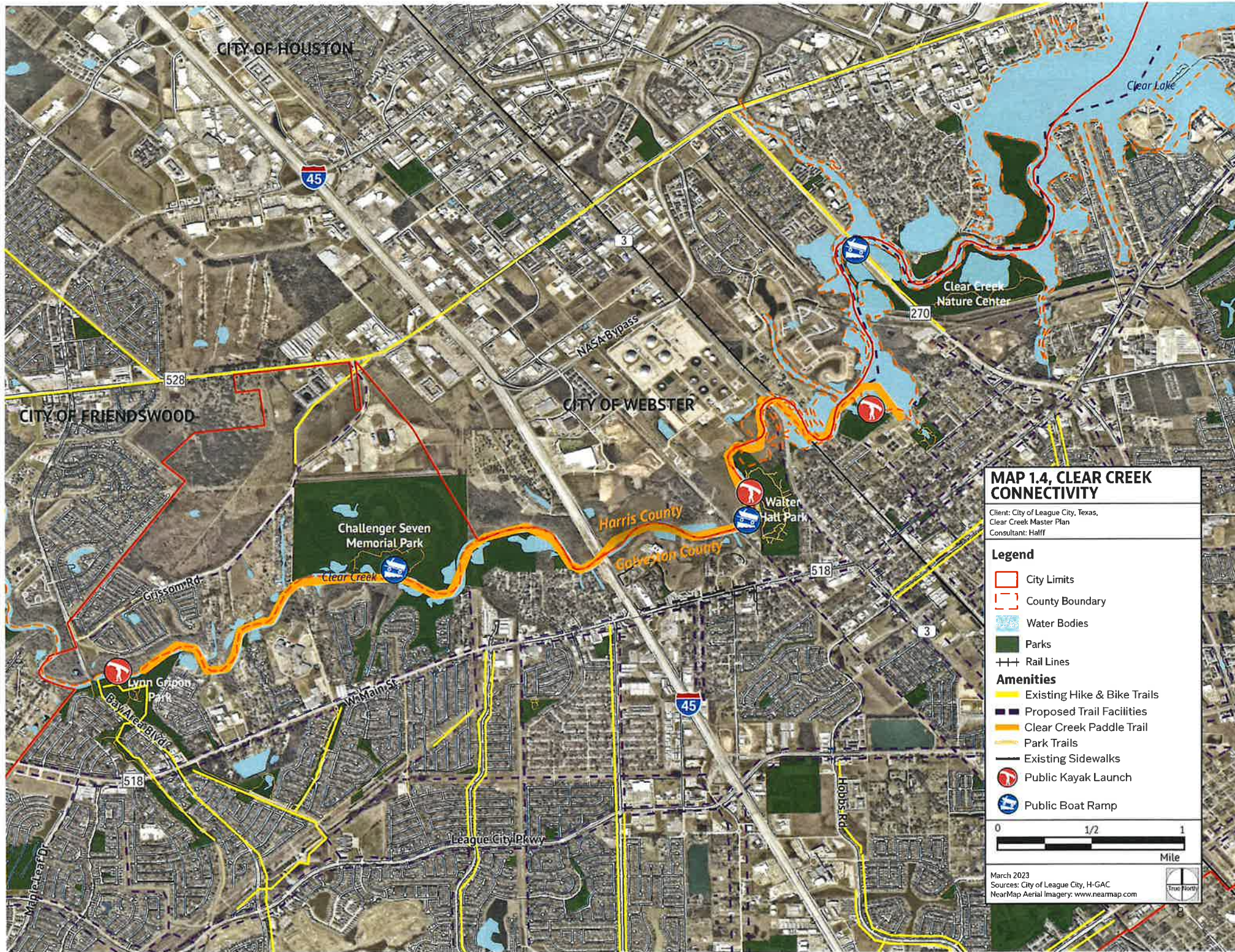
BARRIERS TO CONNECTIVITY

Major highways such as I-45 and SH 3, rail lines, inconsistent sidewalk segments, and limited ADA-accessible handicap ramps and signalized crossings create barriers to connectivity for pedestrians and cyclists to have safe access to Clear Creek. Many neighborhoods fronting Clear Creek have complete sidewalk networks, however, they may be gated or lack paved access to the creek. Private property access points such as personal boat ramps, kayak launches, and docks create additional barriers for those wanting to access the creek.

Existing Facilities Overview

9.6	Miles of Trails (approx.)
6.1	Miles of Blueway / Paddle Trails
774	Acres of Public Access Parkland
136	Acres of Private HOA Parkland
3	Public Boat Ramps
3	Public Kayak Launch Sites
0.5	Miles of Boardwalks (approx.)





MAP 1.4, CLEAR CREEK CONNECTIVITY

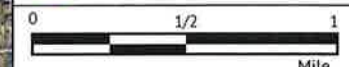
Client: City of League City, Texas,
Clear Creek Master Plan
Consultant: Half

Legend

- City Limits
- County Boundary
- Water Bodies
- Parks
- Rail Lines

Amenities

- Existing Hike & Bike Trails
- Proposed Trail Facilities
- Clear Creek Paddle Trail
- Park Trails
- Existing Sidewalks
- Public Kayak Launch
- Public Boat Ramp



March 2023
Sources: City of League City, H-GAC
NearMap Aerial Imagery: www.nearmap.com



ENVIRONMENTAL CHARACTERISTICS

Estuaries, such as Clear Creek, play important roles in the lives of many animal species and are often called the “nurseries of the sea” because many species rely on estuaries for nesting and breeding. Estuaries filter out sediments and pollutants from rivers and streams before they flow into the ocean, providing cleaner waters for humans and marine life. However, according to National Oceanic and Atmospheric Administration (NOAA), coastal development, introduction of invasive species, overfishing, dams, and global climate change have led to a decline in the health of estuaries.¹

A number of studies have been conducted along Clear Creek to improve habitat and water quality, as well as promote conservation and flood mitigation efforts. Current projects along Clear Creek tributaries include the clearing and de-snagging of Magnolia Creek, Cedar Gully, Landing Ditch, and Newport Ditch. This project consists of the removal of vegetation and snags or other obstructions along Clear Creek to improve drainage and maintain flow capacity.



1: Life in an Estuary. National Oceanic and Atmospheric Administration. 2019
2: Why are Wetlands Important? U.S. Environmental Protection Agency. 2022.

WETLANDS AND FLOODPLAIN

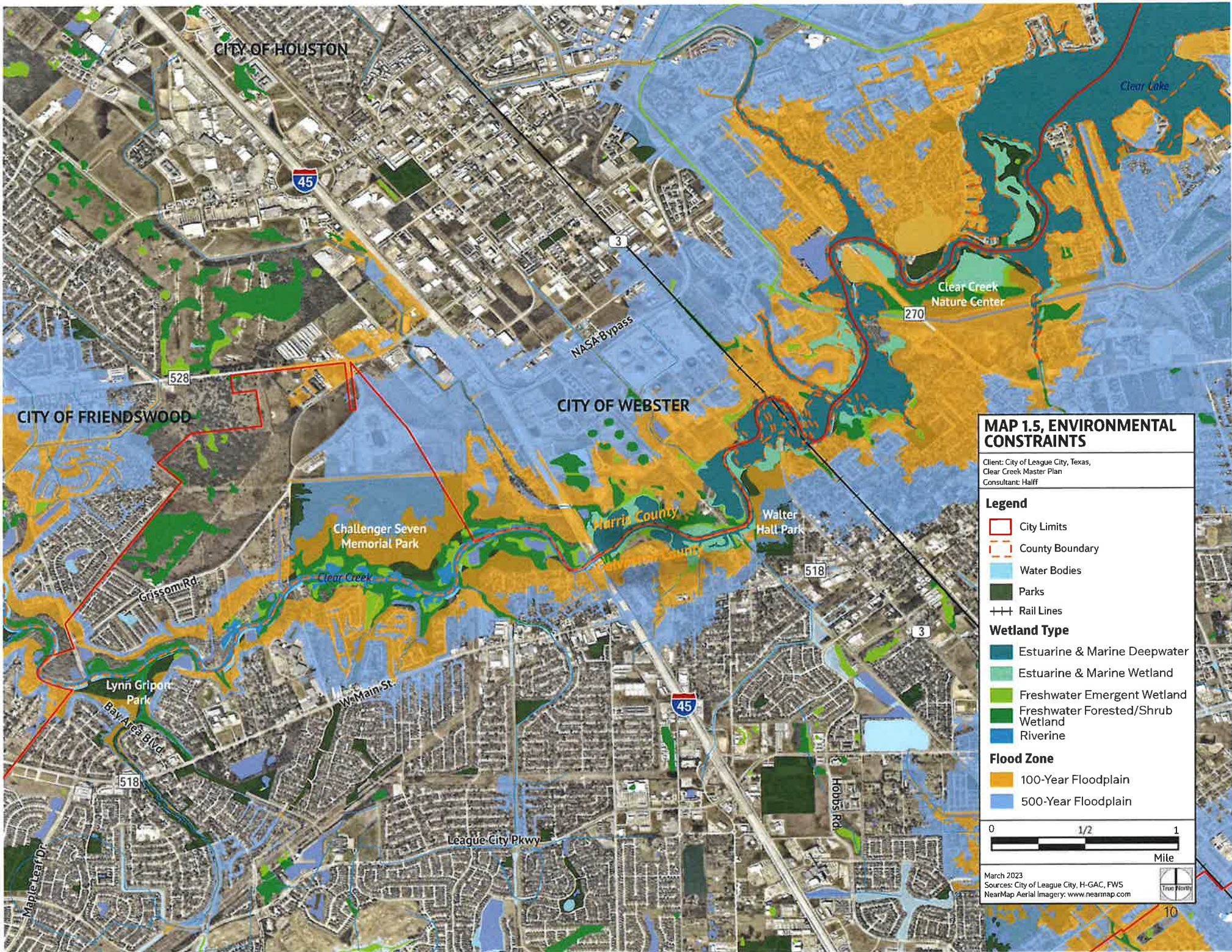
Wetlands are important features in the landscape that provide numerous beneficial services for people, fish, and wildlife. Some of these services, or functions, include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods. According to the United States Environmental Protection Agency (EPA), wetlands are among the most productive ecosystems in the world, comparable to forests and coral reefs. The study area includes five types of wetlands:²

- » Estuarine and Marine Wetlands: Brackish habitats where freshwater and saltwater mix
- » Freshwater Emergent Wetlands: Transitional areas between permanently wet and dry environments
- » Freshwater Forested/Shrub Wetlands: Known as scrub swamps – areas that are too wet to become swamps but too dry or shallow to become marshes
- » Riverine: Areas contained within a waterway channel and associated streamline vegetation



As shown in Map 1.5, *Environmental Constraints*, a majority of parcels in the study area are located within the 100- or 500-year flood zones, which may pose concern for development along Clear Creek. Of the parcels fronting Clear Creek, 27 percent are residential land uses. Approximately 81 percent of parcels fronting Clear Creek also include wetlands on all or portions of the property, 18 percent of which are residential parcels and 23 percent are labeled as vacant developable or undevelopable. As development along Clear Creek continues, conservation and protection of wetland areas should remain a priority to ensure proper ecological functions of the Clear Creek area.





MAP 1.5, ENVIRONMENTAL CONSTRAINTS

Client: City of League City, Texas,
Clear Creek Master Plan
Consultant: Half

Legend

- City Limits
- County Boundary
- Water Bodies
- Parks
- Rail Lines

Wetland Type

- Estuarine & Marine Deepwater
- Estuarine & Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Riverine

Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

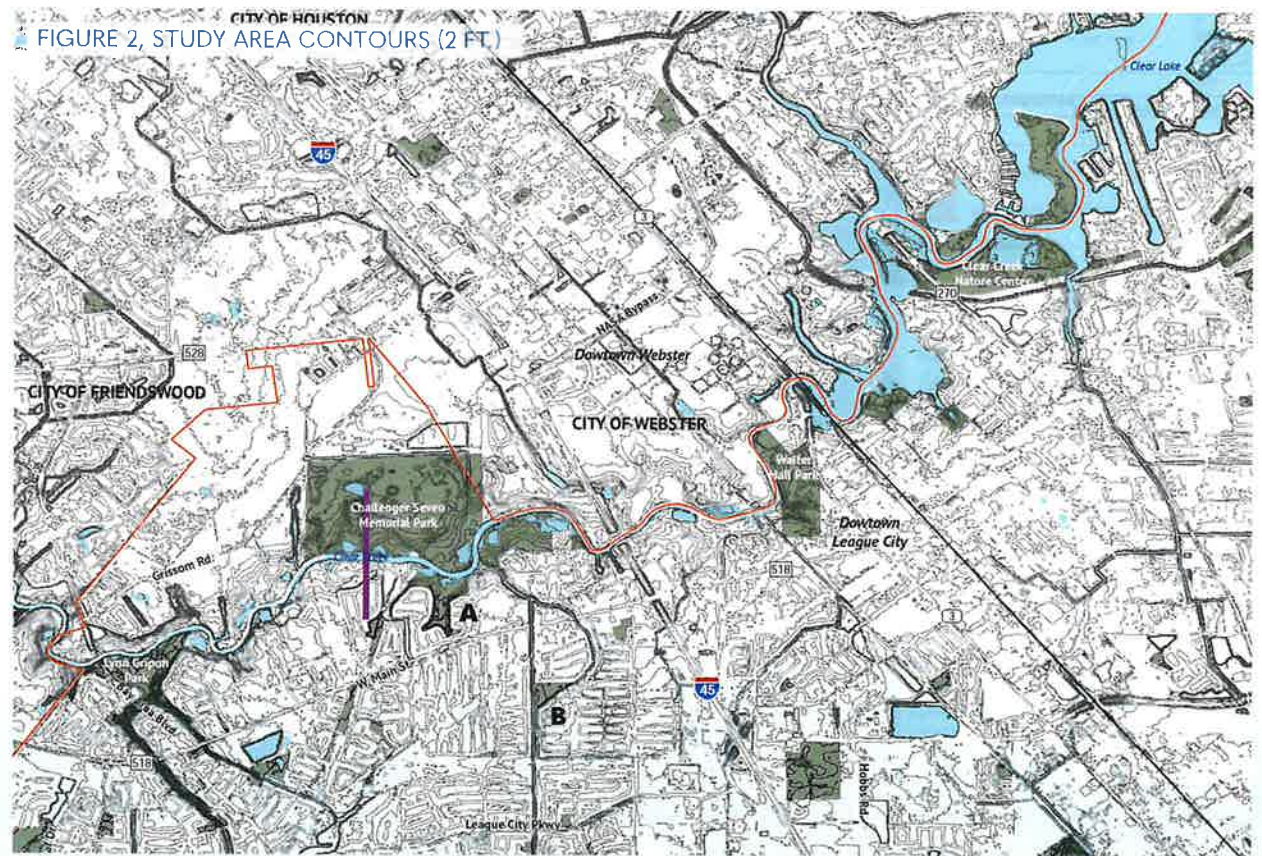
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March 2023
Sources: City of League City, H-GAC, FWS
NearMap Aerial Imagery: www.nearmap.com

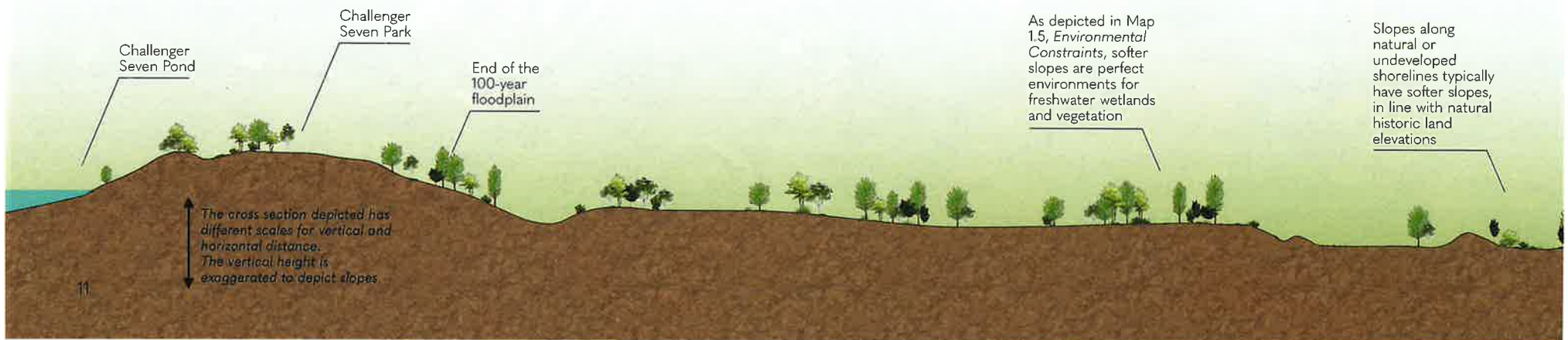
STUDY AREA ELEVATIONS

Within the Study Area, Clear Creek is at elevation 10 ft. (west) to 0 ft. (east) at sea level. Elevations directly parallel to Clear Creek have a two to six feet of rise in elevation. Typically, beyond this initial rise, slopes are more gradual resulting in a wide flood plain and wetland habitats. Clear Creek is lined with many estuaries, inlets, and man made retention ponds creating many low-lying peninsulas and banks. A majority of land uses along Clear Creek are major residential subdivision developments. To prevent flooding in these areas, land was terraformed to create a raised terrace between the low lying lands of Clear Creek and the development (See label 'A' in Figure 2).

League City is a city of water management, featuring a large number of canals, ditches, and man made hydrological systems. Many low lying ditches stretch far into League City leading to Clear Creek. For example, label 'B' in Figure 2 demonstrates a low lying drainage canal and terraforming to prevent flooding of residential development. Retaining a balance between constructed flood prevention and natural flood prevention measures, especially along high outfall waterways, can make a city more resilient to flooding events, while also retaining the natural beauty of the hydrological system.



The cross section below depicts the elevations surrounding Clear Creek at Challenger Seven Memorial Park and Magnolia Estates (as depicted by the purple line on Figure 2). The cross section below showcases a natural shoreline (left) and a semi-terraformed shoreline (right).



FLORA AND FAUNA

As described by the Clear Creek Nature Center, the wetlands along Clear Creek are characterized by “coastal flatwoods, scrub/shrub wetlands, coastal prairie, prairie pothole complexes, freshwater and estuarine wetlands, shallow-water habitats with submerged aquatic vegetation, and deep-water habitats.” This wide range of habitats along Clear Creek and its tributaries provide a variety of spaces for native flora and fauna to thrive unimpeded.

Native trees along Clear Creek include the Bald Cypress, Swamp Chestnut Oak, Water Oak, Parsley Hawthorn, and Sweetbay Magnolia. Native grasses include big bluestem, switchgrass, eastern mamagrass, and gulf muhly. Common plants for hosting butterflies include swallowtail’s, hairstreak’s, and skipper’s.

According to the Native Plant Society of Texas—Houston Chapter a number of native trees and shrubs help in erosion control; these include the River Birch, Green Ash, Bald Cypress, and Rough-leaf Dogwood.

In the League City Nature Center Management Plan (2016) the Chinese Tallow, Trifoliate Orange, Yellow Iris, and Chinese and Panese Privet are listed as invasive shrubs/plants to Clear Creek. Invasive aquatic species include the common Water Hyacinth and Elephant Ear.

Texas Parks and Wildlife Department lists two Clear Creek species as ‘endangered’: the Attwater’s greater prairie-chicken and the Eskimo curlew (bird). Also important to note is that Clear Creek and Clear Lake historically housed sea grass up until the 1990s, which has since been destroyed. Many other birds and fish are listed as ‘threatened’, such as the white-tailed hawk, oceanic whitetip shark, reddish egret, and piping plover.



Barn Swallow
Source: City of League City



Bald Cypress
Source: Tim Fitzharris



Catfish
Source: USFWS



Seagull Seagull Bluestem
Source: Native Plant Soc. of Texas



Attwater's Greater Prairie-Chicken
Source: USFWS



Swamp Chestnut Oak
Source: USDA



Blue Crab
Source: Visit Galveston



Switchgrass
Source: NRDC



Reddish Egret
Source: Nat. Audubon Soc.



