



**LEAGUE**CITY

# Trails Master Plan

April 2010

# Acknowledgments

Prepared for League City, Texas  
Parks and Recreation Department

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We would like to acknowledge the contribution of the  
following people to the success of the Trails  
Master Plan:

Mayor – Toni Randall

City Council  
Position 1 – Neil Baron  
Position 2 – Mike Barber  
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Position 5 – Phyllis Sanborn  
Position 6 – Tim Paulissen  
Position 7 – Jim Nelson

4B Board

Parks Board

Planning and Zoning Commission

City Staff

Residents of League City

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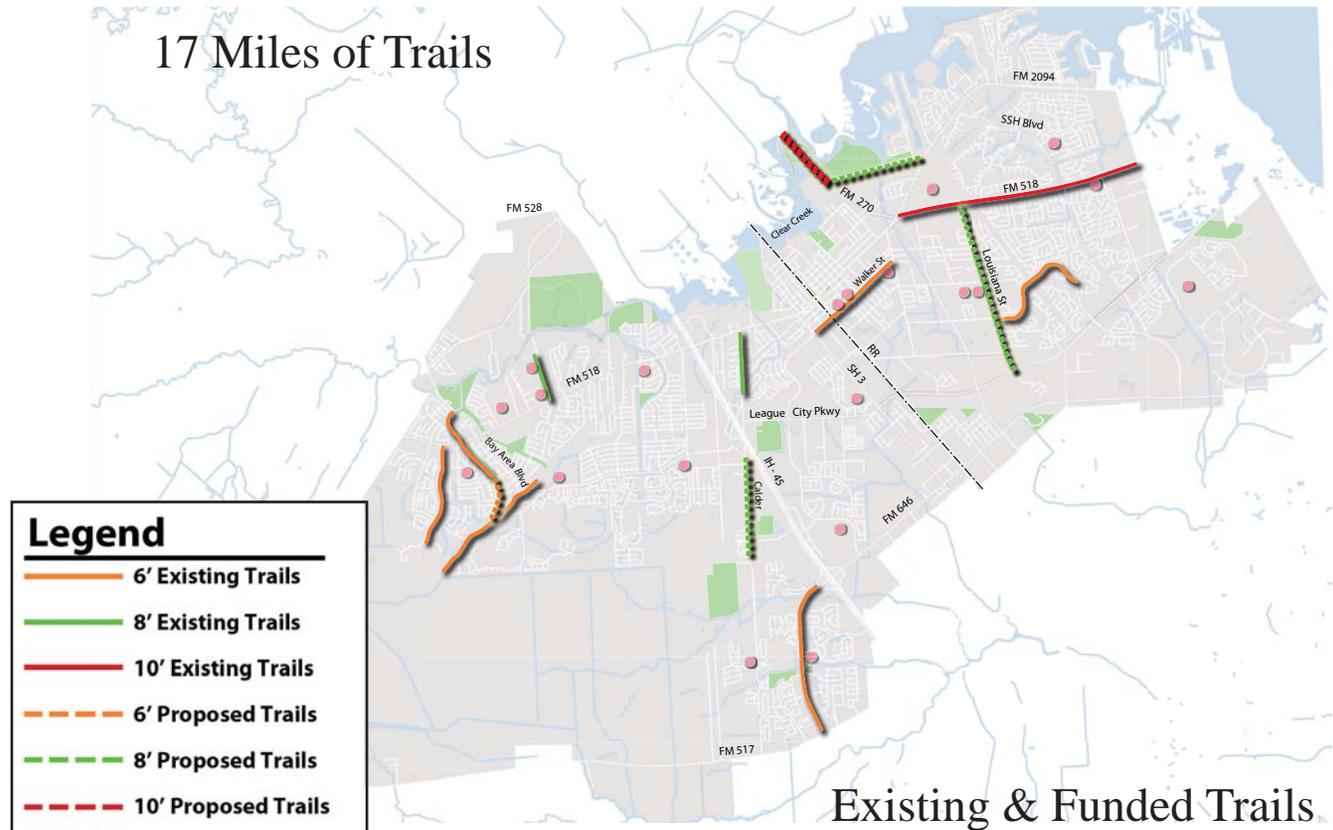


## Executive Summary

The goal of this Master Plan is to outline a trails system for the City of League City, Texas. This Trails Master Plan is a long range ambitious plan that when implemented will be a significant added amenity to the citizens of League City. When fully developed the trail system will consist of 212 miles of off-road trails across the city.

The current trails system consists of less than 20 miles of trails. As the system is expanded to 212 miles, it will connect and link schools, parks, neighborhoods and business centers. The trails will be constructed out of a combination of hard and soft materials to accommodate the needs of varied users, and they will range in size based on the type and location of the trail. The materials chosen for both types of trails are concrete, a multi-use material and decomposed granite, the preference of runners. Another distinction in the League City Trails System is that all proposed trails are off-road or separated from vehicular traffic.

## 17 Miles of Trails



The Master Plan concept is based on creating a comprehensive system of trails with distinctive themes that tell of the history and character of the city. The themes are divided geographically into four zones: Clear Creek Connections, Coastal Plains, League City Heritage and Texas Traditions. Each zone will explore information relating to environmental experiences, sporting opportunities and history of the area. The information will be creatively displayed on unique interpretive and directional graphics. Below are some highlights of the four distinct zones for this Master Plan:

Clear Creek Connections is located along Clear Creek along the northern edge of the city. This zone, like all four zones, is characterized by a strong signature trail; the signature in Clear Creek Connections is the Clear Creek Trail that will enable the citizens to connect and enjoy the waterfront of the creek. Some of the stories that will be told in this zone include early Indian settlements, wetland preservation, waterway usage and wildlife.

League City Heritage zone is located geographically in the heart of the city. This section of the trail system overlaps with the most historic areas of the early days of League City. The signature trail will be called the Heritage Trail and will tell stories about the early founders of the city, historic sites and museums.

The Coastal Plains zone is located in the eastern side of the city. The signature trail will be called the Tall Grass Prairie Trail and will explain stories not only of the preservation of a portion of tall grass prairie, but also the story of migratory birds, a rich tradition in this part of Texas.

Texas Traditions zone is located in the southwest area of the city and covers a largely undeveloped portion of the city. The signature trail will be named the Texas Traditions Trail, and it will be the training ground for long distance runners and bikers. When constructed it will consist of a 13-mile, off-road trail. This trail is proposed as a combination of hard trail and soft surface trail. Some of the stories that will be told in the Texas Traditions zone are those relating to the early history of cattle ranching, farming and orchards.

This comprehensive trail system will become a signature amenity for the City of League City. It will be a regional draw reinforcing the city's quality of life. The trails are envisioned as a system that meets the needs of the citizens and is a combination of mobility, recreation, athletic training and education.