Sea Grass
Source: TPWD



Orange-Crowned Warbler
Source: Gulf Coast Bird Observatory



Rough-leaf Dogwood
Source: Norman Transcript



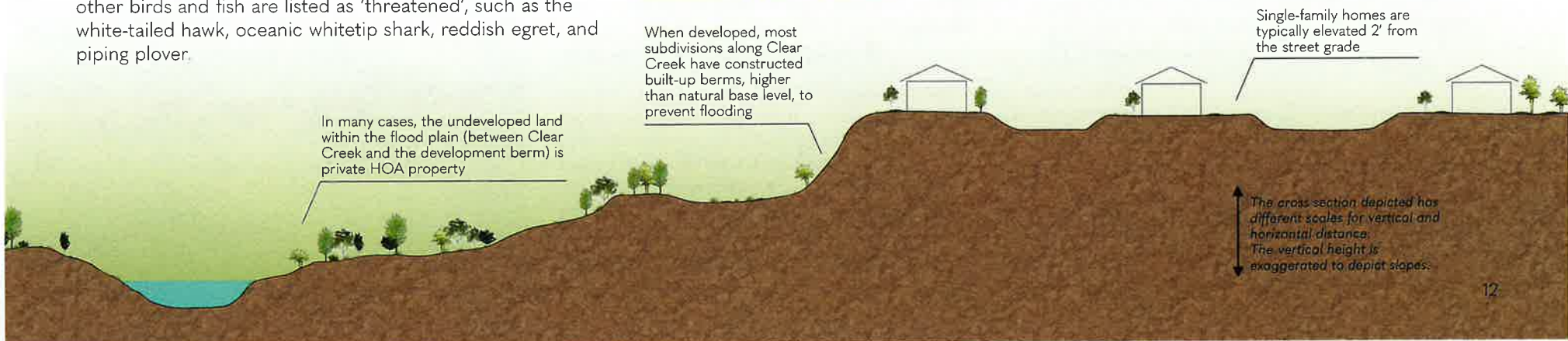
American Kestrel
Source: American Bird Conservancy



Chinese Tallow
Source: Wolf Prairie



Alligator
Source: Houston Chron





PUBLIC ENGAGEMENT

Public Engagement consisted of three public meetings, community wide and statistically valid surveys, and focus group meetings were conducted with City staff and area organizations to gather feedback from community members and implementing agencies regarding opportunities for Clear Creek. The following pages represent the feedback received from these engagement activities that helped guide project recommendations for Clear Creek. All engagement materials, including survey feedback and engagement boards, can be reviewed in Appendix A, *Public Engagement Materials*.

2017 PARKS PLAN FEEDBACK

The 2017 Parks, Trails, and Open Space Master Plan aimed to provide dynamic recreation space to all residents to create a city of “great places.” The 2017 Plan included four targets to achieve this goal:

- » Target 1 — Preserve and Enhance Natural Areas
- » Target 2 — Develop “Great Places”
- » Target 3 — Increase Recreational Opportunities
- » Target 4 — Improve Connectivity

Community survey responses and outreach efforts for this plan identified the need and desire for hiking/biking trails, wildlife conservation, and public access along Clear Creek. The community outreach organized for the Clear Creek Master Plan builds on the feedback received from the 2017 Parks, Trails, and Open Space Master Plan to inform project and policy decisions to help make League City a city of “great places.”

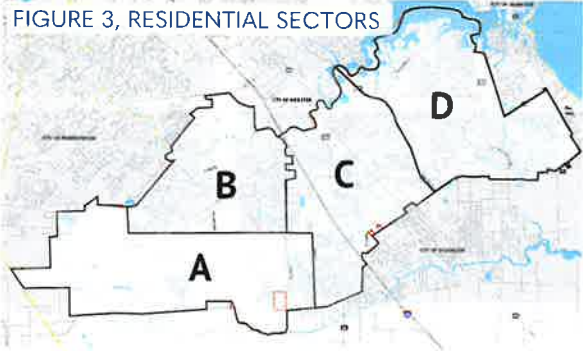
COMMUNITY SURVEY

The City of League City conducted a 15-question online community survey using SurveyMonkey as well as a statistically valid survey to gather feedback regarding the use of Clear Creek and desired amenities and improvements. The community survey was open for one month and received a total of 228 responses. The statistically valid survey as part of the 2017 Parks Master Plan update was open between March and April 2023 and received a total of 421 responses from League City residents. The statistically valid survey was administered as part of the 2017 Parks Master Plan update. Both surveys asked respondents which area of League City they live in, as defined in Figure 3, *Residential Sectors*. As shown in Table 2, *Survey Representation*, most community survey respondents live in Sector B, whereas most statistically valid survey respondents live in Sector D.

Each survey had four questions regarding the community's use of Clear Creek and how they would like to see the creek improve. The results of the online community survey and statistically valid survey are demonstrated on the facing page.

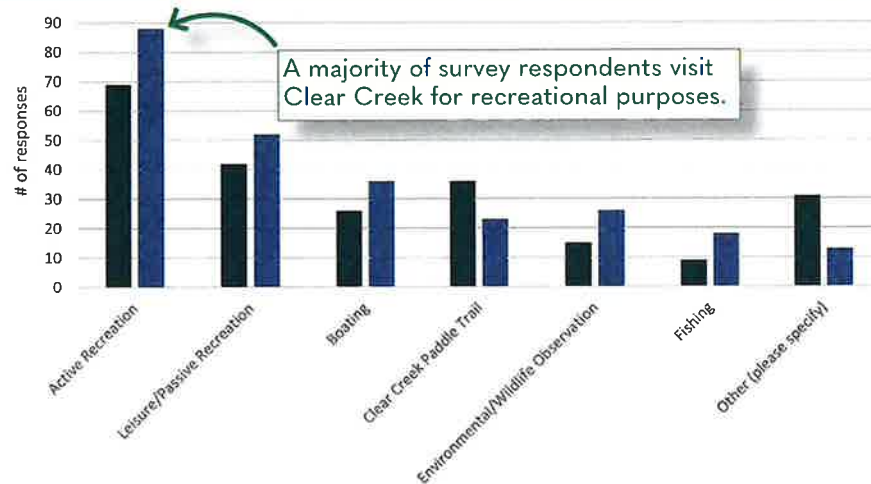
Table 2, Survey Representation

Sector	% Community Survey Respondents	% Statistically Valid Survey Respondents
A	6%	9%
B	37%	34%
C	27%	19%
D	27%	38%
Other	3%	-



WHAT WE HEARD: COMMUNITY & STATISTICALLY VALID SURVEY RESULTS

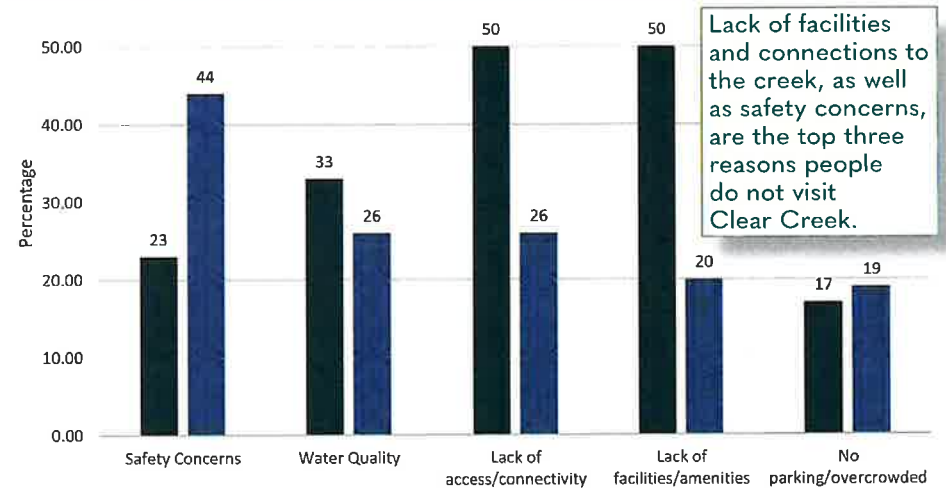
Question #1: What is your primary purpose for visiting Clear Creek?



Online Community Survey

Statistically Valid Survey

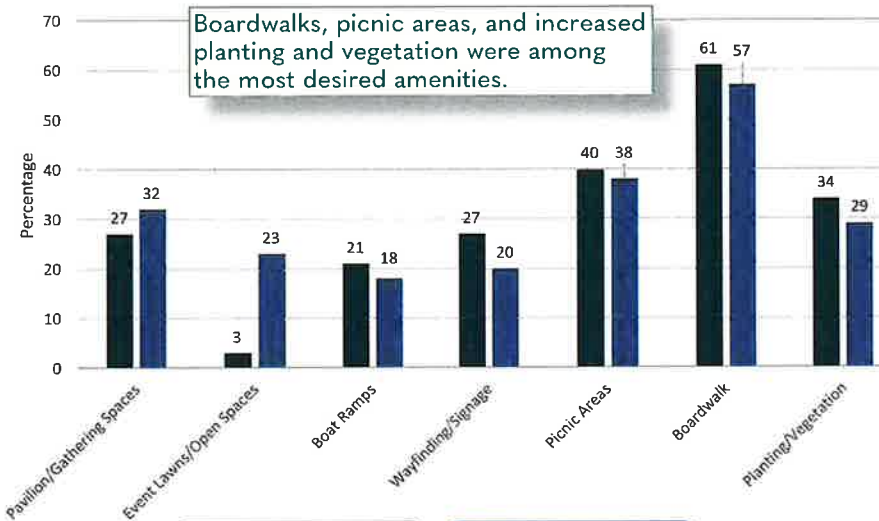
Question #2: What are three reasons you do not visit Clear Creek?



Online Community Survey

Statistically Valid Survey

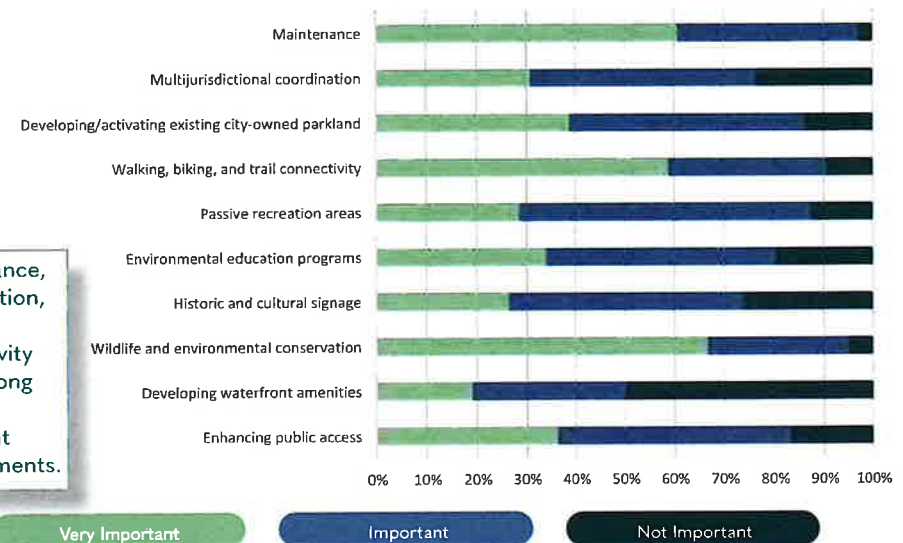
Question #3: What would you like to see more of along Clear Creek?



Online Community Survey

Statistically Valid Survey

Question #4: How important are the following improvements along Clear Creek?



Very Important

Important

Not Important

OPEN HOUSE #1 — MARCH 8, 2023

The first open house meeting was held at the Johnnie Arolfo Civic Center in League City, Texas. Approximately 30 community members attended the meeting and learned about the planning process and provided feedback on engagement boards, shown to the right. When asked about current use of Clear Creek, many participants stated they enjoy observing the wildlife and environmental features along Clear Creek.

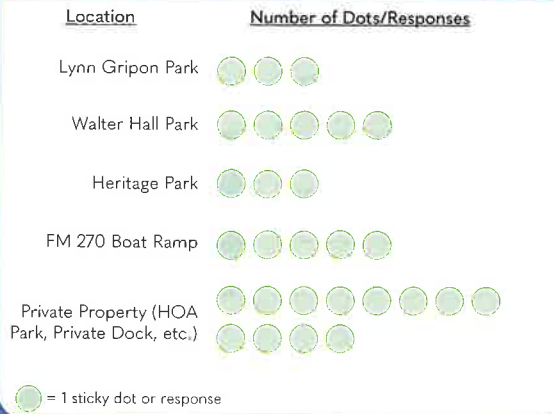
While many participants access Clear Creek at public sites like Walter Hall Park and the boat ramp at FM 270, others live directly on Clear Creek and access the water through their property. At public points of access, improvements would need to be made to allow for access to Clear Creek when tides are low.

Participants would like to see more planting and vegetation along Clear Creek to keep it more natural and preserve areas for wildlife. When asked to rank improvements to Clear Creek based on importance, participants believe wildlife and environmental conservation and maintenance improvements to be very important. Participants found developing or activating city-owned parkland to be the least important improvement.

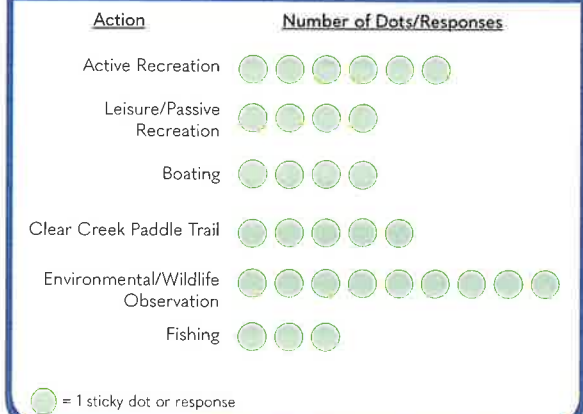
"I WOULD LIKE TO SEE CONNECTED BIKE TRAILS — OTHER CITIES I'VE LIVED IN HAVE LONG BIKE TRAILS AND WALKING PATHS ALONG THE WATERWAYS WITH MULTIPLE ACCESS POINTS. I WOULD LOVE TO SEE THAT HERE."

- Community Survey Respondent

Q1: WHERE DO YOU CURRENTLY ACCESS CLEAR CREEK?



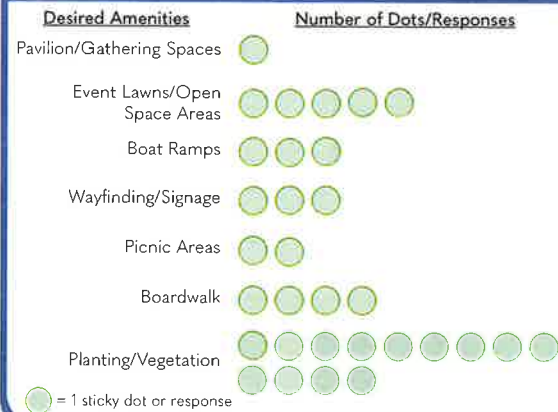
Q2: WHAT IS YOUR PRIMARY PURPOSE FOR VISITING CLEAR CREEK?



"THERE ARE LIMITED PUBLIC AREAS TO ENJOY THE BEAUTIFUL SHORELINES. THERE SHOULD BE INVESTMENT INTO THE AREAS LEAGUE CITY HAS TO OFFER RESIDENTS A UNIQUE AREA TO ENJOY THE WATER WITH PUBLIC BOARDWALKS."

- Community Survey Respondent

Q3: WHAT WOULD YOU LIKE TO SEE MORE OF ALONG CLEAR CREEK?



Q4: HOW IMPORTANT ARE THE FOLLOWING IMPROVEMENTS TO CLEAR CREEK?



OPEN HOUSE #2 — MAY 31, 2023

The City of League City conducted the second public meeting on May 31, 2023, for the Clear Creek Master Plan. The meeting was held at the Johnnie Arolfo Civic Center. Nearly 60 community members attended the meeting to receive an update on project status and review preliminary concepts, goals, and strategies regarding the Clear Creek study area. Feedback and engagement findings were presented from the community and statistically valid survey as well as preliminary recommendations and conceptual designs for three publicly owned sites along the Clear Creek.

Following the presentation, meeting attendees were given the opportunity to speak at a podium to voice their support or concerns regarding the preliminary concepts of the Master Plan. Many attendees expressed the need for increased enforcement and patrol along Clear Creek, particularly near Myrtle Park, as many boaters speed and cause safety concerns for kayakers and other users. Residents suggested floating buoys with "No Wake" signage and police presence along Clear Creek to discourage boats from speeding.



Meeting attendees reviewing engagement materials
Source: Half

Other participants expressed concerns regarding the potential loss of wildlife due to trail development in natural areas, and whether there was additional analysis that has been conducted to measure habitat loss in areas with trails.

Prior to the meeting, some residents expressed concerns regarding access to Myrtle Park through the neighborhood of Clear Creek Village. The proposed concept for Myrtle Park features public access along the CenterPoint utility easement to the west of the park site as well as along the future alignment of Landing Boulevard west of the park. Residents were generally in favor of the proposed improvements throughout the study area; however, safety and enforcement along Clear Creek were among the top concerns for the majority of open house attendees.

2017 PARKS PLAN FEEDBACK

Priority Projects

1. Off-Street Paths
2. Habitat Preservation
3. Large Passive Parks
4. Preservation of Historic Sites
5. Small Neighborhood Parks
6. Open Space Acquisition
7. Renovation of Existing Parks
8. Youth/Teen Center
9. Expand Recreation Programs
10. Leisure Aquatics



Parks



Trails



Open Space

86.6% OF PUBLIC SURVEY RESPONDENTS VOICED THAT PARK SPACE SHOULD BE CONNECTED BY TRAILS

According to the 2017 Parks, Trails, and Open Space Master Plan community survey, off-street paths, habitat preservation, and passive parks were among the top priorities for residents.



Project team presenting an update at Open House #1
Source: Half

"I'M AFRAID TO KAYAK OR CANOE ON CLEAR CREEK BECAUSE OF THE SPEEDING BOATS."

- Statistically Valid Survey Respondent



Project team presenting conceptual area plans at Open House #2
Source: Half

OPEN HOUSE #3 — DATE

The third and final public meeting was held on July 26, 2023 at the Hometown Heroes Recreation Center. Around 10 community members attended the meeting to receive an update on project status and review the final plan recommendations, concepts, goals, and strategies regarding the Clear Creek study area. Prior feedback and engagement findings were presented from the community and statistically valid survey, feedback from Public Meetings #1 and #2, and feedback regarding the conceptual designs for three publicly owned sites along the Clear Creek.

A short presentation was provided at the beginning of the meeting followed by discussions at presentation boards depicting strategies and recommendations of the Master Plan.

The public's comments followed similar themes from prior open houses. Concerns and comments from attendees included:

- » The need for the implementation of safety signage, buoys, and other means to slow motorized boats along the Clear Creek Paddle Trail
- » Ensuring the preservation of existing tree canopy in areas depicted on the Opportunities Map during and after the construction of trail and park facilities
- » General interest in the idea of an oversight board for Clear Creek regarding Paddle Trail safety, posted signage, rules and regulations, and City enforcement

"I'M NOT SURE WHAT THERE IS TO DO ALONG CLEAR CREEK."

- Statistically Valid Survey Respondent



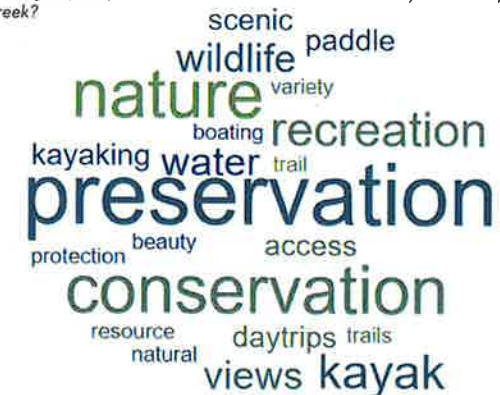
CITY DEPARTMENT FOCUS GROUP MEETING #1 — FEBRUARY 21, 2023

Focus group meetings were held with various departments within the City of League City to provide an overview of the Clear Creek Master Plan and gain valuable insight regarding on-going and future projects that may coincide with the Master Plan. The following city departments were included in the focus group meetings:

- » Public Works
- » Parks and Cultural Services
- » Planning & Development
- » Engineering

Similar to the open house and community surveys, department staff were asked to share their primary reasons for visiting Clear Creek, additional amenities they would like to see along the creek, priorities, opportunities, and constraints. A majority of city staff visit Clear Creek for recreation and leisure purposes and desire boardwalks, gathering spaces, and increased wildlife and environmental conservation along Clear Creek. Overall, city staff expressed enthusiasm and interest in the Clear Creek Master Plan, noting thoughtful and environmentally-sensitive improvements to Clear Creek and connectivity to area destinations were topics of consideration for moving forward.

Focus group responses to "what comes to mind when you think of Clear Creek?"



PARTNER AGENCY FOCUS GROUP MEETING #1 — FEBRUARY 22, 2023

Collaboration efforts between public entities is crucial to ensure projects are cohesive and meet the goals and standards of multiple organizations. The project team met with representatives from area organizations to introduce the Clear Creek Master Plan and explore opportunities for coordinated planning efforts along Clear Creek. These partner agencies were selected due to their work in and around Clear Creek and expertise regarding environmental conservation and preservation.

The following organizations were invited to participate in the partner agency focus group meetings:

- » Galveston Bay Foundation
- » Galveston County Parks
- » Bayou Preservation Association
- » Houston-Galveston Area Council
- » Galveston Bay Estuary Program
- » U.S. Army Corps of Engineers
- » Harris County Flood Control
- » Texas Commission on Environmental Quality

Meeting attendees discussed environmental constraints along Clear Creek, such as management and repair of riparian zones, water quality monitoring, and wildlife habitat conservation. Focus group members identified additional projects and planning efforts in the region that could be applied to Clear Creek.

“I HAVE NEVER USED CLEAR CREEK. WOULD LOVE TO BEGIN USING IT IN SOME FASHION.”

- Statistically Valid Survey Respondent

CITY DEPARTMENT FOCUS GROUP MEETING #2 — MAY 11, 2023

The second city department meeting was held May 11, 2023, to provide an update on the project to the focus group members and discuss preliminary goals and objectives. Overarching goals of the Plan, as well as draft objectives were presented to ensure focus group members supported the plan direction. Focus group members agreed with the preliminary goals, stating they align with the community outreach feedback from the survey and open house overview.

Safety along the creek was a main topic of discussion, as many community survey respondents and open house attendees raised concerns regarding kayak safety and boater etiquette. Ideas were brainstormed regarding various solutions for safety along Clear Creek, including “no wake” signage and police enforcement along Clear Creek. Currently, there is no formal patrol of Clear Creek, and there are opportunities for increased signage and enforcement to ensure safety for all water users. Overall, city department focus group members were in agreement with the plan direction at this update meeting.

PARTNER AGENCY FOCUS GROUP MEETING #2 — MAY 17, 2023

The second partner agency focus group meeting was held May 17, 2023, to provide a project update to partner agency representatives. Focus group members suggested strategies for removing invasive plant species in riparian areas, as well as riparian restoration programs in the region that could be good models for invasive removal, such as the City of Houston’s Riparian Restoration Initiative. Focus group members saw alignment with the Plan’s preliminary goals and objectives to their own organizations, particularly in terms of conservation and preservation of natural areas.

WHAT WE HEARD: KEY THEMES

Throughout the public engagement process, a number of topics, or themes, were expressed by community members and focus group partners regarding the future of Clear Creek. The eight themes listed below were mentioned by community residents multiple times through both surveys as well as at public open house events hosted by the City. These key themes have been used to shape the project goals and objectives presented in Chapter 3, *Recommendations*.

PRESERVATION & CONSERVATION OF WILDLIFE HABITATS & NATURAL AREAS

WALKING/BIKING/TRAIL CONNECTIVITY TO THE CREEK

SAFETY FOR ALL USERS

PUBLIC ACCESS & CONNECTIVITY

INCREASE & IMPROVE AMENITIES, ACTIVITIES, & PROGRAMMING

BOARDWALKS & IMPROVED KAYAK LAUNCHES ALONG CLEAR CREEK

MULTI-JURISDICTIONAL COORDINATION

INCREASED MAINTENANCE OF FACILITIES

Vision

CLEAR CREEK MASTER PLAN



CLEAR CREEK IS A REGIONAL DESTINATION KNOWN FOR ITS VARIETY AND BALANCE OF HABITAT PRESERVATION AND NATURAL RESOURCES, PAIRED WITH WELL-CONNECTED, HIGH-QUALITY RECREATIONAL AMENITIES.

3

INTRODUCTION

The development of the following goals and objectives for the Clear Creek Master Plan was informed by feedback received during public engagement, as well as the four targets of the 2017 Parks, Trails, and Open Space Master Plan. As noted in Chapter 2, *Public Engagement*, community members desire increased public access to Clear Creek through hike and bike trails and programming opportunities while causing minimal impact on the natural environment and preserving wildlife habitats.

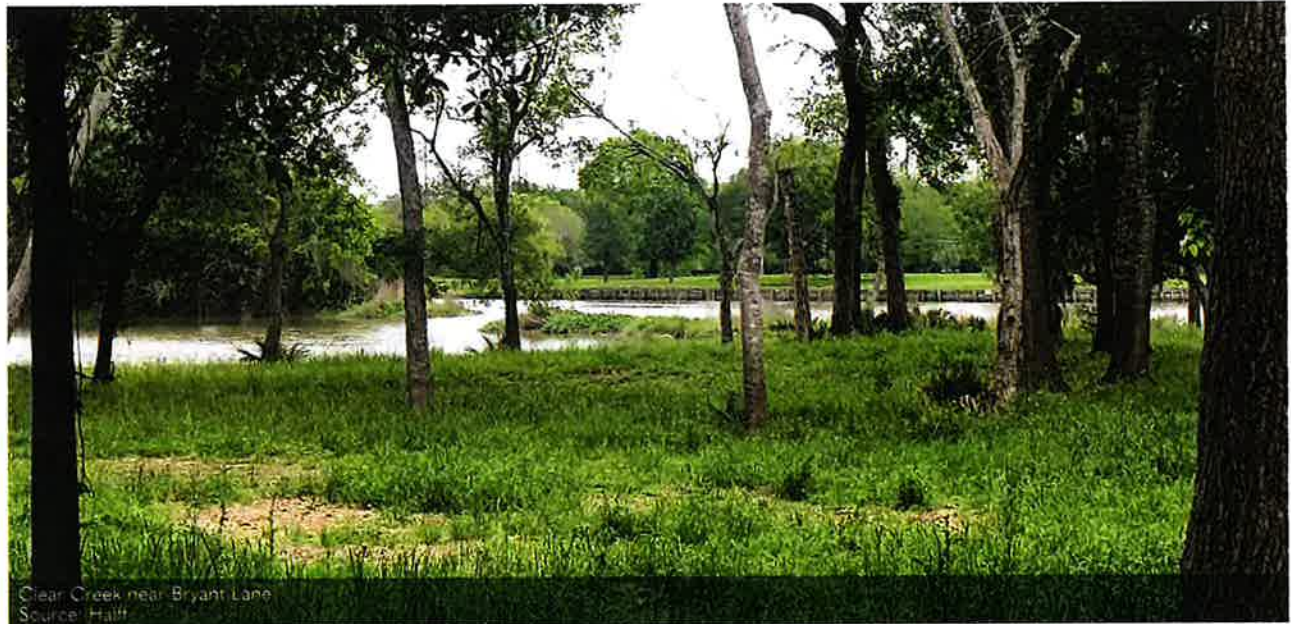
PARKS PLAN INTEGRATION

The 2017 Parks, Trails, and Open Space Master Plan aimed to provide dynamic recreation space to all residents to create a city of “Great Places.” To meet this goal, the 2017 Plan developed four targets and associated objectives to enhance the quality of life and increase recreational opportunities throughout League City.

The four targets of the 2017 Plan include:

- **Preserve and Enhance Natural Areas**
- **Develop “Great Places”**
- **Increase Recreational Opportunities**
- **Improve Connectivity**

To help meet the goal and targets of the 2017 Plan, a series of goals and objectives are developed and described on the following pages for the Clear Creek Master Plan. These Clear Creek specific goals are intended to add to the continued efforts, recommendations, and findings undertaken with the 2017 Plan.



Clear Creek near Bryant Lane
Source: Hall



Looking east along Clear Creek towards Clear Lake
Source: Atticus Real Estate

GOALS

A photograph of a wooden boardwalk or bridge extending over a body of water, surrounded by trees and greenery. The boardwalk is made of wooden planks and has a metal railing on the left side. The water is calm, and the trees are lush green. The sky is overcast.

GOAL 1: ACTIVATION

Continue to activate Clear Creek with safe public access trails, programming, and parkland while minimizing environmental impacts.

GOAL 2: CONNECTIVITY

Improve multimodal access to Clear Creek with additional enhancements to signage and wayfinding along Clear Creek.

GOAL 3: PRESERVATION

Utilize existing natural resources to enhance the biodiversity and viability of the Clear Creek ecosystem for future generations to enjoy.

GOAL 1: ACTIVATION

Continue to activate Clear Creek with public access trails, programming, and parkland while minimizing environmental impacts.



Kayaking Clear Creek
Source: City of League City

Objective 1.1: Continue to expand and improve the Clear Creek Paddle Trail.

To further promote the recreational use of Clear Creek, League City should continue to expand and improve their system of kayak / canoe launches at the Clear Creek Connections Paddle Trail. Cities throughout Texas and the Galveston Bay area have developed their unique river corridors into significant recreational amenities, resulting in enhanced quality of life for residents and visitors. Cities such as New Braunfels and Georgetown have established a robust eco-tourism sector based on the natural resources of the San Gabriel River and Comal River. Baytown and La Porte have significant riparian and wetland tourism programs catering to paddle trail users and birdwatchers. Additionally, several bayou corridors in the Houston area have established paddle trail / blueway programs, such as the Buffalo Bayou Paddling Trail, Cypress Creek, Greens Bayou, and the Brays Bayou Paddle Trail.

WHAT IS A PADDLE TRAIL?

A paddle trail, or blueway, is a designated route along a body of water for canoeing, kayaking, and paddle boarding, intended for recreational purposes. Blueways typically include additional amenities, such as kayak rentals, docks, boat ramps, swimming zones, and other park facilities to create a robust outdoor aquatics program. The Clear Creek Paddle Trail should continually be assessed for opportunities to add new launch sites, rest stop posts, safety signage, amenities, and kayak rental locations.

WHAT DOES IT INCLUDE?

Paddle trails or blueways typically have a trail map and safety information posted at launch sites, which League City should implement at every launch site. Paddle trails also typically include mile-marker signage along the route, similar to recreational trails. These mile-marker signs often double as a tie-post where paddle trail users can tie their kayak to for a moment of rest or in the case of an emergency. League City should construct mile-marker posts and rest stop tie-posts along coastal locations, ideally with conditions of calm water at a natural inlet.

Lastly, paddle trail and blueway users may also include motorized watercraft and sail boats which require a concrete boat ramp. Boat ramps are typically over 120 feet long allowing for vehicles and their boat hitch to reverse into the water. League City should consider improvements to existing boat ramp locations where concrete ramps may be damaged, need erosion control, or additional safety features and signage.

Lastly, as new kayak launch sites are being developed, it is important to understand the tidal changes and water levels of the proposed site. During the public engagement process, many paddle trail users expressed concerns regarding the existing kayak launches frequently being inaccessible due to low water levels. Kayak launches should be placed in locations with minimal flood inundation, along firm coastal soil, and allow access across a wide range of weather events. Launch sites should also be located as close as possible to parking access to minimize the distance traveled on foot. League City should consider the use of floating launch facilities which allow for put-in and take-outs at varying water levels. The City should also consider the addition of handicap accessible launch facilities to reduce exclusion due to age or physical limitations.

STRATEGY 1.1.1: DEVELOP ADDITIONAL PADDLE TRAIL KAYAK LAUNCH SITES AND IMPROVE EXISTING LAUNCHES.

Map 3.1, *Paddle Trail Opportunities*, on the facing page, depicts seven potential sites for new paddle trail kayak launches. A kayak launch is a put-in and take-out location for kayaks and canoes to access Clear Creek. Each launch typically includes a nearby parking lot, signage, and a dock / transition facility for users to enter or exit their kayak. Seven kayak launch locations are proposed on both sides of the creek at about a one-to-two-mile distance between launch sites. If fully implemented, this would increase the Clear Creek Paddle Trail to 12 total kayak launch sites and an additional 3.25 miles of trail.

PADDLE TRAIL CAPITOL OF AMERICA

The state of Florida has the largest number of paddling trail miles, paddling programs, and infrastructure in the nation. The Florida Fish and Wildlife Conservation Commission (FFWCC) has published detailed guiding documents regarding paddle trail construction, trail management, and trail markers. The FFWCC recommends a number of launch designs such as floating docks, concrete bases, docks, synthetic ramps, and stairsteps. They recommend trail signage to include the name of the paddle trail alignment, a mile marker, distance to upcoming launches, and reflector strips on beam posts. The FFWCC also provides tips for making trails more enjoyable such as creating circulator loops, limited each route to 3-5 miles in total length, connecting points of interest, and connections to terrestrial trails for paddlers to stretch.



Consider floating launch docks to address changing tidal patterns in Clear Creek. As heard through the public engagement process, tidal changes in water levels greatly affect the ease and ability to utilize existing launch sites. Existing launch sites in League City include a concrete sloped ramp partially submerged and a post and beam boardwalk style platform. In areas with constantly changing water levels, such as a tidal creek or estuary, floating docks have been utilized to mitigate potential safety concerns and reduce times of inaccessibility.

Consider adding handicap accessible put-in and take-out facilities. Water-based sports, such as kayaking, are often activities of choice for people with reduced mobility or people who use a wheelchair. Handicap kayak launches typically include handrails and guard rails, gently ramped access slopes, and are wide enough for wheelchair access.

The existing wooden dock and ramp kayak launch at Lynn Gripon should be replaced with a floating dock. Additional signage should be placed at parking locations directing users to the launch site.



STRATEGY 1.1.2: DEVELOP REST-STOP WITH TIE-POSTS FOR PADDLE TRAIL USERS AT SHADED COVERED AREAS ALONG THE PADDLE TRAIL ROUTE.

League City should Construct mile marker posts and emergency locational signage along paddle trail routes to indicate the length traveled and trail users' exact location in case of emergency response purposes.

Develop rest stops with tie-posts and emergency signage for paddle trail users at canopy shaded covered areas along the paddle trail route. See strategy 1.4.2 for additional signage recommendations and standards.

Resting spots and emergency locations are an important feature along paddle trails for users who may need a break from paddling or may need emergency assistance. Tie-posts are typically wooden beams inserted into a sea floor or creek bed where kayak users can anchor themselves with rope. These tie posts are typically accompanied by numbered locational emergency signage (if in need of EMS services), mile markers to indicate distance traveled, and additional wayfinding information. Eleven tie-post locations are proposed along inlet zones on the edge of the Creek between existing and proposed kayak launches with natural vegetation shade cover and minimal wake influence.

CITY OF HOUSTON

Clear Creek Paddle Trail Overview

6.1	Existing Miles of Paddle Trails
1.81 & 4.29	Miles Between Existing Launch Sites
3.68	Proposed Additional Paddle Trail Miles
6	New Proposed Launch Sites
0.5 - 2.5	Miles Between Proposed Launch Sites
0.5 - 1.0	Miles Between Proposed Rest Stops

CITY OF FRIENDSWOOD

CITY OF WEBSTER

Challenger Seven Memorial Park

Clear Creek Nature Center

Walter Hall Park

Grissom Rd.

Lynn Griffin Park

W. Main St.

League City Pkwy

MAP 3.1, PADDLE TRAIL OPPORTUNITIES

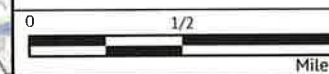
Client: City of League City, Texas.
Clear Creek Master Plan
Consultant: Hall Associates, Inc.

Legend

- City Limits
- County Boundary
- Water Bodies
- Parks
- Rail Lines
- Sidewalks
- Hike and Bike Trails
- Kayak Launches
- Existing Paddle Trail Routes
- Boat Ramps
- Boardwalk
- Lookout/Rest Stop

Proposed Facilities

- Proposed Kayak Launch
- Future Kayak Launch (Funded)
- Proposed Paddle Rest Stop
- Proposed Paddle Trail Routes
- Proposed Boat Ramp
- Proposed Roadway
- Proposed Trail
- Proposed Boardwalk
- Proposed Lookout/Rest Stop
- Proposed Parking Location



June 2023
Sources: City of League City, H-GAC, FWS
Near Map Aerial Imagery: www.nearmap.com

Objective 1.2: Continue to expand and improve the trail, boardwalks, and observation locations along Clear Creek and improve visitor experience.

According to open house and community survey participants, the primary way residents and visitors access Clear Creek is by way of privately-owned trails and boardwalks. League City should continually seek opportunities to develop public boardwalks and trails in natural areas and parkland along Clear Creek. Primary loop trails or routes connecting a park to an existing trail facility should be 10 feet wide to accommodate the expected user capacity. Most internal park trails should be six feet wide. Boardwalks typically range from 8 to 10 feet wide depending on the expected use. Similar to existing boardwalks at Challenger Seven Memorial Park, boardwalks often end right at the shoreline with a covered observation pavilion with bench seating. These locations provide respite opportunities and can include educational signage about potentially observed species.

PLANNING FOR CONNECTIONS

When constructing pedestrian connections, it is important to remember limitations of the wetlands, floodplains, and topography. Concrete trails can only be constructed outside of wetland habitats due to the concrete sub-grading and need for stable packed soils. Boardwalks are ideal for wetland and riparian habitats where minimal disturbance to existing soft soils and vegetation is preferred. Developing boardwalks is a minimal-impact strategy to provide access to and views of Clear Creek.

As shown in Map 3.2, *Opportunities*, on the facing page, recreational trails and boardwalks are proposed throughout the study area and connect



to existing trails throughout League City. Upon completion, the total mileage of proposed trails and boardwalks along Clear Creek equals approximately 20 miles of connected trail infrastructure.



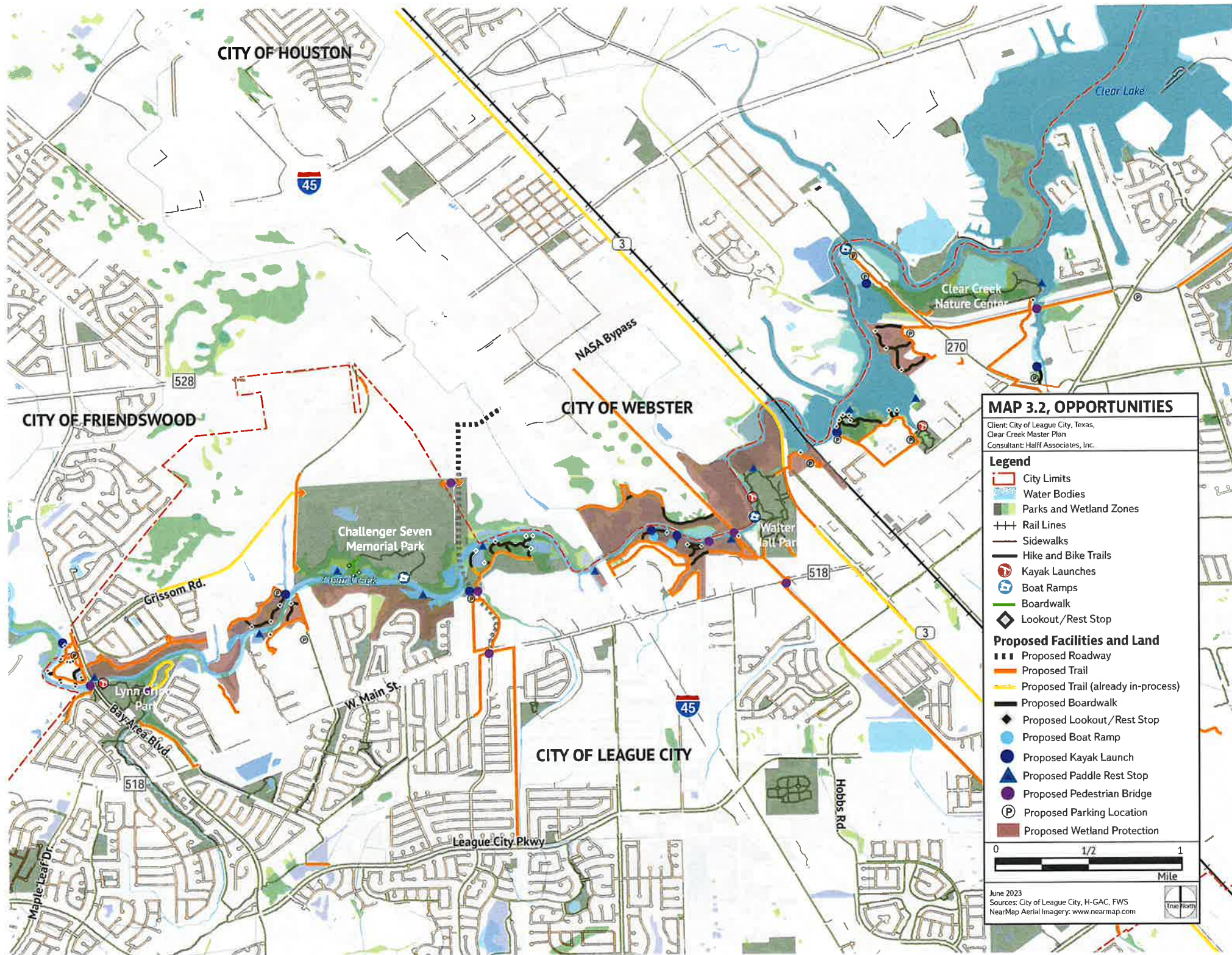
STRATEGY 1.2.1: DEVELOP ADDITIONAL TRAILS AND BOARDWALKS ALONG CLEAR CREEK.