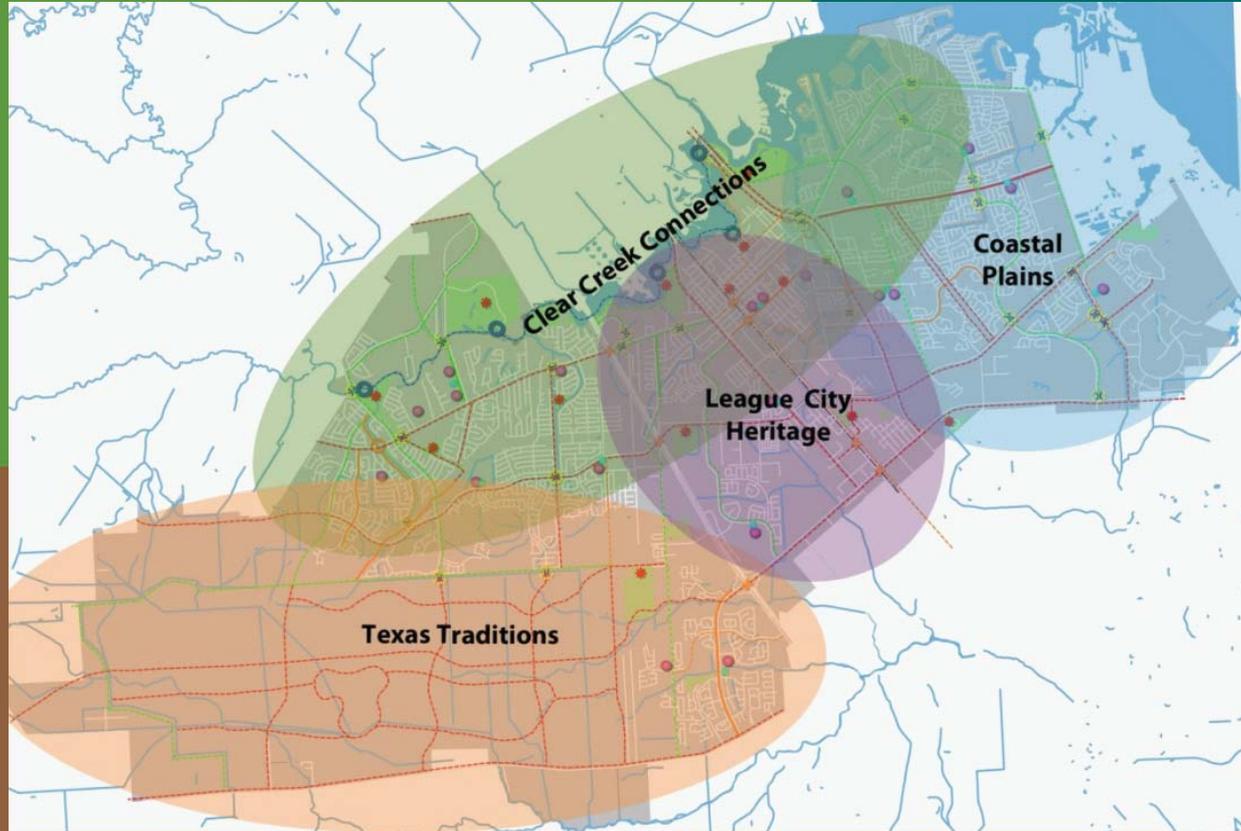


# LEAGUE CITY

a proposed zone approach

CLEAR CREEK CONNECTIONS

COASTAL PLAINS



TEXAS TRADITIONS

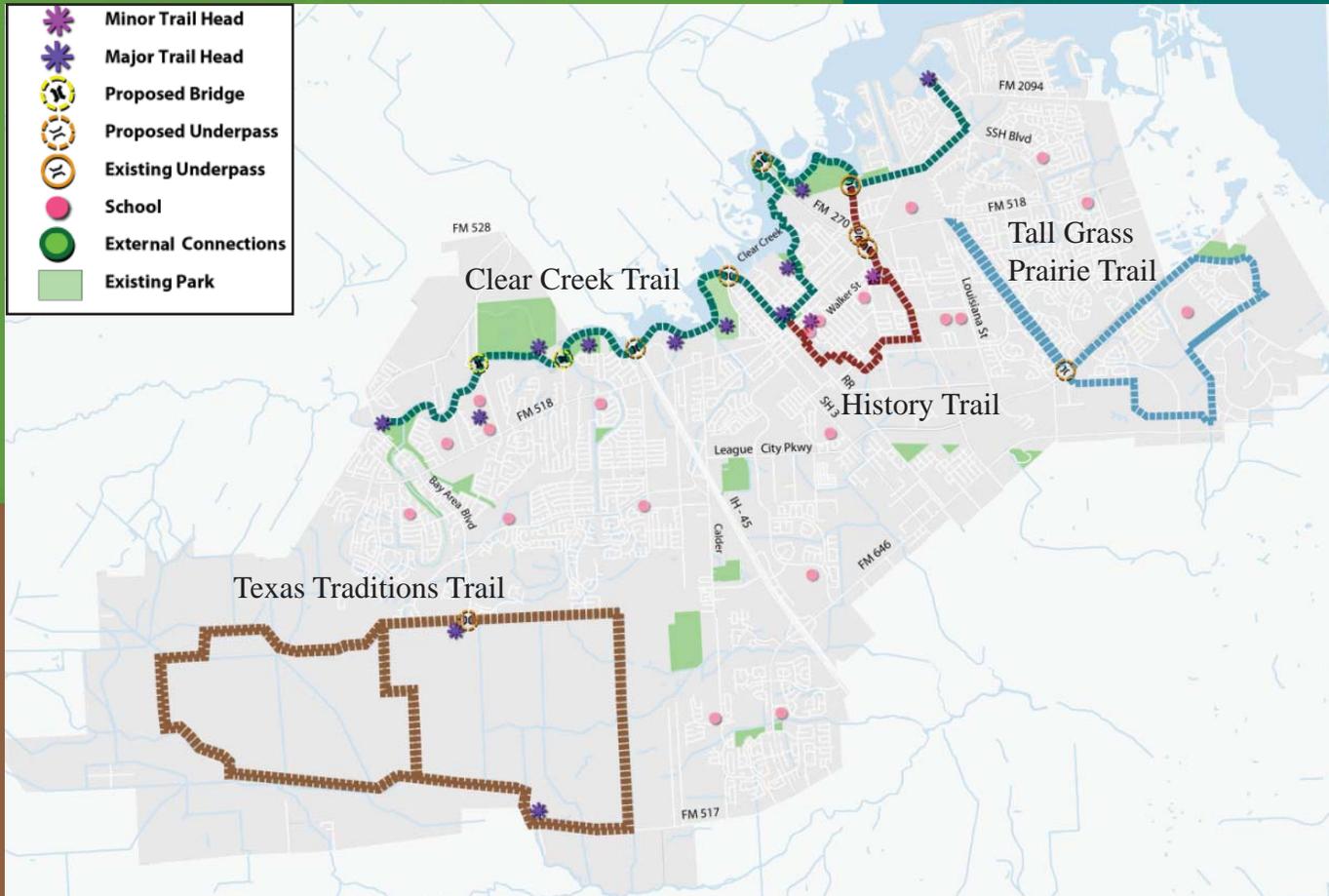
LEAGUE CITY HERITAGE

LIVE IT. LOVE IT. HIKE IT. BIKE IT.

# LEAGUE CITY Signature Trails

## CLEAR CREEK CONNECTIONS

## COASTAL PLAINS



## TEXAS TRADITIONS

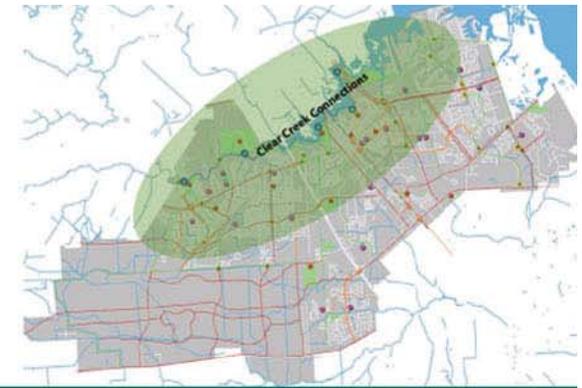
## LEAGUE CITY HERITAGE

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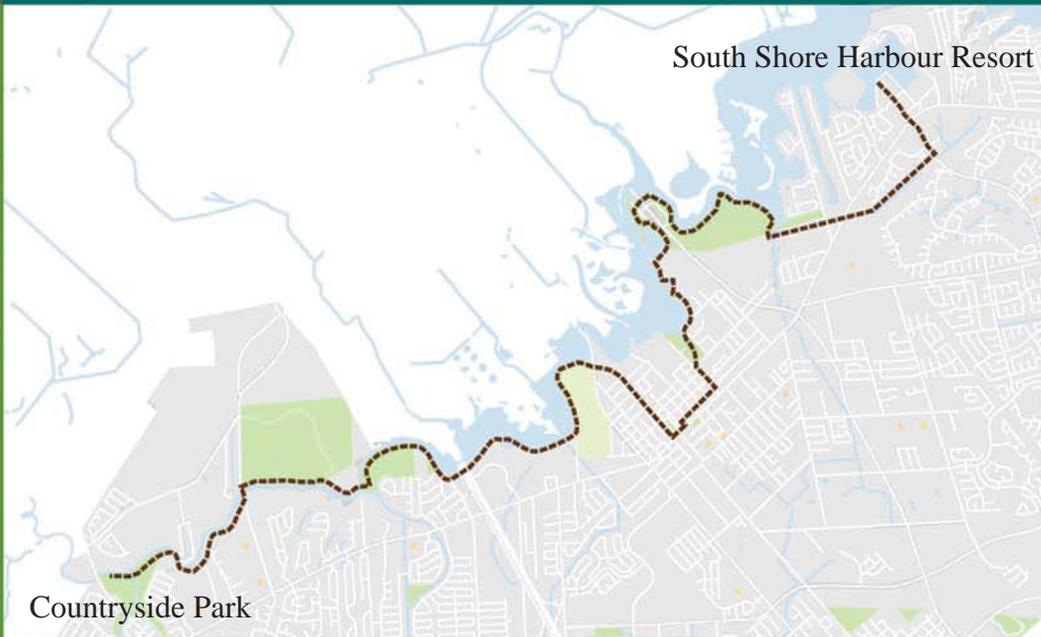


# Clear Creek Connections

## Signature Trail



LEAGUE CITY



Clear Creek in Walter Hall Park  
Before and After

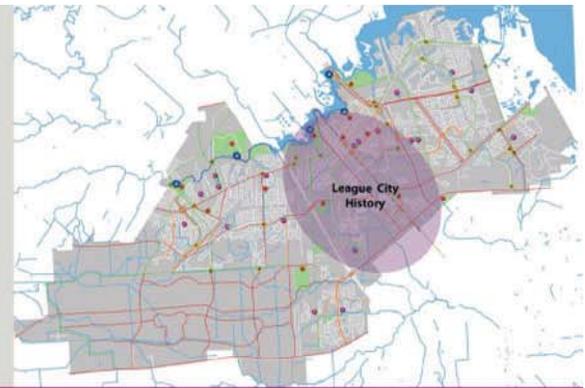


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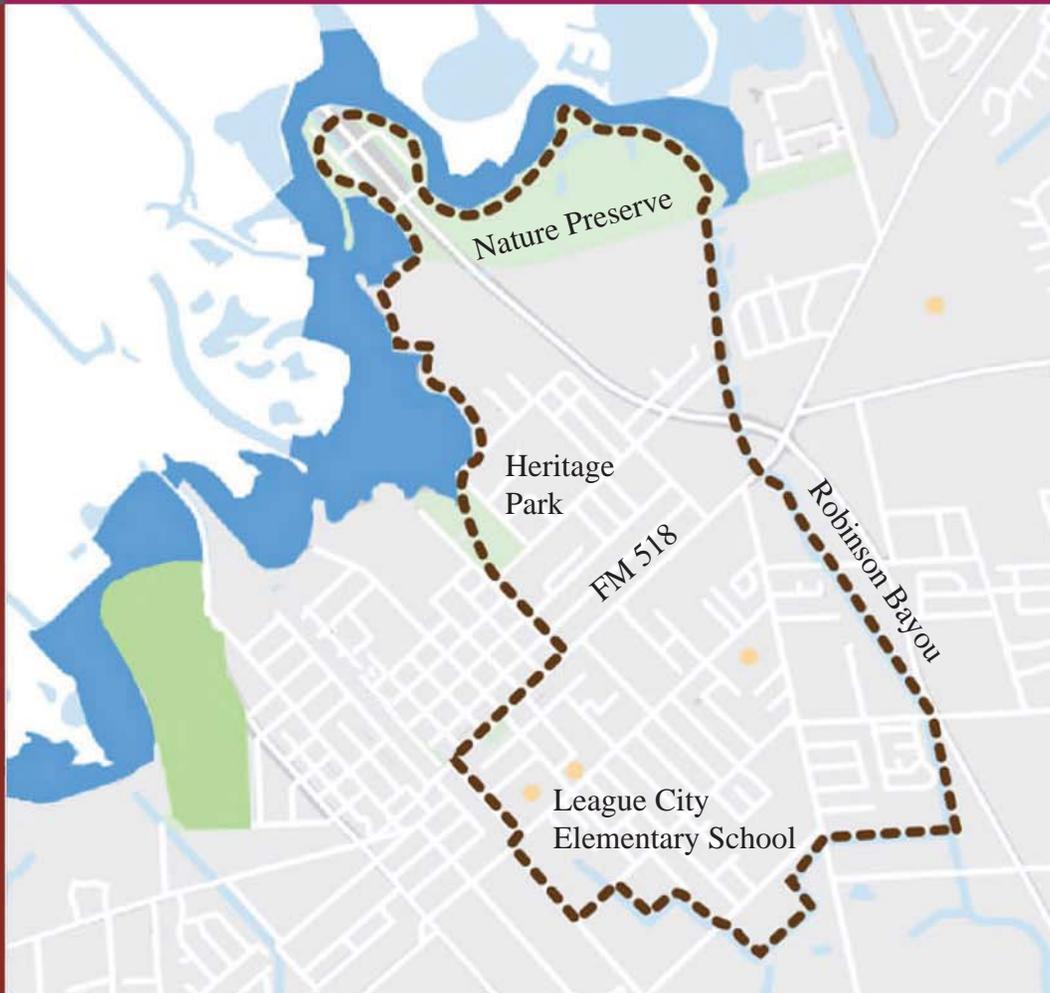




# League City Heritage Signature Trail



LEAGUE CITY



2nd Street Looking West  
Before and After

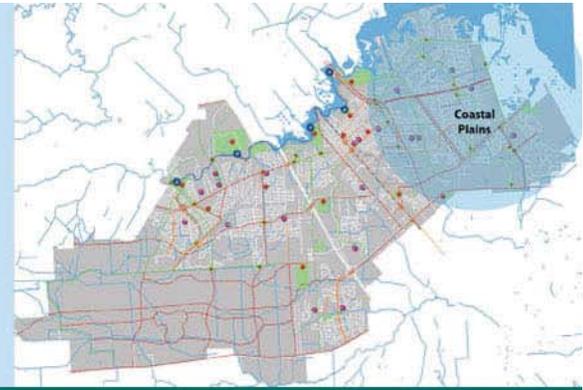


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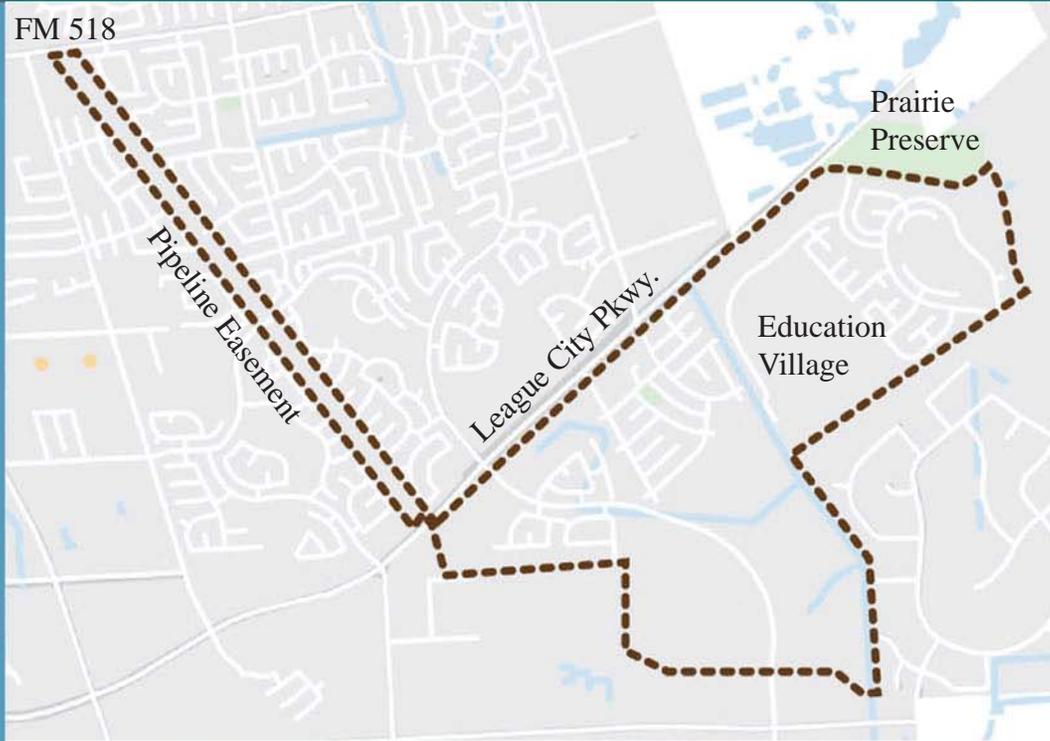




# Coastal Plains Signature Trail



LEAGUE CITY



Pipeline Easement at Austin Street  
Before and After

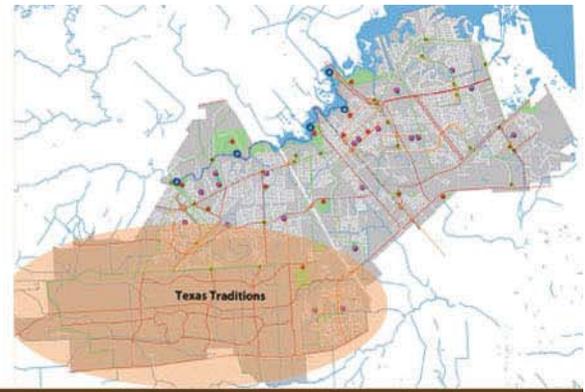


LIVE IT. LOVE IT. HIKE IT. BIKE IT.

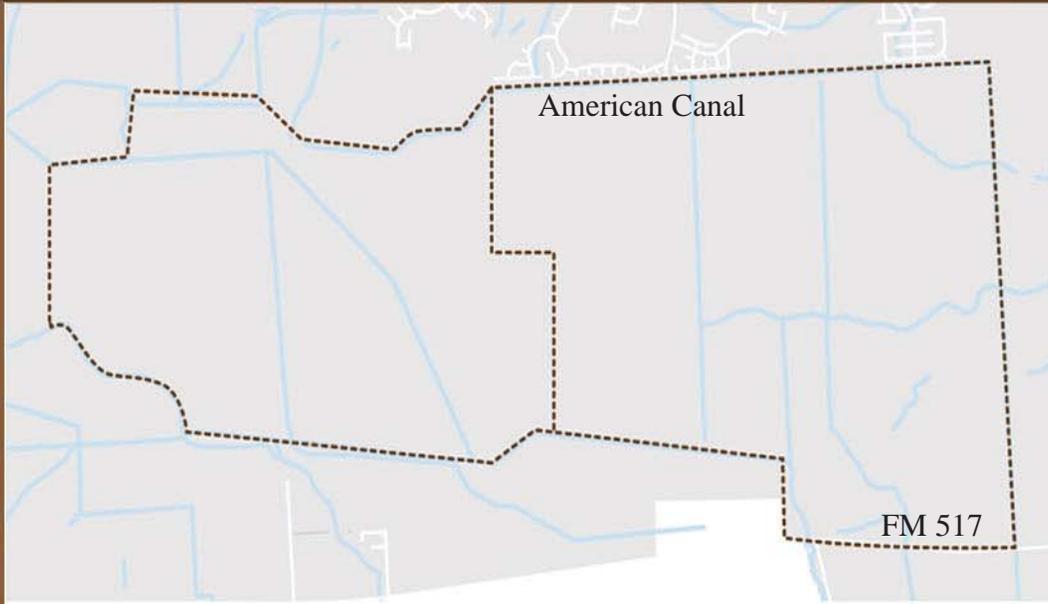




# Texas Traditions Signature Trail



LEAGUE CITY



Southwest Undeveloped Area of the City  
Before and After



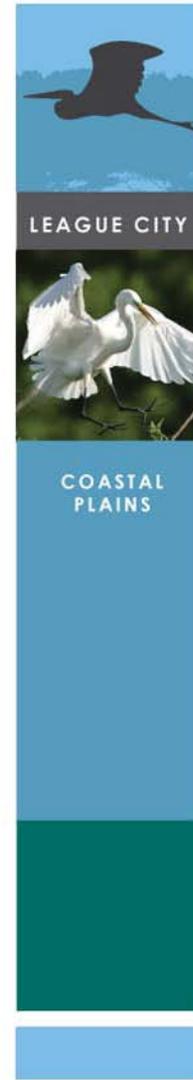
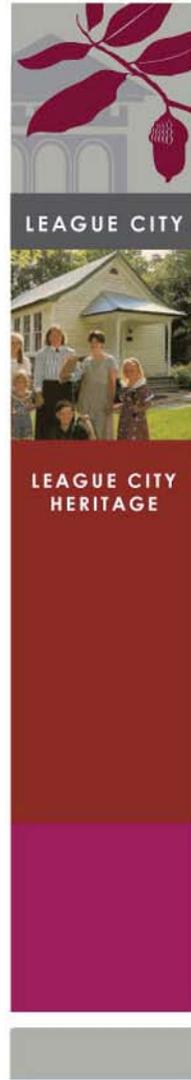
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# LEAGUE CITY zone identification

Palette consisting of:

- \_ Icons
- \_ Images
- \_ Colors
- \_ Typography

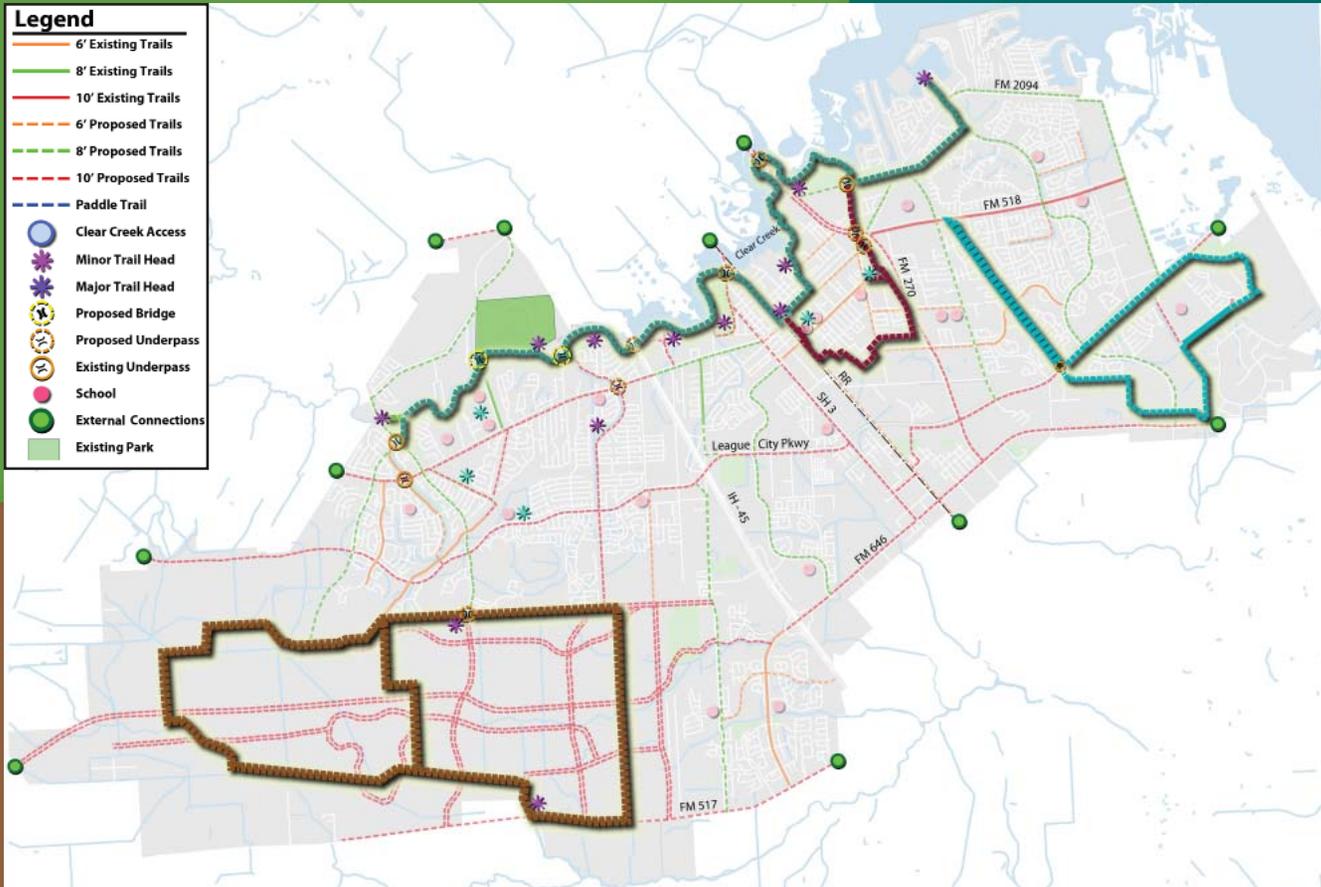


# LEAGUE CITY

master plan trails

## CLEAR CREEK CONNECTIONS

## COASTAL PLAINS



## TEXAS TRADITIONS

## LEAGUE CITY HERITAGE

LIVE IT. LOVE IT. HIKE IT. BIKE IT.

# Chapter 1 - Introduction

## Goal

The goal of this Master Plan is to create a trails system in League City that is second nature to its citizens. A long-range ambitious goal, this Master Plan is a comprehensive plan for a trail system of 212 miles within both the built and the undeveloped areas of the city.

## Purpose

The purpose of this Master Plan is to provide a tangible document for the City staff and officials to serve as a guiding plan that will logically and systematically add mileage to the system and connect greater areas of League City into the trails network.

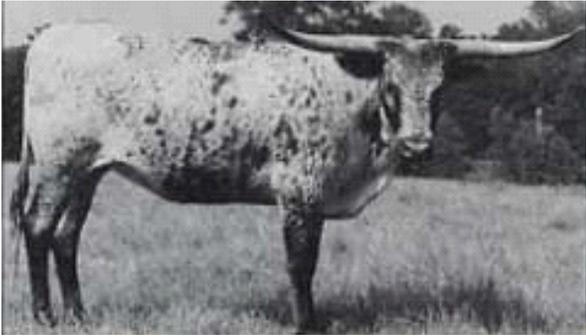
## Benefit

The addition of trails to the City's park system is a Quality of Life issue. Trails can be used by all ages and abilities for both recreation and mobility. Some of the major benefits include safe routes for students to walk or bike to schools which will reduce vehicular congestion around schools; training routes of athletes; an outlet for residents to increase their activity levels; and residents connecting to public and civic destinations with their community.

## Trails Master Plan

Whereas trails were briefly addressed in the League City Parks and Open Space Master Plan completed in 2004 and referenced in both the 2004 Comprehensive Plan and the 1995 Parks Master Plan, this entire document focuses on the further development of the City's trail system. As a comprehensive planning document for trail planning and development this Trails Master Plan addresses all aspects of the City's trail system including trail locations, widths and materials, graphics and amenities along with environmental and engineering considerations. Additional chapters are devoted to the phasing of the system along with estimated costs associated with trails development and maintenance.





To summarize, the Trails Master Plan contains the following:

- I. Introduction - History, Geography, Environment, Development, Population and Process
  - II. Public Input - Public Input Meeting, Draft Master Plan Comments and Final Master Plan Comments
  - III. Vision
  - IV. Trails Standards - Widths, Materials, Engineering Considerations, Landscape Zones and Lighting
  - V. Trail Amenities - Trail Heads and Amenities
  - VI. Graphic Standards - Themes and Family of Signs
  - VII. Environmental Restrictions - Wetlands and Historic Oil/Gas Production and Processing
  - VIII. Subdivision Regulations - Existing and Proposed
  - IX. Trail Plans
  - X. Phasing Plan
  - XI. Implementation and Funding
- Appendices

## History

The original inhabitants of the area were the Karankawa Indians, an indigenous tribe that inhabited the coastal region of Texas. Now extinct as a tribal group, the Karankawa played a pivotal part in early Texas history.

By the mid 1800's three important families had settled in the area of present-day League City. Clear Creek was the original name of the community. The Cowart family settled along Cowart's Creek, the Perkins family along Magnolia Creek, and George W. Butler arrived in 1873 and was the first resident of the town proper. J.C. League acquired the land and laid out the town site along the GH & H Railroad.

In 1907 Mr. League had two railroad cars of Live Oaks delivered, and Mr. Butler and his sons oversaw the planting of the trees. These trees are now known as the Butler Oaks and many line Main Street to this day. Additionally, Longhorn cattle were introduced to the area, and the Butler Longhorn Museum remains an attraction in the city. Early fruit production led to fig production, and the Fig Preserving Plant was located adjacent to the GH & H Railroad.





## Geography

League City is located primarily in northern Galveston County along the south bank of Clear Creek and Clear Lake with a small portion of the city within Harris County north of Clear Creek. A major traffic artery, Interstate Highway 45, provides freeway access through the city creating an east and west side to the city. A few miles east of Interstate 45 is the railroad which also traverses the city near State Highway 3. This Master Plan proposes three street/trail crossing of both of these in order to create a comprehensive and connected trail system for the entire city.

## Environment

The environment shaped early development of the city and today still defines many of the neighborhoods within the city. The lake's edge is dotted with marinas providing many recreational opportunities not only for residents of League City, but also as a regional draw while the creeks that feed into the lake throughout the city are sensitive ecosystems worthy of protection and enhancement. These areas should be protected by careful trail development which will provide public access to the banks of the creek.



Other areas in need of protection and careful development include the Tall Grass Prairie being protected in the Dick Benoit League City Prairie Preserve on the southeast side of the city; the Dr. Ned and Fay Dudley Clear Creek Nature Center; and wetlands and tidal marshes along Clear Creek. Within many of these environmentally rich areas there are endangered species as well as archeological sites.

## Development

Development in the city began around the railroad, the center of town, and contains the oldest structures within the city. Development spread both east and west from there. A large area in southwest League City remains undeveloped today. The trails system will have to be retrofitted into the developed areas of the city, but can be planned in conjunction with future development as the city expands into undeveloped areas.





## Population

The 2000 census stated that the population of the city was 45,444 with an updated population in 2005 estimated at 62,500. Future projections of growth within the city have it reaching a population of 154,300 by the year 2025. League City is now projected to be the largest city in Galveston County. With the city's population projected to more than double in the next 15 years the city must plan for the future expansion of their trails system along and in front of actual development.

## The Process

The process of master planning the trail system in League City began with the Needs Assessment in the 2004 League City Parks and Open Space Master Plan and continued through the staff's preparation in 2009 of the Proposed 2025 League City Trail System. Our team was brought on to further develop a Master Plan document specifically focused on trails and associated amenities.

This process of this Master Plan began with a series of public meetings soliciting input from the citizens of League City. From those meeting the citizens stated:

- Connect
- Commute
- Community Well Being
- Athletic Training

Based on the input from the public meetings, "feet on the ground" site visits throughout the city, and workshops with City staff the Master Plan was penned.

A draft report was presented to the public at a 4B Board meeting and was also presented to the Parks Board, Planning and Zoning Commission and City Council. Public comments were allowed at each of those meetings.

Feedback received at the Draft Master Plan stage helped to define the Final Master Plan. At this stage, another round of meetings was held giving the public and all four governmental entities a final chance for input prior to final adoption by the City Council.

The City is currently developing their Mobility Plan which may add on-street bike lanes and/or bike routes to the City's transportation network. This system of bike improvements is additive to the Trails Master Plan, but does not supersede the need for the implementation of the multi-use off-street trails proposed in this master plan.



# Chapter 2 - Public Input

## Public Input Meetings

Residents had four opportunities to attend a public meeting and give input on the Trails Master Plan. In addition, comment forms were available and have been incorporated into the base of comments. For a full listing of public comments see Appendix B.