Construct trails and boardwalks along Clear Creek as depicted in alignments on the Opportunities map. League City should construct all or portions of the proposed 20-plus miles of boardwalks and trails along Clear Creek to help meet the 2017 Parks, Trails, and Open Space Master Plan recommendation of constructing 50 miles of trail construction between 2023 and 2028. The trails and boardwalks will continue to provide access and passive recreational opportunities to Clear Creek. The proposed trails and boardwalks also help to link existing hike and bike trails in League City which do not already connect or provide access to recreational facilities and natural areas.



Proposed / Opportunity Facilities Overview

21.1	Miles of Concrete Trails
2.0	Miles of Elevated Boardwalks
38	Overlooks / Pavilions
6	Kayak Launches
3.7	Miles of Blueway / Paddle Trails



MAP 3.2, OPPORTUNITIES

Client: City of League City, Texas,
Clear Creek Master Plan
Consultant: Half Associates, Inc.

Legend

- City Limits
- Water Bodies
- Parks and Wetland Zones
- Rail Lines
- Sidewalks
- Hike and Bike Trails
- Kayak Launches
- Boat Ramps
- Boardwalk
- Lookout/Rest Stop

Proposed Facilities and Land

- Proposed Roadway
- Proposed Trail
- Proposed Trail (already in-process)
- Proposed Boardwalk
- Proposed Lookout/Rest Stop
- Proposed Boat Ramp
- Proposed Kayak Launch
- Proposed Paddle Rest Stop
- Proposed Pedestrian Bridge
- Proposed Parking Location
- Proposed Wetland Protection

0 1/2 1
Mile

June 2023
Sources: City of League City, H-GAC, FWS
NearMap Aerial Imagery: www.nearmap.com

Objective 1.3: Continue to pursue opportunities for parkland establishment along Clear Creek.

The City of League City should continually assess the feasibility of parkland acquisition along Clear Creek. The prioritization of public access lands adjacent to Clear Creek will provide residents with engagement opportunities with League City's most important natural resource. As depicted in Map 1.5, on page 10, lands adjacent to Clear Creek mostly consist of wetlands, floodplains, and tree canopy. Parkland acquisition can help preserve and maintain these sensitive habitats through additional funding opportunities for parkland and preservation initiatives. A balance of activation and preservation (untouched zones) should be accomplished with a passive nature-based design to parks, which mitigates impacts to vegetation and the soil. The intended community impact of Clear Creek activation is to help the community gain a greater connection to, appreciation of, and political will to preserve the natural character of Clear Creek.

STRATEGY 1.3.1: CONTINUE TO SEEK LAND ACQUISITIONS OF PARCELS ALONG CLEAR CREEK.

Continue to seek land acquisitions and buy-outs of parcels along Clear Creek designated by the federal government as Repetitive Loss Properties.

Repetitive Loss Properties are assessed and designated by the Federal Emergency Management Agency (FEMA) as properties which have experienced substantial negative monetary losses under the National Flood Insurance Program (NFIP) due to hazardous events such as flooding. This designation incentivizes, through grant funding, the deconstruction of elevated structures on the parcel and its return to providing a "sponge" buffer between waterways and remaining properties. League City should continue to consider the funding and federal assistance from the Repetitive Loss Properties buy-out program to establish additional parkland facilities and natural areas along Clear Creek. This will help to increase overall public access to Clear Creek and help continue to mitigate flooding impacts caused by additional property development and storm events. Land acquisitions should also include other areas along the Creek that may not be susceptible to development.

STRATEGY 1.3.2: CONTINUE TO SEEK PARTNERSHIPS AND SHARED-USE AGREEMENTS FOR PARKLAND ESTABLISHMENT ALONG CLEAR CREEK.

Continue to seek partnership opportunities through shared-use agreements, funding and maintenance agreements, or an acquisition of land to increase parkland activation along Clear Creek. Depicted on Map 3.2, *Opportunities*, on page 26, are several proposed trail alignments which will require a number of shared-use agreements with private or quasi-public entities. Several boardwalk and overlook opportunities are identified at Clear Creek Community Church which can connect to the Clear Creek Nature Center. Additionally trail opportunities are identified at Clear Springs High School behind Clear Creek ISD sports facilities. Lastly, a number of trail opportunities are identified within land currently owned by neighborhood HOAs. These include a trail connection to Lynn Gripon at Countryside, a trail at Autumn Lakes, and a trail alignment along Landing Ditch connecting Newport Park, Brittany Bay, and Ellis Landing. League City should also seek opportunities to enter into agreement with vacant property owners to preserve right-of-way along Clear Creek for preservation or potential trail opportunities.

STRATEGY 1.3.3: CONSIDER PARKLAND ESTABLISHMENT ALONG CLEAR CREEK.

Harris County Flood Control District Site

The Harris County Flood Control District site is an approximately 24-acre piece of land owned by Harris County Flood Control District at Bay Area Boulevard. The site currently has a half-mile shoreline along Clear Creek with a substantial tree canopy and vegetation. The conceptual design of this parkland is based around providing passive trail opportunities and wildlife viewing stations. Additional amenities such as a kayak launch, pavilion, and mountain-bike technical trails are additional programming opportunities for this site. Constraints for implementation include the acquisition or collaboration with Harris County Flood Control District and inter-local city coordination with Friendswood regarding the northern portion of the site which falls within their jurisdiction.

Special Park Site Selection Criteria

As part of the Clear Creek Master Plan, three special park areas were identified based on the following criteria:

- » Directly adjacent to Clear Creek
- » Existing natural landscape with public interest
- » Connectivity opportunities to nearby existing parks and trail facilities
- » Partially covered with trees and wetlands suitable for preservation
- » City or Publicly owned parcels
- » Public street access
- » Addresses the three goals of the Master Plan
- » Can include programming to address the needs heard from League City residents



Case Study

Regional Natural Parks Adjacent to Subdivisions

There are many examples throughout the Houston region where land between residential subdivisions and waterways is utilized for parks and nature preserves. Situations where underdeveloped land is found between waterways and subdivisions typically occurs due to a portion of the subdivision tract land being in the floodplain, limiting the potential build out of residential structures close to the water. In some cases, this land remains under the complete control of the subdivision Homeowner's Association (HOA), while in other cases the land is under contract or bought by a city or county for parkland establishment.

One such example is the Jesse H. Jones Park and Nature Center located near George Bush Intercontinental Airport along Spring Creek. The Kensington Pines subdivision is directly connected to the park by way of trails, while public vehicular access is provided by way of public streets leading to a parking lot and restroom facilities. The park is mostly passive, featuring paved and unpaved trails and boardwalks, connecting to the Spring Creek Greenway Trail. There is also a playground and kayak launch along Spring Creek. This park preserves the tree canopy and vegetative buffer with no visual indication of park activation from the residential property lines.

A second example is Edith L. Moore Nature Sanctuary, home to the Houston Audubon Society, near Memorial Drive and the Sam Houston Tollway. Access to the park is provided with a park drive and parking lot near the subdivision's entrance and at the Memorial Drive United Methodist Church. This park consists of unpaved hiking trails through untouched tree

canopy along Rummel Creek. There is little to no visual connection between the residential subdivision and the park, providing privacy for the residents, while still providing walking access to a nature park. The park entrance is subtly designed as to not stand out against the residential properties.

Lastly, a third example is the Fall Creek Sports Complex and Greens Bayou Wetland Mitigation Bank along the Greens Bayou. The Fall Creek Subdivision is directly connected to the sports complex through one external drive and one internal drive passing through the residential streets. The sports complex provides residents with a direct connection to trails and sports facilities. The establishment of this parkland also ensures homeowners that land adjacent to them will not be developed, retaining the asset of the adjacent natural landscape. In many cases the establishment of passive parkland trails and preservation areas directly contribute to homeowners housing values.



Myrtle Park Site

Myrtle Park is city-owned land along Clear Creek deeded to the City of League City for the purposes of conservation and wildlife protection and education. The parkland consists of tree canopy and wetland habitats that were unsuitable for housing development when Clear Creek Village, to the south, was established. The conceptual design of this parkland is based around providing passive trails and wildlife observation opportunities with observation decks and an additional kayak launch on the south side of the site. Similar to existing HOA-owned parkland facilities at The Park at Clear Creek, a neighboring subdivision, boardwalks and trails can provide residents with access to wildlife without negatively impacting adjacent landowners. Constraints for implementation include the acquisition of the remaining portion of the site, future access alternatives along Main Street depending on the proposed construction of Landing Boulevard over Clear Creek, long-term construction funding, and citizens prioritization input on implementation.





Myrtle Park Concept

Legend

- A Park Entry Signage
- B Wayfinding Signage & Bench
- C Parking Lot & Drive
- D Concrete Trail (6 ft.)
- E Concrete Elevated Boardwalk (6 ft.)
- F Natural Path Trail
- G Wooden Pedestrian Bridge
- H Covered Observation Deck
- I Pavilion & Restrooms
- J Planter Tree
- K Tree Preservation Zone
- L Wetland Zone
- M Proposed Future Roadway
- N Maintenance Drive
- O Existing Utilities and Power Lines
- P Kayak Launch

Client: City of Lenoir, City Team
Project: Clear Creek Master Plan
Consultant: HNTB

Scale: 1" = 100' 0" 200' 0" 300' 0"

Project: 2014-2015

Drawn by: [Name]

Check by: [Name]

Scale: 1" = 100' 0" 200' 0" 300' 0"



Opportunities Study Wetland and Coastal Boardwalks

Brazoria National Wildlife Refuge



Source: Friends of Brazoria Wildlife Refuges
Freeport, TX

Houston Arboretum & Nature Center



Source: Houston Arboretum
Houston, TX

Memorial Park Eastern Glades



Source: Houston Chron
Houston, TX

Keith-Wiess Park



Source: East Alamo Mng Dist
Houston, TX

Pine Brook South Wetlands



Source: Compass R/E
Houston, TX

Galveston Island State Park



Source: Texas State Parks
Galveston, TX

Cullinan Park



Source: Houston Chron
Sugar Land, TX

Brazoria Natural Wildlife Refuge



Source: AllTrails
Fort Bend County, TX

Creole Nature Center



Source: Beaumont CVB
Beaumont, TX

Taulatin Hills Nature Park



Source: Hikespeak
Beaverton, WA

West Creek Wetland



Source: Elk County
Saint Marys, PA

Honey Horn Plantation



Source: Woodland Prints
Hilton Head, SC

Tarklin Bayou Preserve



Source: Florida Hikes
Pensacola, FL

Kantzier Memorial Arboretum



Source: Texas State Parks
Bay City, MI

River Grove Park



Source: HKA Texas
Kingwood, TX

Kilgore-Davis Park Site

The Kilgore-Davis Tract is a 30-acre city-owned portion of land between Clear Creek and the League City Water Treatment facility. The park site has a potentially large impact on the community, with its proximity to Downtown and connections to the proposed Heritage Trail alignment and existing Heritage Park. The conceptual design of this parkland is based around a balance between passive and active recreational spaces. The far west portion of the park, at the dead end of North Kansas Avenue, is dedicated to active recreational facilities, such as a kayak launch, playground, pavilion, picnic zone, and covered observation deck. The middle portion of the park includes elevated boardwalks, natural walking trails through trees, a fishing pier, and a nine-hole disc golf course. The eastern side of the park provides park visitors with a wildflower and tall grass zones, wetland establishment zones, and seating opportunities to view Clear Creek. There is an opportunity for a trail connection to Heritage Park along North Wisconsin Avenue, which can include a new parking lot if additional capacity is needed. The site's design acknowledges and designs around the potential impacts the wastewater treatment facility may have on the park site, such as maintenance vehicle routes, the Kansas Avenue outfall location, and undesirable smells, by providing a vegetative and spatial buffer between recreational spaces and the treatment facility.

The proposed perimeter trail consisting of a 10-foot concrete trail, 6-foot concrete trail, and a 6-foot elevated boardwalk, is currently in the planning and funding phase with the City of League City. Additionally, the proposed parking lot and kayak launch at the dead end of North Kansas Avenue is currently in the planning and funding phase. Phase 2 of Kilgore-Davis Park development would include the additional recreational amenities, trails, boardwalks, and pavillions recommended in the conceptual park site plan.

Edgewater, Webster

Clear Creek

Clear Creek



City of League City Boundary

Phase 1: Perimeter Trail, Parking Lot, and Kayak Launch

Fairview Cemetery

Heritage Signature Trail Connection

North Kansas Ave

League City Water Treatment Facility

North Wisconsin Ave

Heritage Park

Heritage Signature Trail Connection



Kilgore Davis Tract Park Concept

Legend

- A Park Entry Signage
- B Wayfinding Signage & Bench
- C Parking Lot & Entry Drive
- D Parallel Parking
- E Concrete Trail (10 ft.)
- F Concrete Trail (8 ft.)
- G Concrete Elevated Boardwalk (8 ft.)
- H Wooden Elevated Boardwalk (6 ft.)
- I Mulch or Crushed Granite Trail
- J Wooden Pedestrian Bridge
- K Covered Observation Deck
- L Pavilion and Restrooms
- M Open-Air Boardwalk
- N Kayak Launch
- O Playground Zone
- P Picnic Zone
- Q Disc-Golf Course (9-hole)
- R Planter Tree
- S Picnic Table
- T Tree Preservation Zone
- U Wetland Zone
- V Riparian Plantings
- W Tall-Grass Zone (no-mow)
- X Wildflower Prairie Zone
- Y Maintenance Drive

Client: City of League City Texas
Project: Clear Creek Master Plan
Source: Half
Scale: 1" = 100' 0" 200' 0"
Date: 10/20/2011
Author: [Signature]

Objective 1.4: Incorporate safety and educational features along the creek corridor to enhance the visitor experience.

The City of League City should continually assess the opportunity and funding for safety and educational features such as additional patrolling, emergency signage, informative / wayfinding signage, as depicted in Map 3.3, *Signage Opportunities*, on the facing page.

Signage is the number one way park visitors know where to go, know where they are in the case of an emergency, or become informed about all facilities a park offers. League City should ensure that signage along Clear Creek is provided at recreational facilities and sites. Park signage design should be consistent in character to provide an identifiable sense of space and branding around Clear Creek. Signage should be included at all trail entrances, park gateways, and kayak launch sites. Additional secondary signage should be placed within publicly accessible areas along Clear Creek and throughout public parks to provide visitors with educational information about the wildlife and vegetation, as further described in Objective 1.4. Lastly, the City should erect signage along major corridors and trail routes leading to Clear Creek such as along Main Street, Grissom Road, Egret Bay Boulevard, Magnolia Trails, and the Robinson Bayou Trail.

STRATEGY 1.4.1: ESTABLISH EDUCATIONAL, INFORMATIVE, AND HISTORICAL INTERPRETIVE SIGNAGE ALONG CLEAR CREEK TO HELP INFORM VISITORS OF THE WILDLIFE, HISTORY, AND NATURAL ECOLOGICAL SYSTEMS THEY WILL BE OBSERVING.

Common educational signage found at Houston parks and other regional parks include riparian education, wildflower identification, wetland establishment information, birdwatching tips, the human impact on the environment, and special historical site markers.

League City has a long history of settlement based along Clear Creek dating back to the Paleo-Indian period, the Akokisa Tribe, and pioneer settlers around the 1830s. League City has the opportunity to showcase this rich community history and its connection to the natural landscapes of Clear Creek. In collaboration with the League City Historical Society, League City should erect educational

signage at known historical and ecologically important locations. This will further improve community appreciation of the creek and add to the visitor experience while at the creek.

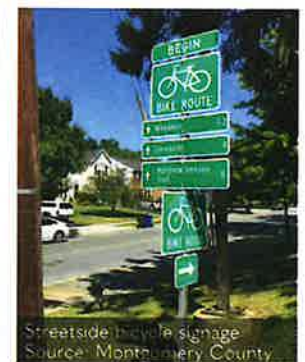
League City should include signage along inter-municipal trails which direct trail users to major economic and social hubs along the trail within each adjacent municipality such as the NASA Campus, Kemah Boardwalk, Stevenson Park, Bayshore Park, and Challenger Columbia Stadium.



Wayfinding signage along the San Jacinto Greenway
Source: Houston Parks Board



Streetside wayfinding signage
Source: Mercer Island Reporter



Streetside bicycle signage
Source: Montgomery County



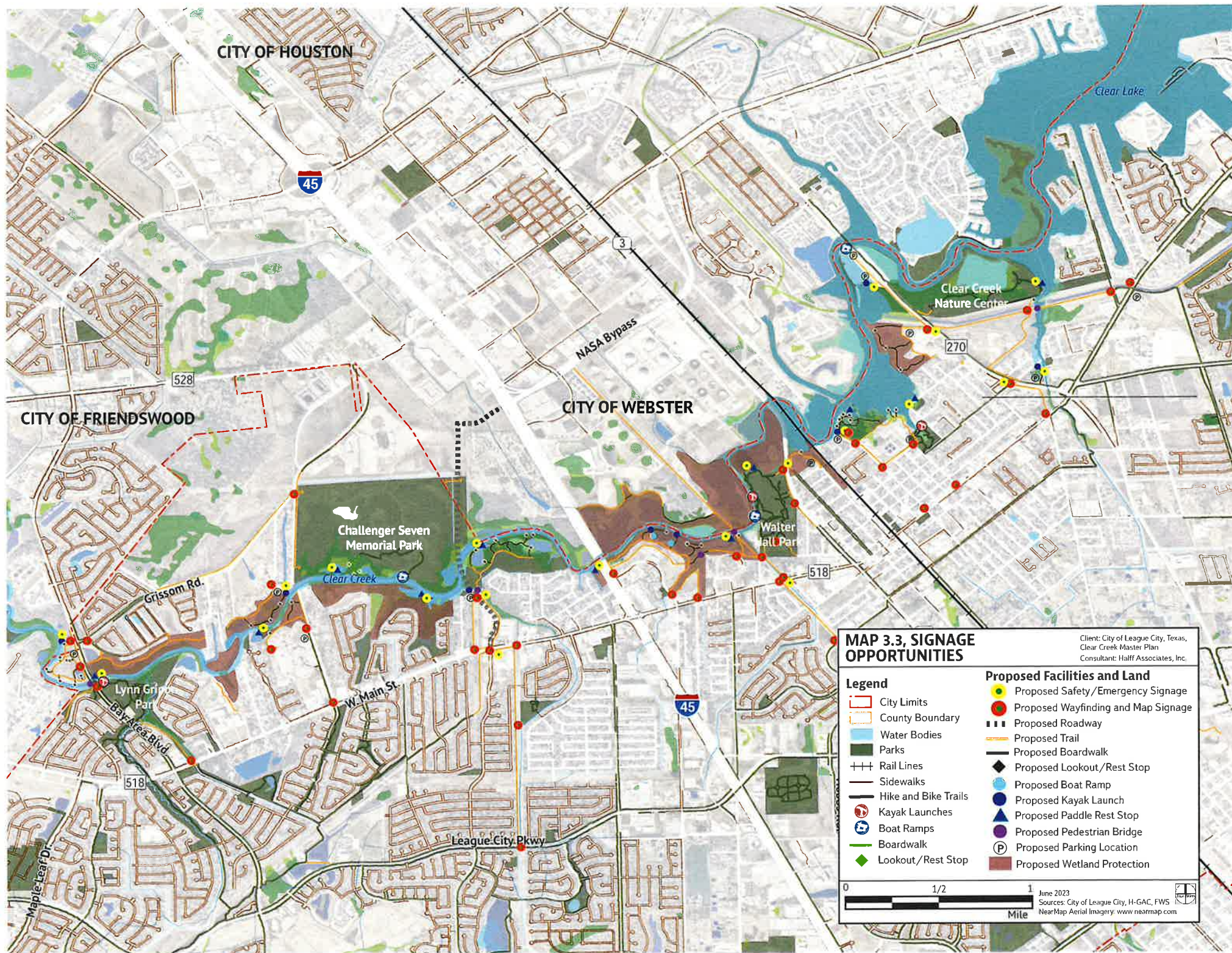
Round Lake Preserve wetland signage and lookoff
Source: Nature Learning Initiative



QR code educational signage
Source: The Tennessean



Trail head signage
Source: Avium Design



MAP 3.3, SIGNAGE OPPORTUNITIES

Client: City of League City, Texas, Clear Creek Master Plan
Consultant: Half Associates, Inc.

Legend

- City Limits
- County Boundary
- Water Bodies
- Parks
- Rail Lines
- Sidewalks
- Hike and Bike Trails
- Kayak Launches
- Boat Ramps
- Boardwalk
- Lookout/Rest Stop

Proposed Facilities and Land

- Proposed Safety/Emergency Signage
- Proposed Wayfinding and Map Signage
- Proposed Roadway
- Proposed Trail
- Proposed Boardwalk
- Proposed Lookout/Rest Stop
- Proposed Boat Ramp
- Proposed Kayak Launch
- Proposed Paddle Rest Stop
- Proposed Pedestrian Bridge
- Proposed Parking Location
- Proposed Wetland Protection

0 1/2 1
Mile

June 2023
Sources: City of League City, H-GAC, FWS
NearMap Aerial Imagery: www.nearmap.com

STRATEGY 1.4.2: AT KAYAK REST AREAS AND PARK SPACES, ESTABLISH A SIGNAGE AND WAYFINDING PROGRAM THAT CAN BE UTILIZED FOR EMERGENCY PURPOSES AS WELL AS INFORMATIONAL SIGNAGE FOR ALL USERS.

As previously stated in Objective 1.1 and Objective 1.2 park entrances, kayak launches, recreational trails, and paddle trail tie-posts typically include signage. League City should continue to erect consistently designed signage and emergency markers at parks and trails along Clear Creek. The city should consider mile-markers along trails and educational signage made of the same materials for all trails and park sites. Typically, parkland based around preservation and natural landscapes feature wooden signage posts and reduce the amount of bright colors utilized in design to reduce the visual impact. Additionally, "bulletin board" style signage should be added to parks and kayak launches which allow for temporary postings, warning of facility closures, safety warnings, or local city information.



Existing Paddle Trail and Hike and Bike Trail Signage in League City
Source: 1, Half; 2, iZone Imagery; 3, iZone Imagery; 4, Half; 5, Half



Genesee River Blueway safety and information pavilion
Source: Genesee River Wilds



Convergence zone marker
Source: National Parks Service



No Wake buoys and barriers
Source: Prior Lake Association

STRATEGY 1.4.3: CONTINUE TO INCORPORATE SAFETY SIGNAGE AND INFRASTRUCTURE ALONG TRAILS, KAYAK LAUNCH SITES, AND BLUEWAY ROUTES.

League City should continue to erect safety signage at Clear Creek facilities to ensure the proper and safe use of facilities. Signage at boat ramps should be provided describing boat ramp rules, fines/fees, emergency contacts, and other tips on boat ramp safety. Signage at kayak launches should include a map of the paddle trail system, how to use a kayak launch, emergency contact and safety tips, and best practices for water quality protection. Signage should also include information related to operation of boats, jet skis, buoys, or kayaks along Clear Creek.

STRATEGY 1.4.4: CONTINUE TO IMPLEMENT METHODS AND LEGISLATION TO ADDRESS SAFETY ISSUES.

As described in the Texas Parks and Wildlife Code (Title 4 Water Safety, Chapter 31 Water Safety, Subchapter 31), League City should establish a governing board which develops and oversees legislation, the rules, and enforcement of water safety and related infrastructure within the municipal jurisdictional waters of Clear Creek.

The Board will oversee the installation of safety signage, regulations, and rules, including "no wake" signage along Clear Creek to protect paddle trail users from wake caused by speeding boats. League City, in collaboration with Texas Parks and Wildlife Department (TPWD), United States Army Corps of Engineers (USACE), and the Board, should also consider the addition of buoys (as set by TPWD Regulatory Markers standards) at creek bends and along paddle trail access points to notify motorized boat users of other users. The City should consider additional patrol boats and a police presence on the water as potential collaborations with other municipalities adjacent to Clear Creek. Nassau Bay has a separate Marine Patrol Division and Galveston County has a number of patrol boats, which can help League City in establishing policies and enforcement.

League City should also consider adding code language which includes "no wake" policies and patrolling policies, similar to Nassau Bay (Chapter 22, Article 2, Section 22-22), Corpus Christi, and Freeport.



Houston Police Department Lake Houston patrol boat and jet-skis
Source: Houston Chronicle

STRATEGY 1.4.5: CONTINUE TO EDUCATE, INCORPORATE, AND ASSESS THE POTENTIAL FOR BIRDING FACILITIES ALONG CLEAR CREEK.

League City should work with local birding advocates and regional birding organizations to continually assess the impact of park and paddle trail development on migratory-local birds and design considerations for birding facilities. League City should continue to add birding facilities such as bird houses, bird blinds, observation sites, and educational signage on birding along trails and parks.



Primitive bird blinds with bench seating
Source: Wild Bird Trust

Paddling Trail Comparison

A detailed assessment of regional paddling trails can help in the decision-making process and establishing design standards for paddling trail facilities along Clear Creek. Paddling trails in the Gulf Coast region typically only include put-in and take-out locations and nothing more. Notably, many of the examples assessed below do not include vehicle or emergency responder access or mid-route exits. Overall, paddling trails throughout the U.S. do not have consistency in design, facility types, or distances between launch sites. The designs are mainly dictated by the existing waterways route, existing bridge crossings, and the location of existing parks along the waterway.

League City should continue to assess regional standards and paddle trail facilities to improve the Clear Creek Paddle Trail.

PADDLING TRAILS AND BLUEWAY DESIGN, SAFETY, AND SIGNAGE STANDARDS

TPWD provides extensive information on paddling trail and blueway standards, development, safety, and sites throughout the state. TPWD classifies two types of paddling trails in Texas; Coastal Paddling Trails; and Inland Paddling Trails. The Paddling Trail Criteria set out by TPWD for officially-designated Inland Paddling Trails includes:

- » The presence of natural or historical attractions
- » Public access put-in and take-out locations
- » Designated linear trail length between four and 12 miles
- » Adequate river flows and depth
- » A population center within 100 miles
- » Local partners and entities to assist in maintenance and safety checks
- » Paddle trail signage and kiosks
- » Local kayak and canoe rental locations

TPWD does not provide exact design standards or recommendations for paddling trails, but does include recommended criteria in the Community Application For Assistance to become recognized by the state as a Designated Paddle Trail. TPWD also provides some guidance for boating markers and buoys. The distance between put-in and take-out locations, the distance between and presence of GPS/tie-posts, safety signage, and access location standards are not specified. Under the Uniform Waterway Markers system provided by the U.S. Coast Guard and Texas State, GPS/tie-post design standards for paddling trails are not listed. Some signage standards exist for motorized boating travel and may be adapted for non-motorized users, such as yellow square and yellow triangle navigation signage along the U.S. Intracoastal Waterways. TPWD does recommend that paddling trail users bring safety and emergency equipment such as a whistle or horn, white light, a rope or anchor, food and water, protective wear, and waterproof bags for personal valuables. It is also recommended that trail users never paddle alone and are aware of current water levels and



Regional Blueway / Paddle Trail Systems
Source: USGS Streamer application, Half, TPWD



Long Creek Paddling Trail onroute wayfinding signage
Source: City of Palm Coast



Beaver Pond Paddling Trail wildlife educational signage
Source: TPWD

GOAL 2: CONNECTIVITY

Improve multimodal access to Clear Creek with additional enhancements to signage and wayfinding along Clear Creek.



Dr. Fred and Fay D. Huey Nature Center
Source: League City Nature

Objective 2.1: Work with neighboring municipalities to plan for intra-city pedestrian, bicycle, trail, and paddle trail connections.

Trails are an important quality of life feature for people and contribute to healthy, livable communities. Trails provide numerous benefits, not just for recreation and health, but also for environmental preservation, transportation and connectivity, and economic growth. The development of trail infrastructure that adequately serves multiple communities requires close collaboration and planning between neighboring municipalities to ensure a sense of cohesion and connectivity along the trail. When coordination does not occur, project development and implementation can often be disjointed and not adequately serve and address the needs of the community. Providing connections to neighboring communities such as Webster, Nassau Bay, Kemah, and Friendswood will help promote active living and alternative modes of transportation to connect trail users to area destinations – such as parks, schools, and retail – by bicycle, foot, or boat.

During the planning process for additional trails, planning departments from neighboring cities should consider on-going trail projects and initiatives in the area and determine feasibility of additional connections to existing and proposed alignments. Neighboring municipalities should aim to create a continuous trail system that provides opportunities for members of all communities to access and enjoy. To enhance user experience along these trails, League City and neighboring municipalities should aim to incorporate wayfinding and educational signage to provide public awareness of the larger trail system and include distance information, including major destinations as well as educational and historical information about the area. New signage should follow design standards established in the 2017 Parks, Trails, and Open Space Master Plan and the new 2023-2024 Master Plan update.

STRATEGY 2.1.1: WORK WITH NEIGHBORING MUNICIPALITIES TO PLAN FOR FUTURE PEDESTRIAN AND BICYCLE CONNECTIONS TO CLEAR CREEK.

Several inter-municipality trail alignments are proposed on Map 3.2, *Opportunities*, on page 26, along utility easements, drainage corridors, and roadways. Of significant note, a major north-south Center Point easement connects Downtown Webster, Downtown League City and Downtown Dickinson. A number of trails provide opportunities to connect to the regional tourist attractions such as Kemah and Bay View, east of League City, could be constructed as sidepaths along Marina Bay Drive and U.S. 96, or trails along existing drainage corridors. Further trail alignments outside of the Clear Creek study area could be constructed to

connect regional bayous such as Dickinson Bayou, Cow Bayou, and Chigger Creek to Clear Creek. Additionally, League City should continually assess the potential to connect trails further up stream along Clear Creek in coordination with Pearland and Friendswood.



Sims Bayou Trail connects multiple community regions in Houston
Source: Houston Parks Board

Objective 2.2: Continue to provide connectivity from major thoroughfares to Clear Creek and between parks along Clear Creek.

Following recommendations from the 2017 Parks, Trails, and Open Space Master Plan, League City should aim to expand access to major destinations, including parks, civic buildings, retail, and residential areas through the development of multi-use trails along major thoroughfares. As shown in Map 3.2, *Opportunities*, on page 26, there are opportunities to expand existing trail facilities throughout League City to improve access to Clear Creek. Proposed trails along major thoroughfares include FM 270, SH 3, Main Street, and Grissom Road. Additional opportunities for trails exist along utility easements and drainage channels connecting residential neighborhoods to Clear Creek.

STRATEGY 2.2.1: CONTINUE TO DEVELOP A CITY-WIDE MULTI-USE TRAIL SYSTEM TO PROVIDE ENHANCED CONNECTIVITY BETWEEN CLEAR CREEK AND KEY DESTINATIONS.

The 2017 Parks, Trails, and Open Space Master Plan proposes a number of trail alignments connecting to Clear Creek that are also depicted on Map 3.2, *Opportunities*, on page 26. These include connections to Lynn Gripon Park from Main Street and the Autumn Lakes Subdivision and connections to Challenger Seven Memorial Park by way of Grissom Road. Additional trail connections to Myrtle Park can be facilitated by way of drainage channel easements south of West Main Street near The Landing subdivision. Opportunities to increase connections to Walter Hall Park exist along SH 3, the CenterPoint easement, and the dead end of League Street. A trail connection to Clear Creek Nature Center and existing boat ramps at FM 270 are possible by way of FM 270 and the drainage channel south of the Nature Center. Lastly,

additional short connections should be considered connecting dead-end streets or cul-de-sacs in subdivisions to existing parkland. Examples depicted on the Opportunities map include connecting Lynn Gripon Park to Sweetgum Drive, connecting Walter Hall Park to League Street and Perkins Avenue, and connecting Clear Creek Nature Center to Alabama Avenue / East Downtown.



STRATEGY 2.2.2: CONTINUE TO DEVELOP TRAIL AND SIDEWALK CONNECTIONS BETWEEN PARKS TO FURTHER PROVIDE CONNECTIONS FROM NEARBY NEIGHBORHOODS TO CLEAR CREEK AND OTHER DESTINATIONS.

A successful trail system typically has continuous stretches of trails connecting points of interest and existing parks which helps to increase the overall number of trail users. As discovered in the Existing Conditions analysis of this Master Plan, the existing trails along Clear Creek lack interconnectivity, mainly due to existing development abutting Clear Creek and major transportation corridors. A straight continuous trail connection from Lynn Gripon Park to Clear Lake along Clear Creek is not possible, although there are still opportunities to connect parks along Clear Creek. Lynn Gripon Park can connect to Challenger Seven Memorial Park by way of a sidepath along Grissom Road. The Marina Bend development along North Wesley Drive and Devereux Advanced Behavior Health Facility can connect to Walter Hall Park. Clear Creek Nature Center can connect to Heritage Park and the Kilgore Tract by way of existing trails and the proposed Heritage Trail.



GOAL 3: PRESERVATION

Utilize existing natural resources to enhance the biodiversity and viability of the ecosystem of Clear Creek for future generations to enjoy.



Factors which risk the preservation of Clear Creek include, but are not limited to:

- » Increased chemical run off effecting water quality
- » Loss in biodiversity of aquatic and terrestrial fauna
- » Loss of tree canopy causing decreased bird populations
- » Loss of soil nutrients and water retention leading to erosion
- » Invasive or introduced species outcompeting native or more productive flora
- » Damage to shorelines and habitats due to flooding and storm events
- » Human activities such as polluting, vegetation trampling, and illegal dumping
- » Upstream tributary dredging and waterway impairment

WHAT IS PRESERVATION?

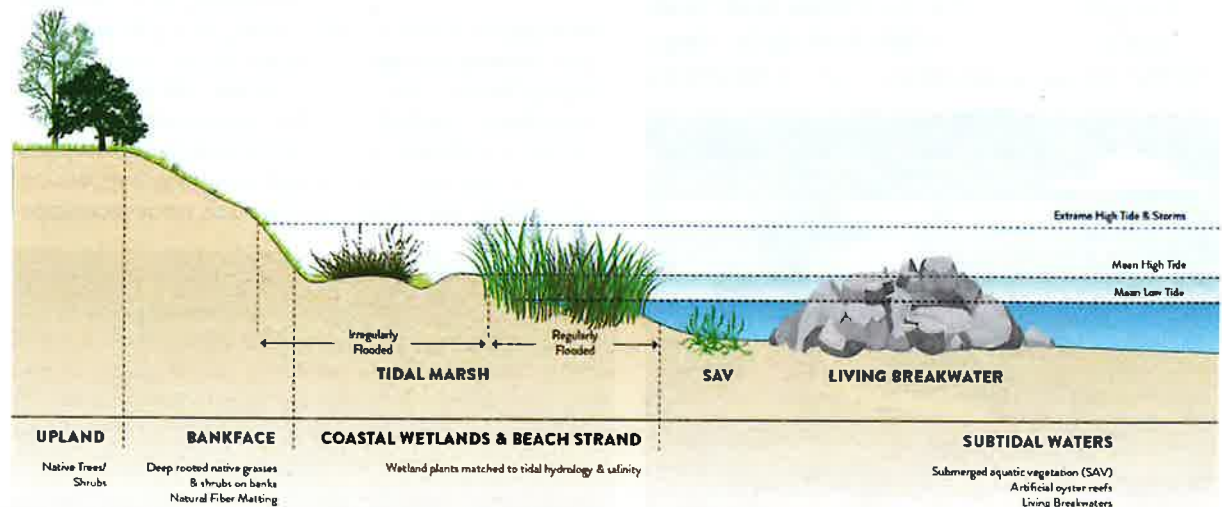
The goal of preservation is based around the protection of natural resources along Clear Creek against harmful effects caused by human activity and disaster-based damage. Throughout the public engagement process, residents expressed their desire for Clear Creek to remain a natural area retaining the existing tree canopy, wetlands, and biodiversity. They wish to see the continued health and improvement of existing ecosystems along the creek. As such, it should be an important goal of League City to preserve existing habitats and at-risk areas.



LOCAL PRESERVATION

A large number of organizations in the Houston region are specifically dedicated to preservation and restoration initiatives. Entities such as Houston-Galveston Area Council (H-GAC), Galveston Bay Foundation, Clear Creek Environmental Foundation, and local "Friends Of" groups all partake and assist municipalities in the planning, implementation, and benchmarking of preservation projects and studies. League City should utilize preservation as a means to grow interlocal coordination and eco-tourism in League City. It is also important to note that preservation areas throughout the Houston region, such as the Brazoria National Wildlife Refuge, Brazos River Park, Armand Bayou Nature Center, and Dwight D. Eisenhower Park, are magnets for ecotourists and "day-trippers,"

Moving forward, preservation partnerships and initiatives should be established as a means of retaining and growing the benefits of League City's ecological assets.



The above diagram depicts a healthy coastal ecosystem after a living breakwater, often made of oyster shell, is added to reduce erosion.
Source: Texas General Land Office

Objective 3.1: Establish initiatives focused on tree canopy, ecosystem restoration, and wetland preservation and replanting.

The EPA defines Protection and Maintenance as “the removal of a threat to, or preventing decline of, wetland conditions by an action in or near a wetland. This includes purchase of land or easement, repairing water control structures or fences, or structural protection such as repairing a barrier island. This term also includes activities commonly associated with the term preservation.” As depicted on Map 3.2, *Opportunities*, on page 26, two types of preservation/protection zones are proposed along Clear Creek. Preservation or Protection Zones are areas which League City should actively work to preserve and improve as a natural area, ensuring the long-term health of ecological functions. These areas will help preserve habitats and help protect adjacent housing from flooding events.

The first zone, a **Tree Canopy Preservation Zone**, is an area identified as embodying a substantial tree canopy along or near Clear Creek which serves as an ecological buffer to development or is a lone-standing section of forest in an area which has been clear-cut or developed over time.

The second zone, a **Wetlands Protection Zone**, is an area identified as having a substantial large size of wetlands habitats (as identified by TPWD and the U.S. Fish and Wildlife Service), should be regularly monitored for healthy ecological functions, and is backed by either formal or informal municipal practices or legislation.

Tree Canopy Preservation Zones and Wetland Protection Zones are identified utilizing the following Selection Criteria:

- » Extensive uninterrupted vegetation
- » Hosts significant wetland grasses and/or tree canopy
- » Buffers between Clear Creek and developed lands
- » Low lying areas not suitable for any development or construction
- » Potential to provide nature-based scenic views and experiences

Benefits of Protecting and Restoring Wetlands and Riparian Habitats:

- | | |
|---|---|
| » Natural flood mitigation | » Pollution and run-off control |
| » Stormwater management | » Protects critical breeding and feeding habitats for fish, birds, and amphibians |
| » Increased aquatic and terrestrial biodiversity | » Eco-tourism benefits within urban regions |
| » Improved water quality and protection of municipal water supplies | » Provides research and educational opportunities |
| » Decreased erosion and sediment build-up | |

Sources: Texas Parks and Wildlife Department, United States Environmental Protection Agency, Texas A&M

STRATEGY 3.1.1: WORK WITH PARTNER AGENCIES TO MITIGATE THE POTENTIAL NEGATIVE EFFECTS OF CONSTRUCTION AND DEVELOPMENT ALONG CLEAR CREEK.

Currently, H-GAC and Harris County Flood Control District are operating nine separate active projects in the Clear Creek watershed (Projects in Clear Creek Watershed Online Portal), some of which include the development of a retention pond near Dixie Farm Road Park, native grass research with Texas Native Seeds near the Brio Superfund Site, drainage improvements at El Lago, channelization and habitat restoration at Nelson Reservoir, and assistance with the Clear Creek Federal Flood Risk Management Project. H-GAC also is collaborating with the Federal Highway Administration to assess and address flooding risks on roadways and adjacent lands caused by the construction of or inefficient designs of state and federal roadways, especially at bridges. League City should continually assess the impact of bridges, trail construction, housing developments, dredging, and canal development on the Clear Creek ecosystem.