Some of the common messages were as follows:

### *Connections*

1. Safe routes to schools
2. Safe routes to parks
4. Coordinate with surrounding communities as trails leave League City

### *Commuting*

1. Safe routes to work
2. Coordinate with surrounding communities as trails leave League City

### *Community Well Being*

1. Recreation
2. Exercise

### *Athletic Training*

1. Group runs - desire softer trail materials such as decomposed granite
2. Group bike training rides - need solid surface such as concrete





## The Draft Master Plan

The draft master plan was presented to the 4B Board, Park Department/Planning and Zoning and City Council on three separate occasions. During each of these presentations the public was given the opportunity to comment in support or opposition to the Trails Master Plan. For a full listing of Public Comments please see Appendix B.

### *Costs*

1. The cost and mileage of a complete trail system is extensive - how many miles does League City need to have an adequate Trail Plan?
2. Opposition stated that the City should consider a smaller circuit of quality trails instead of 212 miles.
3. Comprehensive system of connecting trails should not burden the tax base.
4. Funding through HGAC.
5. The "Texas Tradition Trail" is located in undeveloped land where the infrastructure is not in place to support a trail there in Phase One.
6. What is the maintenance cost for non-right-of-way trails?

### *Construction*

1. Concern that trails along street would end up in front yards and not along edge of street
2. Trail Lighting - master plan is not recommending lighting.
3. Suggested alternate phasing would build smaller connecting trails first before constructing costlier segments for best "bang for buck."

### *Design*

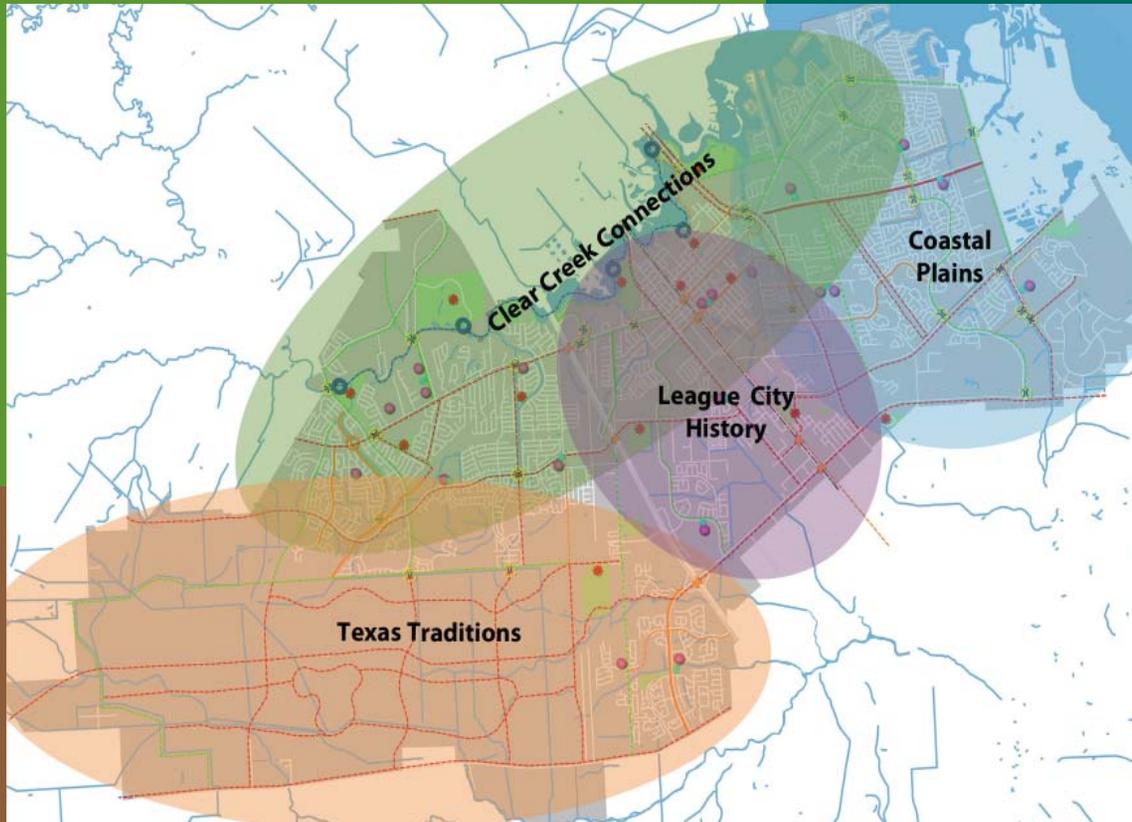
1. The Community Investment Committee has chosen "Trails at the Water's Edge" as the City's official brand.
2. It was suggested that the trail system should connect to future City farmer's market, water sports, dog parks and amphitheater.
3. Trails should be an experience for the residents not just connectivity.
4. Trail system can be incorporated into the main street plan.
6. The Clear Creek Connections trail along private property.
7. Check for compatibility issue with former River Bend plans. Has there been communication with property owners?
8. Make sure trails incorporate the vision/marketing plan for the City.
9. City branding committee will make spring presentation of new city brand.



# Chapter 3 - Vision for City Trails System

CLEAR CREEK CONNECTIONS

COASTAL PLAINS



TEXAS TRADITIONS

LEAGUE CITY HERITAGE

LIVE IT. LOVE IT. HIKE IT. BIKE IT.

## Graphic Themes

The City's Trail System has been divided into four Thematic Zones – areas of interest - for graphic representation within the signage system. The thematic zones are intended to tell the story of League City including its Environmental Experiences, Outdoor Sporting Opportunities and City Heritage. Specifically, the four themed zones will showcase the varied plant and wildlife in the community, cultural and economic influences, and a wide array of sporting and athletic opportunities found within League City.

The four zones include:

1. Clear Creek Connections
2. League City Heritage
3. Coastal Plains
4. Texas Traditions

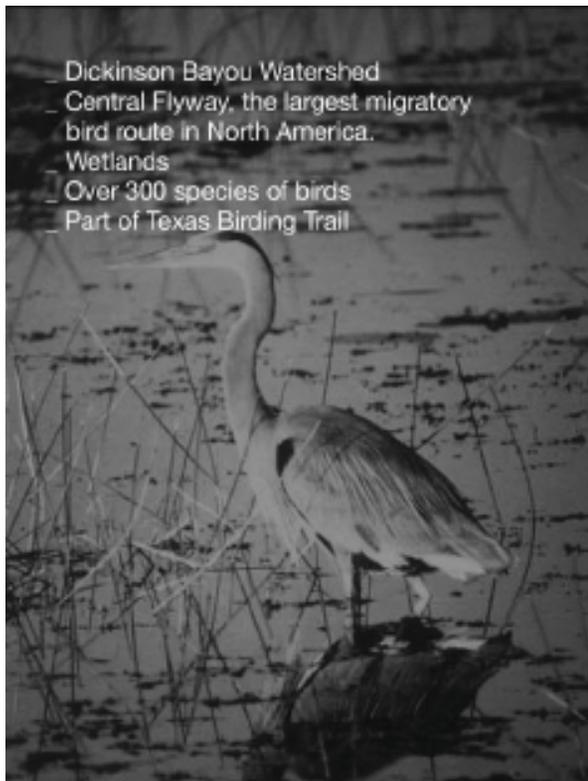
Within each of these zones it is important to seize upon the opportunities to educate and to celebrate all that is League City. Although subtle variations occur from east to west across the city, those variations do create distinct differences in many of the plants, animals and birds found natively across the city. The theme of each of these zones allows for these differences to be highlighted.

### Clear Creek Connections

Running east/west through the northern part of League City, the creek gave life to the ancient settlements of the region and still today provide an iconic symbol of the city. An important watershed for the region, Clear Creek's watershed encompasses 260 square miles. This zone is rich in environmental, cultural and recreational opportunities. Clear Creek itself travels through several distinct environmental, planting and therefore wildlife habitats. From intertidal wetlands to the east to upland hardwood/deciduous forests further west, the creek is full of wonderment and a great natural and recreational asset to the residents.

### League City Heritage

The original town was laid out along the train tracks and Main Street. Our Heritage Zone focuses on the central region of League City. This area incorporates the older areas of League City that center on





the heritage of League City. Within this zone, the story of the trails turns to the story of League City, its founders, and early growth. Stories to be told in this area include the Butler Oaks, the Longhorn Museum, the Fig Factory and the Interurban Railroad.

### **Coastal Prairie**

The theme for the eastern part of the city revolves around the rich heritage, flora and fauna associated with our coastal life. The Western Gulf Coastal Plain Ecoregion of Texas is historically dominated by upland and wetland prairies. Texas Parks and Wildlife also describe this ecoregion as the Bluestem Grassland. Unique plant material native to the coastal prairie, including the Tall Grass Prairie, has been protected in the city's new Prairie Preserve. This portion of the city is rich in birding activities associated with migratory birds that travel along the coastal and waterfront areas of Texas.

### **Traditional Texas Zone**

The southwest portion of the city is mainly undeveloped at this point and reflects the economic activity Texas is known for – agriculture including citrus, figs and rice; ranching with longhorn cattle being established by early settlers; and gas/oil production. While thematically the zone recalls great traditions of Texas, the zone also represents the future of League City and that of its trails system. The city can get ahead of development and prepare for a trail to be incorporated along with and out front of development rather than retrofitting an existing infrastructure with new trails.