Keith Wiess Park Detention Basin constructed wetlands and boardwalk developed by Harris County Flood Control District
Source: Houston Chronicle

STRATEGY 3.1.2: RECONSTRUCT, ENHANCE, ADD, AND PRESERVE EXISTING WETLAND HABITATS ALONG THE BANKS OF CLEAR CREEK TO HELP MITIGATE FLOODING IMPACTS AND RETAIN ECOSYSTEM HEALTH / BIODIVERSITY

League City should continually assess the health of existing wetlands and preservation zones, as well as opportunities for establishment as a means of shoreline stabilization, establishing low impact drainage strategies, and improving the ecological health of Clear Creek.

2011: BEFORE



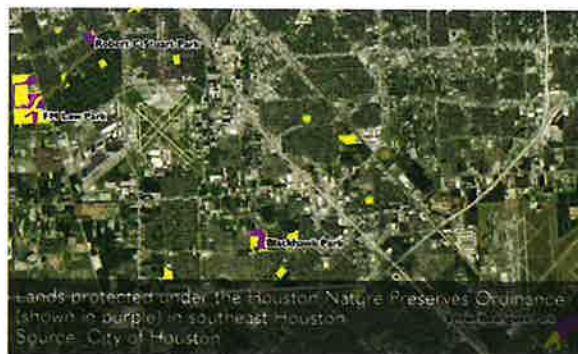
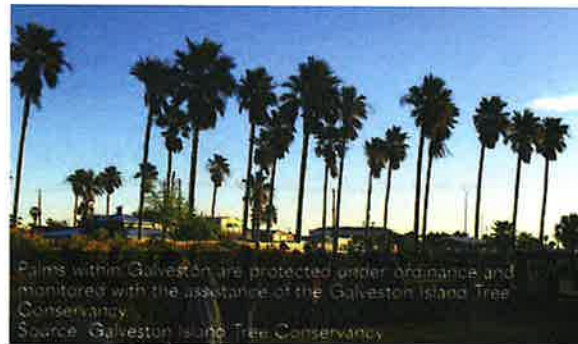
2019: AFTER



The Galveston Bay Foundation's Living Shorelines Program helps to address erosion and loss of habitat. Pictured above is a Living Shorelines project at Baronridge Park, in Taylor Lake Village, with over one-acre of riparian habitats planted and shoreline stabilization, to enhance existing shoreline barrier walls. Source: Galveston Bay Foundation

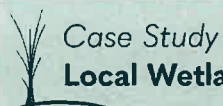
STRATEGY 3.1.3: CONSIDER NEW CITY LEGISLATION WHICH HELPS TO PROTECT EXISTING LANDSCAPES ALONG CLEAR CREEK.

Consider adding additional language to League City's Tree Ordinance (Article 7, 2018) to require developers of property adjacent to Clear Creek to preserve existing tree canopy (including the already protected species) to an appropriate threshold and / or require developers to include native trees in development plans. Some regional examples of such legislative actions include the City of Houston's Tree and Shrub Ordinance which requires the replacement of protected trees if removed and other assessments to be conducted including determining the Critical Root Zone of trees, remediation due to tree death caused by construction for up to five years, and adjusting building sub-floor designs to reduce root effect.



The City of Galveston requires developers, under Ordinance Number 20-015, to maintain and protect trees, leave trees above a certain diameter untouched, and includes punishments for the decline in health of significant trees. Lastly, Houston also passed in 2022 a Nature Preserves Ordinance (Number 2022-812), which aims to protect 7,423 acres of natural land from development for the purposes of passive recreation and flood mitigation. The ordinance will protect identified existing tree canopy zones and wetlands zones in Houston parks from further development of active facilities, such as ballfields, and will require if facility development occurs that it is passive (trails and boardwalks) and will not adversely affect the existing ecology.

League City should also consider a required public-access buffer zone or easement for all new residential and commercial developments along Clear Creek. This will protect existing shoreline vegetation and continue to provide natural landscapes for new and existing residents.



Case Study

Local Wetland and Riparian Restoration & Establishment

Due to the coastal low-lying location of the Houston and Galveston region and a large amount of development over the past century, there are an abundance of wetland habitat restoration and coastal replanting sites surrounding Galveston Bay. Environmental advocacy groups and municipalities have begun to establish planting and monitoring projects to address an increase in flood events, an increase in storm severity, and a decline in coastal habitat ecosystems. These include replanting and establishment of native riparian habitats, oyster and mussel establishments, migratory and native bird monitoring, water quality assessments, water impairment studies, and sediment removal projects. Below are a number of regional examples of such restoration projects:

Baytown Nature Center

Located along the Galveston Bay near San Jacinto Monument the Baytown Nature Center was originally a large wetland estuary habitat. The area was then developed and dredged for the Brownwood housing development in the 1950s, but by the 1980s, major flooding caused by Hurricane Alicia and aquifer subsidence forced the destruction and removal of the houses. Today the land is home to the Baytown Nature Conservancy and a city public access park focused on wetland remediation and environmental reestablishment. The Nature Center has already been home to saltmarsh grasses reestablishment, debris and pavement removal, and a number of coastal shoreline stabilization projects. In the future, there will be several new walking trails, wetland forest replanting, and continued studies on the effects of and interaction between oil drilling/refining near adjacent wetland habitats.

Dickinson Bayou Marsh Restoration

From 2013-2016 the Texas General Land Office Coastal Management Program and TPWD funded a \$194,000 project to restore 10 acres and protect 17 acres of marshland at the mouth of the Dickinson Bayou. Prior to the restoration about nine feet of marshland was lost to water inundation every year. The project aimed to establish a 10-acre coastal marsh in areas once above water as a means to protect existing marshland. The USDA Natural Resource Conservation Service harvested seed from existing smooth cordgrass on site to grow new grass shoots to be replanted in the marsh. This project also included the dredging of the bayou's mouth, which caused over four-feet of sediment build up, to then be placed along historic coastal locations and utilized as the soil base for replanting.



Baytown Nature Center
Source: Baytown Nature Center



Tree and grass buffer planted at Meyer Park in 2007
Source: Harris County Flood Control District

Houston Tree Planting Program

The Houston Tree Planting Program is an initiative by H-GAC, Harris County Flood Control District, Trees for Houston, and the Houston Parks Department (HPD) to establish vegetative buffers of riparian plantings and trees in Houston parks adjacent to bayous and water bodies. The goal is to increase overall ecological services provided by parks through mitigating flooding events, providing habitat, and creating a more attractive parks landscape. HPD began the initiative back in 2007 with replanting native trees and grasses within a 200-foot buffer along Cypress Creek at Meyer Park. In 2018, after a hurricane event which damaged a large amount of vegetation, the initiative replanted trees to reforest Milby Park. Other notable completed projects areas include the Houston Arboretum, Herman Brown Park, Blackhawk Park, Sylvan Rodriguez Park, and Marron Park. HPD's end goal is to develop 200-foot vegetative buffers at all parks along bayous. Other services taken in tandem with replanting includes invasives removal, tree health monitoring, and brush clearing. Notably at Hamal Park, HPD utilized goats as a means to clear overgrown invasives and brush. HPD typically plants trees in rows at about a 30-foot distance between to provide for easier monitoring and maintenance. The location and types of riparian buffers and plantings are decided on after a survey of the soils and floodplains. HPD offers guiding documents for entities wanting to partake in a similar program; documents include a Houston Native Tree Plantings List, fish biological surveys, regional sedimentation surveys, and tree health identification documents.

Sources: National Oceanic and Atmospheric Administration (Texas Restoration Projects Transport Concrete Marsh / Undoing Bayous: Pesticide Laden History), Texas General Land Office (Coastal Grants / Dickinson Bayou Wetland Restoration), Edge Effects (Baytown Nature Center), Student Conservation Association (Replanting the Flood Zone in Houston)

Objective 3.2: Consider the addition of innovative natural landscapes, materials, and construction methods into park spaces.

Finding innovative ways to protect or create wildlife habitats in urbanized areas is critical to both environmental and human health. The addition of native plantings and grasses bring multiple benefits to insects, birds, and other native wildlife, as well as the environment. Native grasses have fibrous roots which are great for holding soil in place in areas that are prone to erosion, helping to build organic matter in the soil and increase water infiltration. Once established, native plantings are mostly self-sufficient, oftentimes reducing maintenance costs for parks departments.

To help mitigate the effects of flooding in parks and greenspaces, League City should implement low impact development (LID) practices and systems. LID refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration, or use of stormwater to protect water quality and associated aquatic habitat. At both the site and regional scale, LID and green infrastructure practices aim to preserve, restore, and create green space using soils, vegetation, and rainwater harvesting techniques. Examples of LID include rain gardens, vegetated rooftops, rain barrels, and permeable pavement types which can be utilized alongside concrete trails to reduce overall impacts of hardscape construction. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. When applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions.

Innovative construction methods can be utilized to help mitigate environmental harm during the surveying and construction of park facilities. These can include utilizing a jersey buggy (see image on page 45) to eliminate grass buffers on either side of a constructed trail, constructing boardwalks using boats or floating stations, and utilizing GPS devices during site surveying to ensure accuracy and the ability to model varying site impacts.

To promote and improve the hydrological and ecological functions near Clear Creek, League City should look to implement native plantings identified in Chapter 1, *Introduction*, as well as develop strategies to include LID and green infrastructure practices and strategies along Clear Creek.

STRATEGY 3.2.1: CONSIDER ADDING WILDFLOWER AND TALLGRASS ZONES IN PARKS ALONG CLEAR CREEK TO REDUCE MOWING AND MAINTENANCE COSTS FOR UNPROGRAMMED PASSIVE NATURAL AREAS.

Developing no-mow zones or tallgrass zones within municipal parks has become a popular trend in parks development, especially in more passive nature-based parks. Traditionally municipal parkland has a majority of its ground cover as shortgrass that is mowed regularly, at an expense to the municipality. League City should seek to establish dedicated zones where mowing does not occur, allowing for grasses and wildflowers to grow in place. This will reduce the amount of acreage needed to be maintained and cut, thus reducing overall operating costs. These tallgrass or wildflower zones can be used to direct park visitors away from undesired locations, used as visual barriers, or utilized as separate park amenities with narrow dirt walking paths and seating areas.





Study

Mitigating Impacts in Parks

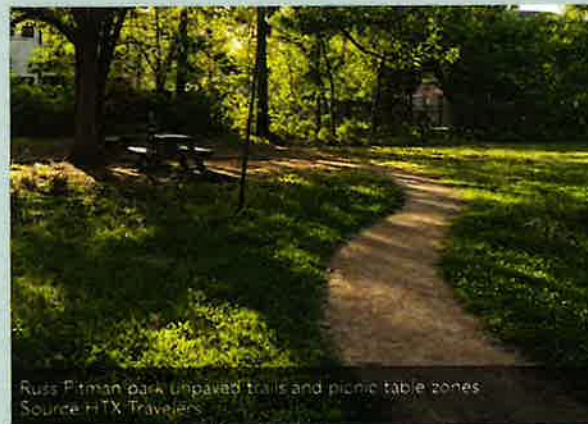
Throughout the public engagement process for the Clear Creek Master Plan, the top two project priorities heard from League City residents included, 1) conservation and preservation of natural areas, and 2) to provide more opportunities to experience nature along Clear Creek. At first these two priorities may seem at odds with each other. One may ask themselves, how can land be activated park facilities while also retaining the wildlife, ecosystems, and natural areas. The key is finding a balance between activation and preservation within the design choices made. Several design elements and features are commonly utilized help mitigate and minimize the effects parkland activation can have on the existing natural environment. Such structures include the boardwalks and overlooks in place at Challenger Seven Memorial Park.

Boardwalks are a popular way to provide pedestrian access to wetland and riparian habitats while preserving the overall integrity of the ecosystem. Boardwalks are elevated wooden, recycled plastic, or pre-cast concrete walkways, which are grounded by post beams, and provide up close interaction and views of habitats. Boardwalks are best suited for low lying areas with wetland and riparian habitats in which the soil is softer, and the construction of concrete trails may adversely affect the ecosystem. Boardwalks also help to maintain overall drainage patterns and coastal estuaries.

A guiding document on constructing boardwalks, develop by the Association of State Wetland Managers, Inc. (ASWM) and the International Institute for Wetland Science and Public Policies, provides overall best practices and considerations when constructing boardwalks.



Deer Creek Greenway, in Saint Louis, utilizes precast concrete boardwalks and concrete trails.
Source: Great Rivers Greenway



Russ Pitman park unpaved trails and picnic table zones
Source: HTX Travelers



Boardwalk at Katy Prairie Preserve near Waller County, Texas
Source: Houston Chronicle

The ASWM document notes a number of factors to be considered which include:

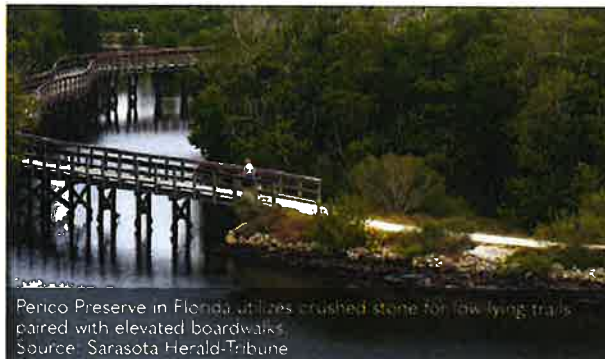
- » Depth of water and sediment
- » Vegetation along the route
- » Connections to existing trails and park facilities
- » Sun coverage beneath boardwalks
- » Soil composition

Another method of mitigating the impacts of activated parkland is to reduce the amount of soil disruption with gravel, decomposed granite, or crushed shell trails. Decomposed granite trails are cheaper than concrete trails to construct, do not include subgrade materials which may be harmful or infeasible in low lying areas, and are best suited for more passive users such as hikers and walkers. Robert C. Stuart Park and Russ Pitman Park in Houston, along the Sims Bayou, has implemented a number of crushed rock trails and boardwalks which provide users with a more primitive and natural outdoor experience. Another regional example is the Texas City Prairie Preserve located along Moses Lake and SH 146. Stuart Park features a number of boardwalks, unpaved trails, and marshland flora and fauna. The park is protected by The Nature Conservancy and Galveston Bay Foundation and has been home to wetland replantings, grassland reestablishment, sea turtle and other nursery activities, debris removal, and research activities. Lastly, the park features prairie trails, similar to what is proposed in the Kilgore Davis Park concept, on page 32, with three to four-foot-wide dirt paths through tallgrasses and wildflowers, reducing the chances of vegetation trampling by park visitors.

Sources: U.S. Federal Highway Administration (Recreational Trails Program / Wetland Trail Design and Construction), American Trails (GEQ Effect of Boardwalks on Vegetation and Wildlife), Association of State Wetland Managers (Constructing Wetland Boardwalks and Trails)

STRATEGY 3.2.2: CONTINUE TO PURSUE OPPORTUNITIES FOR ALTERNATIVE PAVING TRAIL TYPES.

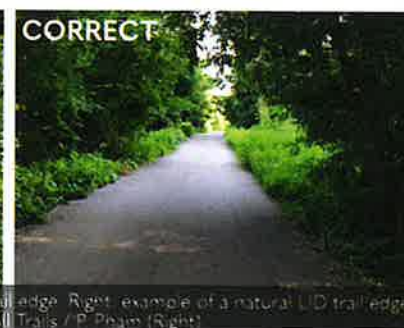
Currently, a majority of trails along Clear Creek are concrete-based trails. League City should seek to develop alternative trail types, without limiting overall mobility, by implementing a diversity of trail pavement types. As previously mentioned, specific pavements are not well suited for specific ecosystems, such as concrete trails in wetland areas. The use of elevated wooden boardwalks, pre-cast boardwalks, decomposed granite, and elevated bridges are alternatives to the traditional concrete trail. Dirt paths, wood fiber, decomposed granite, crushed gravel, compacted stone, and crushed shell are all alternatives in areas where soils may be softer, a large amount of existing vegetation exists, the trails are narrower than five feet, or where there is an expected low number of trail users. Crushed shell, often made of crushed oyster shells, is preferred over decomposed granite in areas with large volumes of run off and sheet flow occurs. Crushed shells small form generally consists of flat pieces of shell which helps stabilize the sub-grade soils during flooding or heavy rain events preventing material movement, wash-out, and the need to top-dress the trail. Trail designs and the choice of materials should aim at reducing overall construction costs, maintenance costs, and environmental impact through assessing existing site conditions and contexts.



STRATEGY 3.2.3: CONSIDER INNOVATIVE CONSTRUCTION AND IMPLEMENTATION METHODS TO LIMIT ENVIRONMENTAL IMPACT.

During trail construction, often trail paths are cleared at a wider width than what the final trail width will be, resulting in grass strips on either side of trails. These grass strips are land which once was covered by canopy trees and often see non-native vegetative overgrowth after trail construction, which can negatively impact the visitor's experience and sightlines. Utilizing Hydro-X and jersey buggy technologies can ensure that the cleared path for trails, especially in tree canopy heavy areas, only be as wide at the trail's intended width. This helps preserve tree canopy over the trail, preserve directly adjacent vegetation, and overtime reduce maintenance costs. Although, in certain high traveled areas the grass buffer may reduce concerns over user safety and nighttime visibility.

League City should also consider a phased approach to implementing trails. Wood fiber (mulch) paths can be developed first in place of concrete trails or boardwalks to further assess the overall needed capacity of each alignment. This can help League City better allocate funds towards higher use trail alignments and identify problem areas with future trails which may need rerouting. This is also a cost-effective way to provide some amount of additional trail and recreational capacity without a large upfront cost.



Objective 3.3: Continue to develop partnerships and work with local entities to help in the planning, maintenance, preservation, and advocacy of parkland, paddle trails, and natural areas along Clear Creek.

Creating partnerships between local environmental advocacy and conservation groups is crucial to the quality and longevity of Clear Creek. Organizations such as the Galveston Bay Foundation and Back the Bay aim to improve the environmental quality of the Galveston Bay by increasing awareness about the Bay's value among the public. To help mitigate the erosion of shorelines within the Galveston Bay Estuary, the Galveston Bay Foundation installs "living shorelines" to provide erosion control benefits while enhancing the natural habitat. These projects include strategically placed natural materials such as plants, rocks, or oyster shells to reduce wave energy and erosion while supporting plant growth, marsh creation, and improving water quality. Back the Bay is an advocacy group focused on conserving the natural resources of the Galveston Bay and aims to educate citizens in the Houston-Galveston region on improving water quality, conserving water, and protecting critical fish and wildlife habitats. Back the Bay partners with local, state, and national organizations such as the Galveston Bay Foundation, H-GAC, and EPA to participate in public outreach and conservation events across the Houston-Galveston region. Partnering with these organizations can help League City organize creek cleanup events, determine areas for vegetative rehabilitation, coordination, and education and outreach efforts.

Community advocacy groups, also referred to as "Friends Groups," are mission-driven, volunteer-led, non-profit groups that support parks and natural areas through volunteering, fundraising, and public education. Friends Groups provide community members and stakeholders a chance to raise awareness of and advocate for community and environmental needs during city planning and development processes. Friends Groups regularly hold events such as trash clean-ups and vegetation restoration and may aid parks and recreation departments by volunteering to perform basic maintenance and improvements to parkland areas. When recognized as a 501(c)(3) organization, Friends Groups are eligible for public and private grants from agencies such as TPWD and NRPA to help fund improvement and maintenance costs. A Friends of Clear Creek organization may partner with existing organizations such as the Clear Creek Environmental Foundation, Galveston Bay Foundation, or the Galveston Bay Estuary Program to host regularly scheduled events centered around stewardship and preservation of parkland and natural areas along Clear Creek and participate in the planning process for future improvements to the creek.

STRATEGY 3.3.1: WORK WITH ENTITIES TO ASSESS AND ENACT OPPORTUNITIES FOR WETLANDS AND RIPARIAN HABITAT REESTABLISHMENT AND DEVELOP AN INVASIVE SPECIES REMOVAL AND PREVENTION PROGRAM.

As previously mentioned, many regional advocacy and leadership groups are currently working to protect and reestablish critical coastal habitats in the Houston region. The Galveston Bay Foundation is one such entity which employs volunteers and researchers in several programs. Some programs provided include oyster and mussel reestablishment, sea grass propagation, a number of natural resource workshops, beach and wetland clean-up events, Bike Around the Bay event, testing with their Water Monitoring Team, and Living Shorelines Riparian and Coastal Prairie Restoration and Establishment Programs.