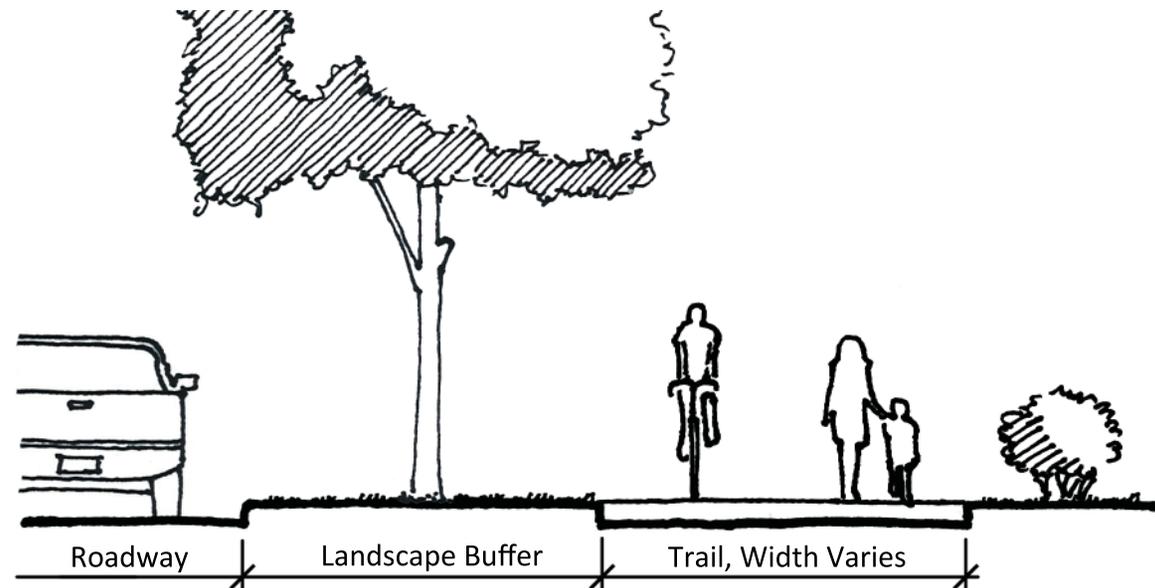
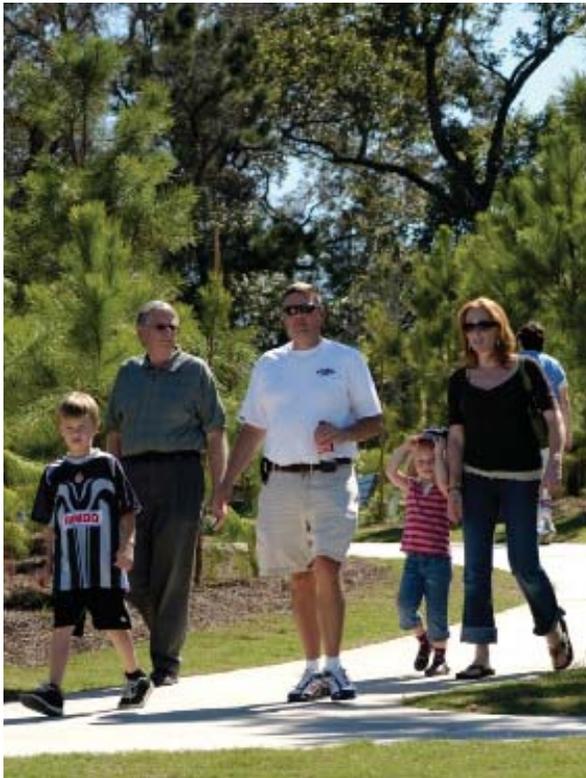
# Chapter 4 - Trails Standards

## Trail Widths

A variety of trail widths are appropriate in a city-wide trails' system. The width of the trails is determined by the context and use. Influences including adjacent roadways, easements or natural settings, as well as the type and quantity of users determine the trail widths. This Trails Master Plan recommends 10-foot wide, 8-foot wide and 6-foot wide trails.

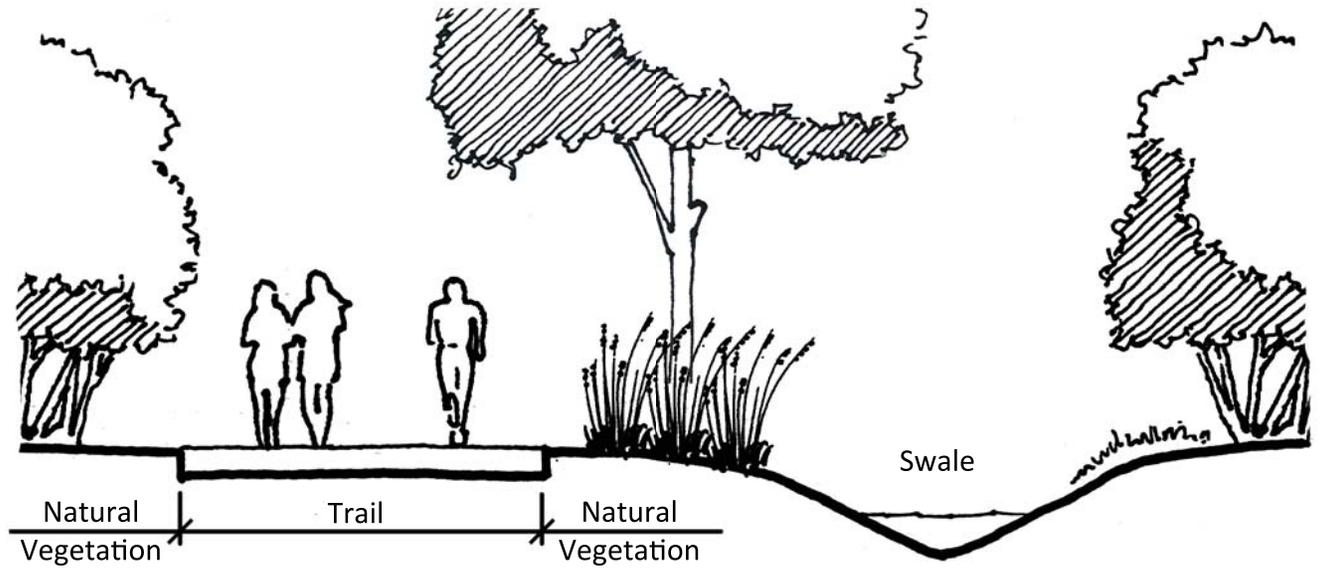
### 10-Foot Trails

A 10-foot wide trail serves as a multi-use spine trail within the trail system in the city. These trails are located along the major thoroughfares. These trails accommodate heavier usage and should be striped and signed with appropriate regulatory signage. These trails are the "major arteries" of the city's trails' network. In addition to the major spines within the trail system, 10-foot wide trails are also appropriate in easement or park settings that accommodate larger groups of runners and bikers in a longer trail with limited interruptions.

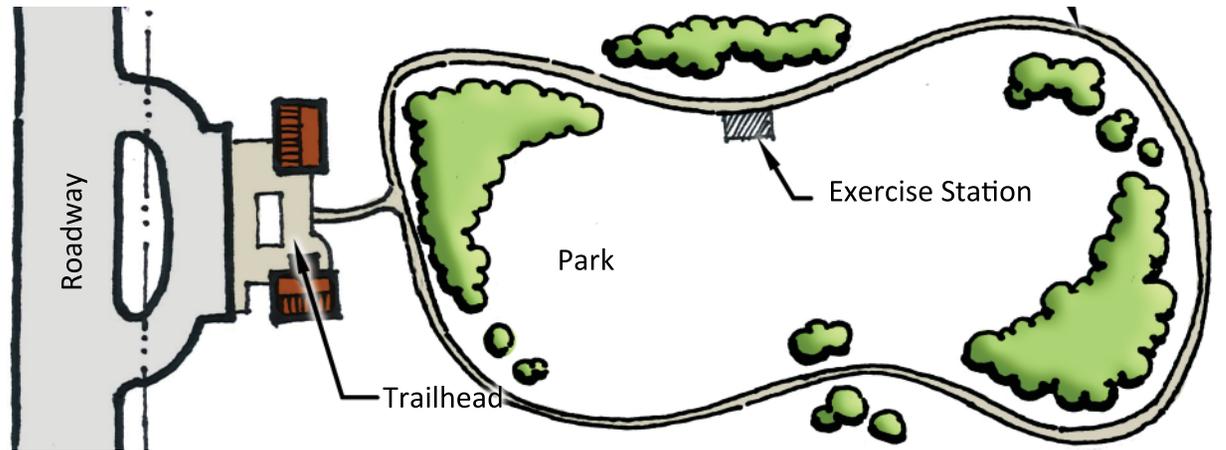


10 FOOT TRAIL IN PUBLIC RIGHT OF WAY





10 FOOT TRAIL IN EASEMENT



10 FOOT PARK LOOP TRAIL





### **8-Foot Trails**

An 8-foot wide trail is an integral part of the trail system. Accommodating smaller groups these trails allow for expansion of the system into greater areas yet are less expensive to construct and maintain. Good examples of these trails are connections to schools and parks.

### **6-Foot Trails**

A 6-foot wide trail creates the neighborhood connections allowing more of the residents of the city to access the major 8 and 10-foot wide trails system. These connections serve fewer residents, are more localized, and also provide trail opportunities in areas with restricted land for trails.

### **Trail Materials**

Just as trail widths vary throughout the city so does the choice of materials. Through the public input process the residents requested a mix in material types creating a balance in the trail system in both materials and maintenance.

#### **Concrete**

Most trails in the city are concrete and provide a strong network of easy to maintain trails. Concrete trails accommodate a variety of trail users; (Cyclists, Strollers, Elderly and Impaired) and is a material that holds up well in League City. Concrete is an appropriate material for use adjacent to city streets and roadways and where service and emergency vehicle use is anticipated. Concrete trails are used primarily as multi-use trails in high traffic areas and locations where flooding/erosion will be problematic.

#### **Decomposed Granite**

Decomposed granite (DG) is a surfacing material made up of crushed granite and aggregate. DG trails are appropriate in park loops where groups of runners are found and in more naturalistic areas along creeks and drainage easements. DG also contributes less of a physical impact on runner's knees and joints than concrete. In naturalistic areas DG trails are simply cut into the existing grade to blend in with the environment. In a highly refined area a concrete edge can be poured to contain the edges of the trail. DG should not be used in areas where flooding/erosion are present because it can be easily washed away. The initial installation cost of a DG trail is less than that of a concrete trail, however, maintenance costs are greater.