Clear Creek Environmental Foundation clean up on loading at the Clear Creek boat ramp at Highway 270 in League City
Source: Clear Creek Environmental Foundation Facebook

The Bayou Preservation Association (BPA) is a group that works to protect the ecological functions of bayous and waterways in the Houston region. The BPA has completed work on 22 waterways, including Dickinson Bayou and Clear Creek. With BPA's scientific approach, they have developed reports on bacterial growth in Dickinson Bayou and Gum Bayou. They have completed a 2022 Habitat Restoration Project Report for Challenger Seven Memorial Park, which includes the removal of invasive species, clearing debris, and wetland grasses replanting. Their work has reduced the number of invasives at Challenger Seven to less than five percent and has observed the resurgence of native species populations due to the replanting of Milkweed, Ironweed, Downy Lobelia, and Passionflower.

Programs offered by regional protection and restoration entities can help in the protection of Wetland Protection Zones, conduct research and mitigation efforts at Tree Canopy Preservation Zones, and work to reestablish riparian habitats and prairie zones on public lands and parks along Clear Creek.



Discovery Green Conservancy and the Citizens Environmental Coalition host the annual Earth Day event at Discovery Green in Houston with other regional organizations to promote green infrastructure and the environment with a number of youth educational opportunities.
Source: Discovery Green



Study Buffalo Bayou Partnership

Established in 1986, the Buffalo Bayou Partnership (BBP) is a non-profit organization that focuses on redevelopment and stewardship of the 10-mile stretch of Buffalo Bayou through Downtown Houston. BBP works to improve Buffalo Bayou through the protection of parks and greenspace, construction of hike and bike trails, and operating comprehensive clean-up and maintenance programs for parks and trails along the bayou. BBP receives funding from Tax Increment Reinvestment Zones (TIRZs) and the Houston Parks Board to help maintain hike and bike trails and greenspaces along the bayou from Sabine to Fannin Streets and relies on many volunteers and community service workers each year to remove weeds and invasive species, plant wildflowers, pick up trash and remove silt from the trails after heavy rains.



Buffalo Bayou Trail often connects to adjacent streets, focusing on connections to other parks and destinations.
Source: Half



The BBP's new vacuum clean-up boat is aimed at cleaning up bayou shorelines and large debris identification.
Source: Community Impact

STRATEGY 3.3.2: CONSIDER PARTNERSHIPS WITH CLEAR SPRINGS HIGH SCHOOL, BAY AREA CHRISTIAN SCHOOL, AND/OR CLEAR CREEK COMMUNITY CHURCH TO ESTABLISH PARKLAND FOR THE BENEFIT OF THE LANDOWNERS AND THE PUBLIC.

Similar to the Spark Park program (where local, federal, and school funds are grouped to develop a publicly available park at or adjacent to school property), League City should seek partnership opportunities with landowners near or adjacent to Clear Creek to meet the goals of this Master Plan and implement trail alignments, boardwalks, and Protection Zones proposed on Map 3.2, *Opportunities Map*, on page 26. Creating trails, boardwalks, and additional access points provides an opportunity for students to learn about environmental conservation as well as facilitate alternative modes of transportation to and from school. The pooling of funding, resources, and community members can mean that parkland can be established faster, maintained easier, provide more parkland opportunity sites, and provide a wider benefit to the community and partners.



Discovery Hill Outdoor Learning Center installed by TPWD as a joint partnership with Austin ISD to establish a public educational outdoor facility for youth.
Source: Public New Service, NFW



Study

Preservation and Restoration Site Actions

Below is a summary of the steps an entity should take in establishing preservation or restoration programs.

1. Identify the site.

- » The first step is to acquire or identify the site in question where restoration and preservation efforts may take place.

2. Identify the desired outcomes.

- » The next step is to identify the desired outcome of the preservation and conservation efforts. The focus may be on several ecological goals. These can include:
 - » Replanting riparian habitats and tree canopy
 - » Reestablishment of riparian habitats and tree canopy
 - » Improved hydrological systems
 - » Improved soil health and hazard dilution
 - » Protecting existing habitats for previously known birds and other fauna on site
 - » Provide effective flood buffers between developed land and waterways
 - » Provide ecological education and nature-based experiences

3. Contact potential partners.

- » The next step is to contact potential partners and agencies which are involved in restoration and preservation. Often, city and county entities have limited capacities or knowledge to carry out large-scale ecological efforts on sites. The Houston area and Texas have many partnering agencies, noted in Objective 3.3, which specialize in site inventorying, site assessment, native planting knowledge, and the associated funding and staff.

4. Conduct a site assessment.

- » Several site assessments are typically conducted on a site in tandem. Site assessments ensure that the actions taken on site result in the best outcome possible. Common ecological site assessments include:
 - » Soil sampling and coring to identify existing soil compositions and potential for harmful chemicals or minerals.
 - » Erosion and sediment assessments along stream banks to identify the location and amounts of sediment deposition, including the specific causes of the erosion zones.
 - » A topographical and hydrological assessment, including the impact of man-made canals, to mitigate potentially biologically harmful, undesired, or inefficient hydrological flows
 - » A detailed wetlands assessment to identify the exact locations of wetlands and their ecological value to the site, as state-wide assessments and data may not be up to date, provide enough detail, or factor in recent developmental impacts of adjacent properties.
 - » Planting health assessment to develop an idea of the overall ecological health of the site. A planting health assessment is often conducted by choosing specific points to assess plantings within a 30-foot radius, to gain an overall idea of the site's plant health



Biodiversity Assessment in a coastal wetland
Source: College of Charleston

- » Planting inventory assessment to identify the composition and location of existing plantings on site including understory growth and invasive species.

5. Develop Goals based on existing conditions.

- » Based on the findings from the site assessment a series of goals should be developed to help guide and benchmark the actions to be taken on site.

6. Establish a Plan.

- » The next step is to establish specific actions to implement to help meet the developed goals. A work-plan should be developed, and funding should be identified for the efforts on site. Identify appropriate funding sources to address the issues found in the existing conditions site assessment.

7. Restore, Replace, and Preserve.

- » Conduct the replanting, restoration, soil redistribution, and other efforts needed on site.

8. Benchmarking and Assessment.

- » Develop methods of future benchmarking and site assessment, to be conducted on an annual basis, to ensure the longevity of and impact of the site's preservation and restoration efforts. Develop plans with the partnering agency to conduct future assessments and actions.



Texas Coastal Watershed Program educating students
Source: Texas Community Watershed Partners

Information above is provided by the Texas Nature Conservancy, U.S. Department of Agriculture, City of Houston Parks and Recreation Department, and the City of Houston Mayor's Office of Resilience and Sustainability



IMPLEMENTATION

Chapter 4, *Implementation*, establishes a basic framework to implement strategies presented in Chapter 3, *Recommendations*.

IMPLEMENTATION TABLE

This section outlines objectives and strategies presented in Chapter 3, *Recommendations*, and identifies local, regional, or state agencies that could serve as a project champion or provide a funding match for grant opportunities for the implementation of projects and policies. The proposed programs and strategies were assigned priority scores to determine the level of benefit and resources required, such as dedication of staff or funding, for implementation. Rather than putting strategies in short-, medium-, and long-term time frames, initiatives were identified as one-time actions or on-going. One-time actions are related to policies or ordinances that should be enacted to help facilitate the implementation of future projects, while on-going efforts are those that can be done at specific time intervals throughout the implementation process.

COST ESTIMATES

This section includes a conceptual level of opinion of probable costs for proposed facilities and special park area concepts to promote and enhance active and passive recreation options along Clear Creek. The costs outlined on the following pages were developed using TxDOT bid tabs and project references and should only be used to assess the feasibility and budget for improvements and new infrastructure construction. Costs may be subject to additional design development, field verification, and construction documentation and specifications.

ACTION LEADERS AND PARTNERSHIPS

League City's role in the implementation of this Master Plan will be to increase its commitment of financial and human resources to the recreational growth and development of Clear Creek to effectively manage and maintain programs and amenities proposed for moving forward.

Much of this Master Plan's proposed trail connections and projects will be located within public road rights-of-way or on publicly-owned land. Successful Plan implementation will require close coordination with federal and state entities such as the U.S. Army Corps of Engineers and TxDOT. Other partnerships may include champions outside of local government such as the Galveston Bay Foundation, H-GAC, Bayou Preservation Association, or Clear Creek Environmental Foundation.

PRIORITIZATION CRITERIA

Consistent with the Plan goals and objectives presented in Chapter 3, *Recommendations*, this section establishes the criteria in which the proposed projects were ranked or prioritized for development. A series of criteria was created to assign prioritization to the list of proposed projects.

Prioritization criteria for proposed projects along Clear Creek includes:

- » Direct connection or extension to existing trails
- » Connection to existing public parkland
- » Connection to major destinations such as schools, Downtown, and retail centers
- » Provision of pedestrian and bicycle connectivity where it does not currently exist
- » Land acquisition or joint partnerships
- » Cost of implementation

Based on the aforementioned criteria, three timeframes for implementation are presented. As consistent with the 2023 Parks Master Plan update implementation time frames of short-, medium-, and long-term will assist League City in identifying priority projects and benchmarking achievements.

Prioritization timeframes for proposed projects along Clear Creek includes:

SHORT-TERM 1-5 Years

Actions or projects which may require minimal capital investment, are adjacent to or aid in the development of existing efforts or projects, and / or provide an immediate impact on the entire Clear Creek system.

MEDIUM-TERM 5-10 Years

Actions or projects which may require moderate capital investment and planning, require a level of partnerships or community engagement, and / or requires additional infrastructure before development.

LONG-TERM 10-15 Years

Actions or projects which require a large capital investment and large effort of planning, require substantial grant funding, assistance, assessment, or collaboration, and / or minimally connects to or enhances existing infrastructure.



Housing along Clear Creek
Source: Hall

Table 3, Strategies and Recommendations

Action Leaders:

BP Bayou Preservation Association

CC Clear Creek ISD

GB Galveston Bay Foundation

HP Harris County Precinct Two Parks Department

HF Harris County Flood Control District

HA Home-owners Associations

HG Houston-Galveston Area Council

LE League City Engineering Department

LW League City Public Works Department

NM Neighboring Municipalities

TT Texas Department of Transportation

TP Texas Parks and Wildlife Department

AC U.S. Army Corps of Engineers

GOAL 1: ACTIVATION				Timeframe	Action Leaders
OBJECTIVE 1.1: CONTINUE TO EXPAND AND IMPROVE THE CLEAR CREEK PADDLE TRAIL.					
Develop additional Paddle Trail kayak launch sites, including floating docks, and handicap accessible facilities.	X	X	X	HF, HA, HG, TP, AC	
Develop rest-stops with tie-posts and emergency signage for paddle trail users at canopy shaded covered areas along the paddle trail route		X	X	HF, HA, HG, TP, TT, AC	
Continue to seek ways to improve and maintain existing kayak launches, such as floating dock replacement, signage, and parking improvements.	X	X		HF, HA, TP	
OBJECTIVE 1.2: CONTINUE TO EXPAND AND IMPROVE TRAIL, BOARDWALKS, AND OBSERVATION LOCATIONS ALONG CLEAR CREEK TO IMPROVE USER EXPERIENCE.					
Construct trails, boardwalks, pavilions, and overlooks along Clear Creek.	X	X	X	CC, HP, HF, HA, LE, LW, NM	
OBJECTIVE 1.3: CONTINUE TO PURSUE OPPORTUNITIES FOR PARKLAND ESTABLISHMENT ALONG CLEAR CREEK.					
Continue to seek land acquisitions and buy-outs of parcels along Clear Creek designated by the federal government as Repetitive Loss Properties	X	X	X	TP, AC	
Continue to seek partnership opportunities and shared-use agreements for parkland establishment along Clear Creek.	X	X	X	CC, HP, HF, HA, NM, TT, TP	
Consider parkland establishment at Harris County Flood Control District land, Myrtle Park and the Kilgore-Davis Tract	X	X	X	HF, LE, LW, TP	
OBJECTIVE 1.4: INCORPORATE SAFETY AND EDUCATIONAL FEATURES ALONG THE CREEK CORRIDOR TO ENHANCE THE VISITOR EXPERIENCE.					
Establish educational, informative, wayfinding and historical interpretive signage along Clear Creek to help inform visitors of the wildlife, history, and natural ecological systems they will be observing	X	X		BP, GB, TP	
At kayak rest post locations and launch sites, establish a signage and wayfinding program that can be utilized for emergency purposes as well as informational signage for all users	X			BP, GB, TT, TP, AC	
Establish an oversight Board, consistent with Texas Parks and Wildlife Code Title 4 (Water Safety), to establish and enforce safety infrastructure, rules, and signage.	X			AC, TP	
Continue to incorporate safety signage, no-wake signage, and buoys along trails, kayak launch sites, and blueway routes.	X	X		BP, GB, TT, TP	
Consider additional patrol boats and police presence on the Creek		X		BP, GB, NM, TT, TP, AC	
Continue to educate, incorporate, and assess the potential for birding facilities along Clear Creek	X	X	X	BP, GB, NM, TT, TP, AC	

Table 3, Strategies and Recommendations

Action Leaders:

BP Bayou Preservation Association

CC Clear Creek ISD

GB Galveston Bay Foundation

HP Harris County Precinct Two Parks Department

HF Harris County Flood Control District

HA Home-owners Associations

HG Houston-Galveston Area Council

LE League City Engineering Department

LW League City Public Works Department

NM Neighboring Municipalities

TT Texas Department of Transportation

TP Texas Parks and Wildlife Department

AC U.S. Army Corps of Engineers

	Short	Medium	Long	
Timeframe				Action Leaders
GOAL 2: CONNECTIVITY				
OBJECTIVE 2.1: WORK WITH NEIGHBORING MUNICIPALITIES TO PLAN FOR INTRA-CITY PEDESTRIAN, BICYCLE, TRAIL, AND PADDLE TRAIL CONNECTIONS.				
Work with neighboring municipalities such as Webster, Nassau Bay, Kemah, and Friendswood to plan for future pedestrian and bicycle connections between the cities which cross or connect to Clear Creek	X	X	X	NM, HG, LE, LW, TT, TP
OBJECTIVE 2.2: CONTINUE TO PROVIDE CONNECTIVITY FROM MAJOR THOROUGHFARES TO CLEAR CREEK AND BETWEEN PARKS ALONG CLEAR CREEK.				
Continue to develop a City-wide multi-use trail system to provide bicycle and pedestrian connectivity throughout the community and to Clear Creek – particularly locations along Clear Creek that provide linkages between key destinations, such as neighborhoods, parks, and schools	X	X	X	CC, HA, LE, LW, TT, TP
Continue to develop trail and sidewalk connections between parks to further provide connections from nearby neighborhoods to Clear Creek and other destinations	X	X	X	CC, HA, HG, LE, LW
GOAL 3: PRESERVATION				
OBJECTIVE 3.1: ESTABLISH INITIATIVES FOCUSED ON TREE CANOPY, ECOSYSTEM RESTORATION, AND WETLAND PRESERVATION AND REPLANTING.				
Work with partner agencies to mitigate the potential negative effects of future dredging, bridge construction, and other developments along Clear Creek	X	X	X	BP, GB, HF, HG, LE, LW, TP
Reconstruct, enhance, add, and preserve existing wetland habitats along the banks of Clear Creek to help mitigate flooding impacts and retain ecosystem health / biodiversity	X	X	X	BP, GB, HF, HG, LE, LW, TP
Consider additional language to League City's Three Ordinance (Article 7, 2018) which would require developers of property adjacent to Clear Creek to preserve existing tree canopy (including the already protected species) to an appropriate threshold	X			LE, LW
Consider a required public-access buffer zone or easement for all new residential and commercial developments along Clear Creek	X			LE, LW
OBJECTIVE 3.2: CONSIDER THE ADDITION OF INNOVATIVE NATURAL LANDSCAPES, MATERIALS, AND CONSTRUCTION METHODS INTO PARK SPACES.				
Consider adding wildflower and tallgrass zones in parks along Clear Creek to reduce mowing and maintenance costs for unprogrammed passive natural areas	X	X	X	BP, GB, HG, LE, TP
Continue to pursue opportunities for alternative paving trail types such as decomposed granite, packed soil, boardwalks, natural dirt paths, and pre-cast concrete pavements	X	X	X	BP, GB, HG, LE, TP AC
Consider innovative construction and implementation methods to limit environmental impact	X	X	X	BP, GB, HG, LE, TP, AC
OBJECTIVE 3.3: CONTINUE TO DEVELOP PARTNERSHIPS AND WORK WITH LOCAL ENTITIES TO HELP IN THE PLANNING, MAINTENANCE, PRESERVATION, AND ADVOCACY OF PARKLAND, PADDLE TRAILS, AND NATURAL AREAS ALONG CLEAR CREEK.				
Work with entities such as the Galveston Bay Foundation, Bayou Preservation Association, and Clear Creek Foundation to assess and enact opportunities for wetlands and riparian habitat re-establishment and develop an invasive species removal and prevention program	X	X	X	BP, GA, HG, LE, LW, TP
Consider partnerships with Clear Springs High School, Bay Area Christian School, and/or Clear Creek Community Church to establish parkland for the benefit of the landowners and the public		X	X	CC, TP

PROPOSED FACILITIES PRIORITIZATION CRITERIA

The implementation of proposed facilities varies in the amount of funding, coordination, municipal leadership, and community impact. To help the City and Partners better assess which proposed recreational facilities should take priority, a series of criteria is presented. The priority criteria below helps to identify if the action is a short-term, medium-term, or long-term project. Each criteria point is assessed using a score of one or zero, while the implementation costs and acquisition requirement criteria is assessed using a -1 to 1 score. The higher the prioritization score number, the more of a priority the proposed trail is recommended to be.

Table 4, Facilities Prioritization

Project	Connects directly to or extends existing trails (1)	Connects to existing public parkland (1)	Connects to Major Destinations such as ISDs, Downtown, and Shopping Centers (1)	Provides pedestrian and bicycle connectivity where it does not already exist (1)	Requires acquisition or joint-partnerships (-1, Private property)	Cost of implementation; (1, low) (0, medium) (-1, high)	Total Score
A. Autumn Lakes	1	0	0	0	-1	1	1
B. Countryside West Connect	1	1	0	0	-1	1	2
C. Lynn Gripon 518 Connect	1	1	0	0	-1	1	2
D. Bay Area Christian School	0	0	1	0	-1	1	1
E. Clear Springs High School	1	0	1	0	1	-1	2
F. Clear Creek Shores	0	0	0	0	-1	-1	-2
G. West Nasa Road	0	0	0	0	1	1	2
H. Cedar Branch Newport Connect	1	1	0	1	1	-1	3
I. Marina Bend	0	0	1	1	-1	-1	0
J. Marina Walter Hall Connect	1	1	1	1	-1	1	4
K. CenterPoint Webster Dickinson	1	0	0	1	1	-1	2
L. Walter Hall to League Street	1	1	0	1	1	1	5
M. Walter Hall-Perkins-HW 3 Connect	1	1	0	1	1	0	4
N. Kansas-Satsuma	0	1	1	1	1	1	5
O. Clear Creek Community Church	0	0	0	0	-1	-1	-2
P. Egret Bay Boat Connect	1	0	0	1	1	0	3
Q. Egret Bay Davis Road Connect	1	0	0	1	1	0	3
R. Nature Center Main Street Connect	1	1	0	1	1	-1	3

1) All Magnitude of Costs represent the Consultant and their Sub-Consultant(s) best judgement as professionals, familiar with the construction industry and current available unit pricing; Consultant/Sub-Consultant(s) do not guarantee that proposals, bids or actual project costs will not vary from the Magnitude of Cost. Quantities are estimates only and the actual amount of work and/or materials are contingent upon final design of these facilities.

2) Unit pricing is based on average cost statewide and do not account for any site specific determinates that would effect costs of construction (i.e.- unknown subsurface conditions, etc.)

3) Construction Contingency covers but is not limited to general conditions, unclassified earthwork, etc.

4) Utility provider fees are not accounted for in this Magnitude of Cost.

5) Finalized professional design fees and real property acquisitions are not accounted for in this Magnitude of Cost.

6) Opinion of probable construction cost should include a 10% increase each year.

UNIVERSAL COSTS

Universal Costs include facilities which typically have fixed costs regardless of location and are proposed in various locations along the Clear Creek study area.