**Pavers**

In the historic downtown area of League City it is appropriate to upgrade to a brick or concrete paver trail or at least a concrete trail with paver accent bands. This is an upgrade in materials delineating a special area of the city. Construction costs for paver trails or paver bands is greater than that of concrete trails; however, since they are laid on top of concrete sub-slabs the maintenance is similar to that of concrete trails. Trails within this area relate to the history theme being proposed (see Chapter VI – Graphic Standards). The use of this material would also denote areas of the trail system where walking is a primary function and an area of potentially greater pedestrian conflicts with the trails doubling as sidewalks to the various homes and businesses along the streets.

**Asphalt**

Asphalt is a trails material alternative mentioned in the public meetings. However, due to soil conditions in League City and increased maintenance costs associated with asphalt trails, it is the recommendation of this Trails Master Plan not to utilize asphalt as one of the City’s trail materials.

**Trail Corridors**

Trails will be located off-street using a combination of four types of corridors.

**Right-Of-Way**

Trails will be constructed in existing state, country or city rights-of-way adjacent to the roadways so the trails will not encroach upon private property. Depending on location, additional drainage improvements may be required prior to trail construction.

**Easements**

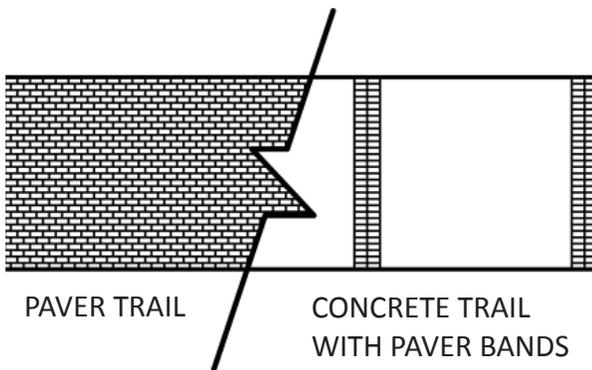
Drainage or utility easements will be used for trail construction with the permission of the governing agency. These trails will be designed to not interfere with the function or maintenance of these easements.

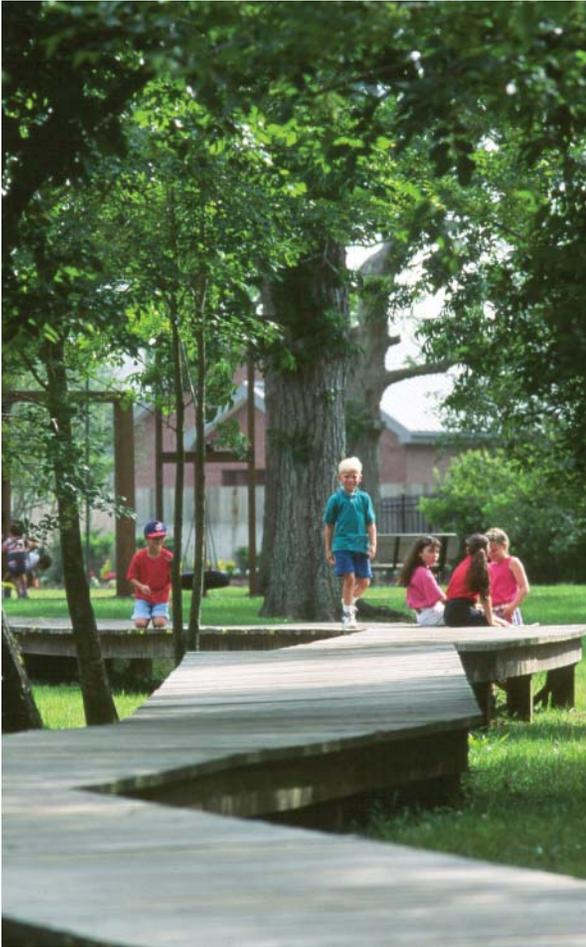
**Open/Green Space**

City, county or state owned open space and green space can be used as corridors for the trails.

**Civic Enterprises**

Area of community lands, such as churches, schools, municipal facilities, etc. will be negotiated for opportunities for trail access.

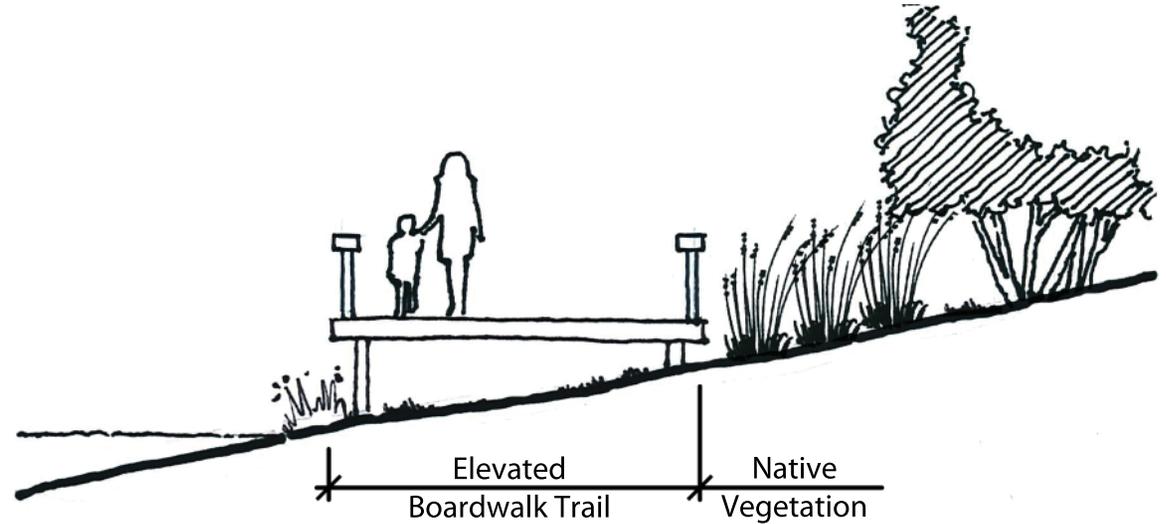




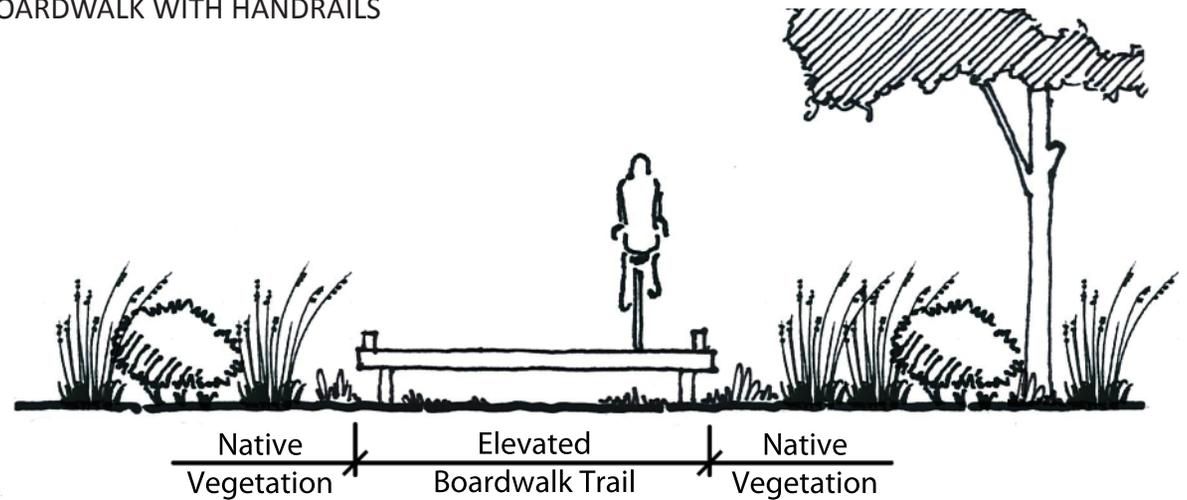
## Environmental Considerations

### Boardwalk

The use of a boardwalk is best suited in areas that are typically wet, associated with wetlands, or environmentally sensitive areas. Materials may vary from wood to recycled plastic products. The character of the boardwalks add a different experience to the trail system. It is the most expensive option of all the trails materials and would be used on a limited basis.