Signage

Project	Per Unit	Order of Magnitude Costs
Monument Signage	Each	\$5,000-\$10,000
Flag Mount	Each	\$2,000-\$5,000
Printed High Pressure Laminate	Each	\$1,000-\$2,500
Trail Wayfinding Post	Each	\$500-\$1,000

Pedestrian Bridge

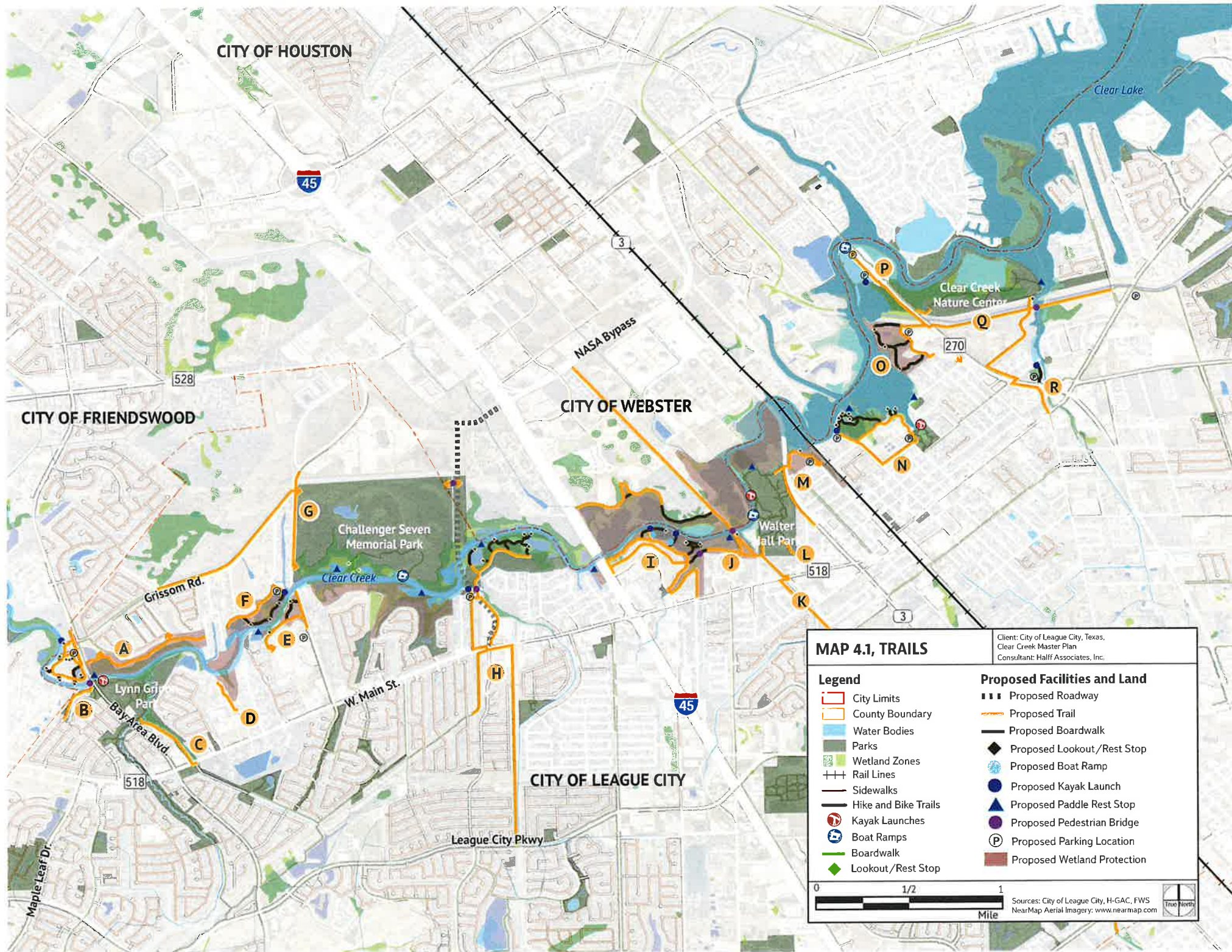
Project	Per Unit	Order of Magnitude Costs
12 ft. Wide Pedestrian Bridge (50 ft. Long) (Timber Frame, Timber Piles, Composite Deck, Timber Rail)	Each	\$100,000-\$150,000
12 ft. Wide Pedestrian Bridge (80 ft. Long) (premanufactured and provides 18 ft. clearance)	Each	\$350,000-\$500,000

Kayak Launches

Project	Per Unit	Order of Magnitude Costs
Floating Plastic Dock (20X20 ft.)	Each	\$55,000
Wooden Beamed Dock (20X20 ft.)	Each	\$100,000

Overlooks / Pavilions

Project	Per Unit	Order of Magnitude Costs
15X15 ft. Overlook	Each	\$50,000
20X20 ft. Overlook	Each	\$60,000
100X50 ft. Pavilion W/ Restrooms	Each	\$450,000



RECREATIONAL FACILITIES

Table 5, Trails (10 ft.)

Project	Distance (Feet)	Priority Score	Priority			Order of Magnitude Costs*
			Short	Medium	Long	
A. Autumn Lakes	4,667	1			X	\$373,360
B. Countryside West Connect	1,322	2		X		\$105,760
C. Lynn Gripon 518 Connect	2,298	2		X		\$183,840
D. Bay Area Christian School	880	1			X	\$70,400
E. Clear Springs High School	2,774	2			X	\$588,160
F. Clear Creek Shores	2,349	-2			X	\$962,820
G. West Nasa Road	2,979	2		X		\$238,320
H. Cedar Branch Newport Connect	9,099	3	X			\$727,920
I. Marina Bend	8,973	0		X		\$717,840
J. Marina Walter Hall Connect	2,605	4	X			\$208,400
K. CenterPoint Webster Dickinson	23,376	2			X	\$1,870,080
L. Walter Hall to League Street	579	5	X			\$46,320
M. Walter Hall-Perkins-HW 3 Connect	3,868	4	X			\$309,440
N. Kansas-Satsuma	2,106	5	X			\$168,480
O. Clear Creek Community Church	2,320	-2			X	\$1,768,160
P. Egret Bay Boat Connect	3,548	3	X			\$283,840
Q. Egret Bay Davis Road Connect	4613	3		X		\$369,040
R. Nature Center Main Street Connect	5,374	3		X		\$644,540
TOTALS	88,784 ft. / 16.8 mi.	Subtotal: \$10,041,040 20% Contingency: \$2,008,208 15% Estimated Design Fees: \$1,506,156 Grand Total: \$13,555,404				

*Costs for the above trails do not include additional signage, crosswalk markings, and other facilities beyond pavement construction

Table 6, Boardwalks (8 ft.)

Project	Distance (Feet)	Priority Score			Order of Magnitude Costs
		Short	Medium	Long	
E. Clear Springs High School	872			X	\$366,240
F. Clear Creek Shores	1,845			X	\$774,900
I. Marina Bend	3,433		X		\$1,411,700
O. Clear Creek Community Church	3,768			X	\$1,582,560
R. Nature Center Main Street Connect	511		X		\$214,620
TOTAL	10,429 ft. / 1.97 mi.	Subtotal: \$4,350,020 20% Contingency: \$870,004 15% Estimated Design Fees: \$652,503 Grand Total: \$5,872,527			

Table 7, Kayak Launches

Project	Priority Score			Status
	Short	Medium	Long	
Grissom Road at HCFC		X		Proposed
Shady Lane			X	Proposed
Myrtle at Landing Ditch		X		Proposed
Kilgore Davis	X			Planned-Funded
Marina Bend 1		X		Planned-Funded
Marina Bend 2		X		Planned-Funded
Egret Bay Boulevard	X			Planned-Funded
Lynn Gripon		X		Proposed Improvement

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6) Opinion of probable construction cost should include a 10% increase each year.

SPECIAL AREA PARK SITES

Table 8, Harris County Flood Control Park Concept

Facility Type	Order of Magnitude Costs
General**	\$634,519
Hardscape***	\$2,000,842
Hardscape Amenities****	\$268,800
Softscape*****	\$63,927
Architecture*****	\$450,000
Subtotal: \$2,269,642 20% Contingency: \$452,928 15% Estimated Design Fees: \$340,446 Grand Total: \$3,064,017	

Table 9, Myrtle Park Concept

Facility Type	Order of Magnitude Costs
General**	\$674,053
Hardscape***	\$3,202,556
Hardscape Amenities****	\$187,000
Softscape*****	\$50,982
Architecture*****	\$75,000
Subtotal: \$4,189,591 20% Contingency: \$837,918 15% Estimated Design Fees: \$628,438 Grand Total: \$5,655,947	

**General Costs include permitting, mobilization, demolition, site work, clearing, grading, and drainage improvements

***Hardscape Costs include concrete trails, bridges, unpaved trails, crushed granite trails, parking pavement, and observation decks

****Hardscape Amenities include benches, tables, waste receptacles, water fountains, trail and informative signage, and park entry signage

*****Softscape Costs include planter trees, planting beds, sod, and vegetation additions

*****Architecture Costs include pavilions and restroom facilities

Table 10a, Kilgore-Davis Park Concept

PHASE 1 Facility Type	Order of Magnitude Costs
General**	\$0
Hardscape***	\$3,000,00
Hardscape Amenities****	\$0
Softscape*****	\$0
Architecture*****	\$0
Subtotal: \$3,000,000 20% Contingency: \$N/A 15% Estimated Design Fees: \$N/A Grand Total: \$3,000,000	

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2) Unit pricing is based on average cost statewide and do not account for any site specific determinates that would effect costs of constuction (i.e.- unknown subsurface conditions, etc.)

3) Construction Contingency covers but is not limited to: general conditions, unclassified earthwork, etc.

4) Utility provider fees are not accounted for in this Magnitude of Cost.

5) Finalized professional design fees and real property acquisitions are not accounted for in this Magnitude of Cost.

6) Opinion of probable construction cost should include a 10% increase each year.

Table 10b, Kilgore-Davis Park Concept

PHASE 2 Facility Type	Order of Magnitude Costs
General**	\$513,245
Hardscape***	\$1,709,610
Hardscape Amenities****	\$884,950
Softscape*****	\$506,894
Architecture*****	\$216,000
Subtotal: \$3,830,699 20% Contingency: \$766,139 15% Estimated Design Fees: \$574,604 Grand Total: \$5,171,444	

ACTION LEADERS AND PARTNERSHIPS

Implementing the proposed projects and programs outlined in this Master Plan will involve a host of local and regional partners working together towards a common vision to activate, connect, and preserve the Clear Creek watershed.

Clear Creek action leaders can include:

- » Bayou Preservation Association
- » Clear Creek ISD
- » Galveston Bay Foundation
- » Harris County Precinct Two Parks Department
- » Harris County Flood Control District
- » Home-owners Associations
- » Houston-Galveston Area Council
- » League City Engineering Department
- » League City Project Management Department
- » League City Public Works Department
- » Neighboring Municipalities
- » Texas Parks and Wildlife Department
- » U.S. Army Corps of Engineers

Potential Clear Creek partnerships can include:

Local Entities

- » Butterfly Enthusiasts of Southeast Texas
- » Galveston Bay Council
- » Galveston Bay Area – Texas Master Naturalists
- » Galveston Bay Foundation
- » Gulf Coast Master Naturalists
- » Keep Houston Beautiful
- » Houston Audubon Society
- » Houston Canoe Club
- » Houston-Galveston Area Council
- » Houston Wilderness
- » Memorial Park Conservancy
- » Native Plant Society of Texas – Clear Lake Chapter
- » Trees for Houston

State Entities

- » Bayou Preservation Society
- » Indigenous Cultures Institute (ICI)
- » Keep Texas Beautiful
- » Land Heritage Institute with the EPIcenter
- » Native Plant Society of Texas
- » Sierra Club: Lone Star Chapter
- » Texas A&M AgriLife Extension Service
- » Texas A&M Forest service
- » Texas Association for Environmental Education
- » Texas Commission on Environmental Quality
- » Texas Environmental Health Association
- » Texas General Land Office
- » Texas Living Waters Project
- » Texas Master Gardeners
- » Texas Master Naturalists
- » Texas Ornithological Society (TOS)
- » Texas Parks and Wildlife Department
- » Texas Water Development Board / Green Project Reserve Program (GPR)
- » Texas Water Smart
- » Texas Wildlife Association
- » Texan By Nature

National Entities

- » Arbor Day Foundation
- » Bayou Land Conservancy
- » International Society of Arboriculture – Texas Chapter
- » U.S. Fish and Wildlife Service – and the, Migratory Bird Conservation Commission
- » U.S. Environmental Protection Agency
- » Rails to Trails Conservancy
- » National Oceanic and Atmospheric Administration - Office of Response and Restoration
- » National Wildlife Federation

FUNDING SOURCES AND GRANTS

This section outlines funding strategies at the regional, state, and federal levels that can be utilized to implement proposed projects. This section includes an overview of potential grants, timeframe for applications, potential grant amounts, and level of effort required to apply. The following funding programs represent the most reliable resources for implementing active recreation and environmental conservation projects outlined in this Master Plan:

NATIONAL & STATE FUNDING

Texas Parks & Wildlife

TEXAS PADDLING TRAILS PROGRAM COMMUNITY APPLICATION FOR ASSISTANCE

- » Purpose: To fund paddling trail facilities which can include signage, parking, kiosks, put-in and take-out facilities (launches), and interpretive information. This Application grants the paddle trail official state designation which then allows the submitting entity to receive funding
- » Time: Any time
- » Amount: Undetermined
- » Effort: City assessment of paddle trail ecological resources, route alignment, connections to other facilities, and signage and safety at launch sites.

RECREATIONAL TRAILS GRANT

- » Purpose: To fund recreational / bike and bike trails (paved or unpaved) for the purposes of walking, hiking, cycling, mountain biking, motorcyclists, equestrian use, and all-terrain vehicle use
- » Time: February 1st annual deadline
- » Amount: \$300,000 maximum for a non-motorized trail, local match of at least 20%
- » Effort: Pre-planning of the trail alignment, detailed costs / itemized budget, engineering documents, and political approval of the trail prior to application

BOATING ACCESS GRANT

- » Purpose: To fund the development of boating infrastructure to increase access which includes funding launch facilities (ramps, loading docks, and navigational aids, barrier walls, security/surveillance, trash collection), supporting facilities (restrooms, camping facilities, parking areas), site accessibility (bridges, signals, dredging, and stump removal), and associated repairs to facilities
- » Time: Anytime
- » Amount: \$500,000 maximum, local match of at least 25%
- » Effort: Detailed costs / itemized budget, summary of impact improvements, associated engineering documents

LOCAL PARKS NON-URBAN OUTDOOR RECREATION GRANTS

- » Purpose: To assist in the acquisition and development of parkland facilities, equipment, and safety measures.
- » Time: August 1st annual deadline
- » Amount: \$750,000 maximum, local match of at least 50%
- » Effort: Pre-planning documents, detailed costs, summary of improvements, associated engineering documents

COMMUNITY OUTDOOR OUTREACH PROGRAM GRANTS

- » Purpose: To provide local municipalities, universities, school districts and nonprofits with funding for youth and minority group programming costs of personnel, food, travel expenses, participant liability insurance, entrance fees, outdoor recreation equipment and environmental education supplies
- » Time: November 1st annual deadline
- » Amount: \$70,000 maximum
- » Effort: Detailed description of the program, cost of materials or personnel needed

GENERAL CONSERVATION GRANT

- » Purpose: To protect, enhance, or benefit local and migratory bird populations, including increasing conservation awareness, land acquisitions, and funding birding facilities such as signage, trails, boardwalks, and bird blinds
- » Time: Annual
- » Amount: No minimum or maximum, typically \$1,000 to \$10,000
- » Effort: Detailed description of the program including migratory bird ecosystem data and local birding data

Texas General Land Office

TEXAS COASTAL MANAGEMENT PROGRAM GRANT

- » Purpose: To fund projects that address environmental concerns and promote economic development within the Texas coastal zone. This includes coastal natural hazard response, public access, critical area enhancement, permitting and inter-government coordination efforts, ecotourism, and waterfront revitalization. Note that this grant is only applicable to League City only east of I-45 in the designated Coastal Zone.
- » Time: Annual
- » Amount: Unspecified
- » Effort: Pre-Proposal Process, detailed description of the program, cost of materials or personnel needed

Environmental Protection Agency

WETLAND PROGRAM DEVELOPMENT GRANTS (REGION 6)

- » Purpose: To aid public entities in developing or refining state/territorial/tribal/local programs which protect, manage, and restore wetlands. This may include replanting, monitoring and assessment, and water-quality testing
- » Time: Annual
- » Amount: \$100,000 to \$200,000, 25% match
- » Effort: Methods of assessment and benchmarking outcomes, project goals and anticipated outcomes, associated direct costs, involved personnel and collaborations entities

5 STAR WETLAND AND URBAN WATERS RESTORATION GRANT PROGRAM

- » Purpose: To fund public and nonprofit entities with projects which improve, monitor, or restore water ecosystems, which includes water quality improvements, drainage adjustments, and coastal / wetland restoration
- » Time: Anytime
- » Amount: \$10,000-\$40,000
- » Effort: Methods of assessment and benchmarking outcomes, project Goals and anticipated outcomes, associated direct costs, involved personnel and collaborations entities

Texas A&M Forest Service

COMMUNITY FORESTRY GRANT PROGRAM

- » Purpose: To fund public and nonprofit entities with projects which “help communities develop sustainable programs that provide Texans with healthy trees and forests.” This includes grant categories focusing on Climate Resiliency and Human Health Equity And Accessibility, aimed at addressing species vulnerability, ecological diversity, nature-based solutions, and to develop tools for maintenance and improvement
- » Time: Annual
- » Amount: Unspecified Matching Amount in the form of In-Kind or Cash Purchases contributions
- » Effort: Project goals and anticipated outcomes, associated direct costs, description of community benefit and impact

Texas Commission on Environmental Quality

NONPOINT SOURCE GRANT PROGRAM

- » Purpose: To fund Watershed Protection Reports and Plans, along with other efforts to assess and mitigate water quality due to pollution, ecosystem degradation, chemical run off, stormwater drainage, and assist in management measures
- » Time: Annual
- » Amount: Unspecified
- » Effort: Preliminary reports and data on environmental water quality and the current issues needing funding

GALVESTON BAY IMPLEMENTATION GRANT PROGRAM

- » Purpose: To fund and implement projects outlined in The Galveston Bay Plan, focusing on habitat protection, species protection, environmental quality, research, education, shoreline management, and flow/circulation improvements
- » Time: Unspecified
- » Amount: Unspecified
- » Effort: Outline action steps and needed resources to achieve the purpose of the application, demonstrate an understanding of the Bay Plan and how the application meets specific site goals

U.S. Fish & Wildlife Service

TEXAS COASTAL PROGRAM

- » Purpose: To fund and assist in coastal habitat projects which emphasize habitat conservation and rehabilitation, habitat maintenance, engagement opportunities, and assistance in federal trust and priority species
- » Time: Unspecified, Partnership
- » Amount: Unspecified
- » Effort: Unspecified

COASTAL WETLANDS GRANTS

- » Purpose: To fund public and nonprofit entities in land management and land acquisitions relating to habitat monitoring, assessment, restoration, replacement, and habitat enhancement, including species rehabilitation and migratory bird retainment
- » Time: Unspecified
- » Amount: \$1,000,000 maximum, 25% matching
- » Effort: Application for federal assistance, a project summary and need, expected results and approach to the project, project budget, and involvement of other entities

LOCAL FUNDING

Additional funding opportunities for the build out, implementation, and maintenance of the Master Plan recommendations currently existing through multiple League City enacted ordinances, fees, and policies.

Funds and Fees

GENERAL FUND REVENUES

- » Funds dedicated as part of the annual City budget for parks and recreation.

USER FEES

- » Funds from users of special or shared facilities such as sports complexes, boat rentals, pavilion rentals, and programming services.

VOTER APPROVED PARKS BOND

- » Funds paid for by a percentage of City tax from residents specifically for parkland acquisitions and improvements.

SECTION 4-B ECONOMIC DEVELOPMENT SALES TAX

- » League City residents approved a 1/4 cent sales tax which allows the city to allocate funds to specific projects related to amateur sports facilities.

PARK DEDICATION FEES

- » The current park ordinance requires a park dedication fee per lot or unit for newly developed lands.

PARTNERSHIPS AND SPONSORSHIPS

- » Partnerships can also help to offset construction or operating costs of city park facilities. Entities identified at Action Leader and Partners, on page 57, can help assist league city in the implementation of this Master Plan.



Housing along Clear Creek
Source: Halcrow



LEAGUE CITY **CLEAR CREEK MASTER PLAN**