BOARDWALK WITH HANDRAILS



BOARDWALK WITHOUT HANDRAILS



## Bridges

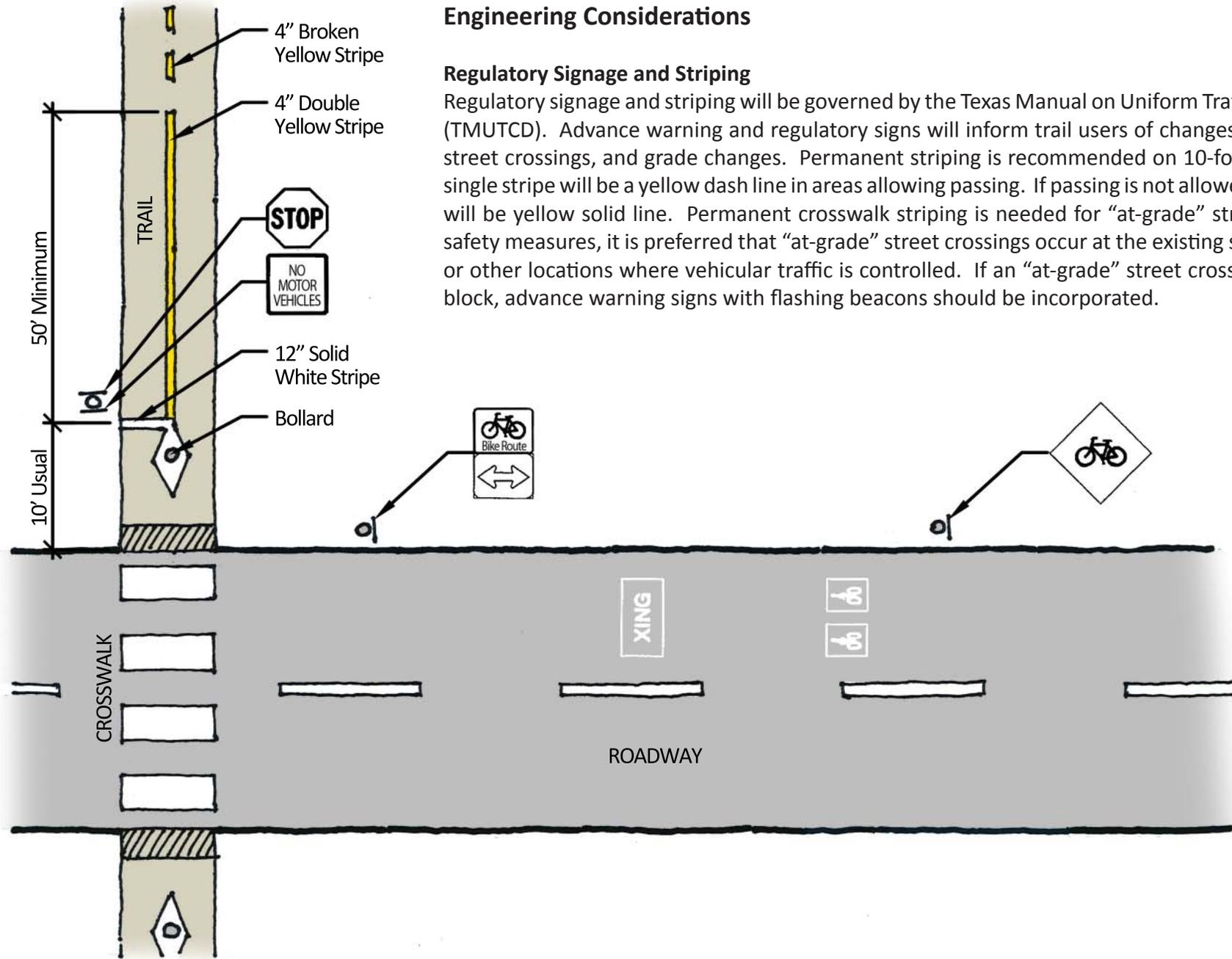
Bridges are needed to enable trails to cross larger drainage channels and ditches. The design and style of the bridge should be in keeping with the context of the site and may be pre-fabricated and craned into location or constructed on site. It should be determined if the bridge is located near navigable waters and would be required to meet standards set by the U.S. Coast Guard.



## Engineering Considerations

### Regulatory Signage and Striping

Regulatory signage and striping will be governed by the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Advance warning and regulatory signs will inform trail users of changes in trail alignment, street crossings, and grade changes. Permanent striping is recommended on 10-foot wide trails. The single stripe will be a yellow dash line in areas allowing passing. If passing is not allowed, the single stripe will be yellow solid line. Permanent crosswalk striping is needed for "at-grade" street crossings. For safety measures, it is preferred that "at-grade" street crossings occur at the existing street intersections or other locations where vehicular traffic is controlled. If an "at-grade" street crossing is located mid-block, advance warning signs with flashing beacons should be incorporated.



REGULATORY SIGNAGE AND STRIPING AT CROSSWALK



### **Crosswalks**

Crosswalks are recommended throughout the trail system. The local jurisdictional authority will govern the design for crosswalks within the public right-of-way. The proposed location of crosswalks is paramount for safety reasons, and it is best to utilize existing controlled intersections to provide a safe route for trail users to cross existing streets along the proposed trail alignment.

### **Drainage issues**

Drainage is an important design consideration, and this Master Plan recommends several solutions. All trails should be designed with positive drainage. Where needed, small or medium culverts or small bridges will be added to the trail to accommodate drainage at the trail. When located within the floodplain or floodway as defined by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) the trails are required to meet federal guidelines including mitigation of areas of fill.

Although impacts may be minimal for the proposed trails in the City of League City's Trails Master Plan, another engineering consideration is storm water quality management.

### **Culvert Crossings**

Culvert crossings are recommended for most smaller applications on the trails. Typically, a culvert crossing is considered for small-scale drainage swales, narrow channels, or ditches that transverse the proposed trail alignment. Culvert crossings are more economical than a small-span "foot" bridge across a narrow channel or ditch.

The size of a proposed culvert crossing is dependent upon the geometry of the existing drainage swale or channel and the intensity, duration, and frequency of the rainfall event that is dictated by the design criteria adopted by the local jurisdictional authority. Typical culvert crossings range in size from 18 inch diameter pipe to 12-foot by 12-foot box culvert. Culvert crossings require work in the bottom of the existing major drainage channel which can lead to wetland considerations.

Materials recommended for trail culverts should match the requirements of the jurisdiction in which the trail and culvert is located.

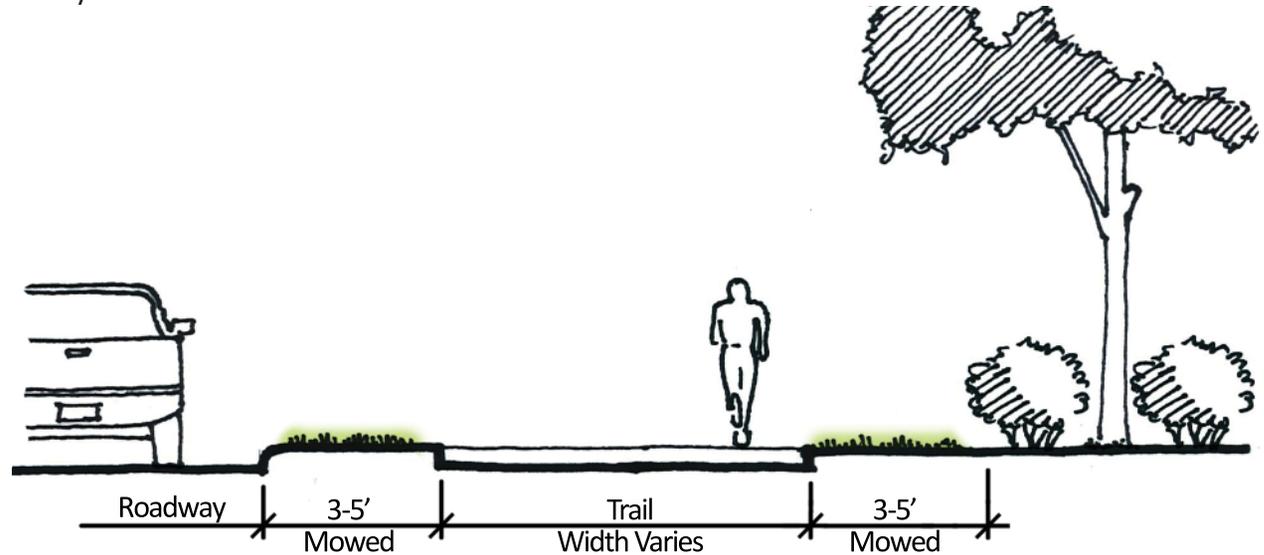




## Landscape Standards

### Turf

A standard turf strip is required on both sides of the trails. The minimum width of the mowed strip is 3-feet and the recommended width is 5-feet. The turf strips provide a safety clearance zone and are used by runners who prefer not to run on concrete trails. In a roadway right-of-way, provide turf between the trail and the curb. When the trail is located outside of a public road right-of-way, additional plantings are allowed outside of the 5-foot mowed turf strip as long as sightlines are kept clear for the safety of the trail user.



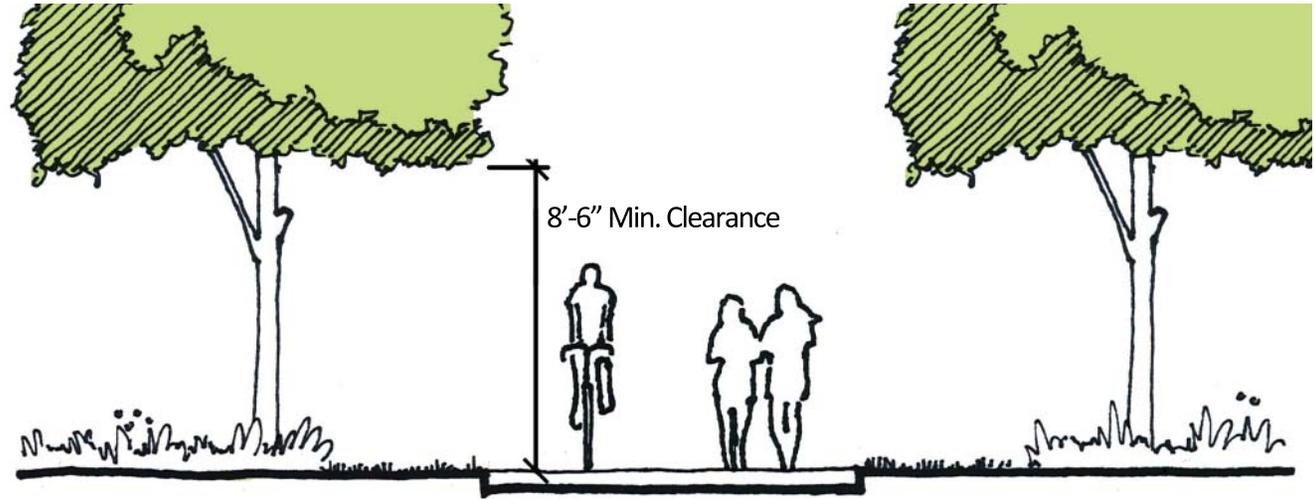
MOWED TURF AREAS ALONG TRAIL

### Trees

Trees are a welcome addition to a trail system providing shade to trail users and separation from adjacent roadways. This Trails Master Plan recommends trees beside trails where there is a 10-foot ground clearance between the trail and adjacent roadways, fences or structures. Location of trees must adhere to jurisdictional requirements for clear lines of sight at intersections. In addition to the horizontal clearance from the trail, a vertical clearance above the trail of 8-1/2 feet is recommended.

The recommendation is to add trees to amenity areas and trail heads. Within environmentally sensitive areas, trees shall be placed based on the context of the trail to enhance the character of the site. Native and adaptive plant materials are recommended for trail projects.

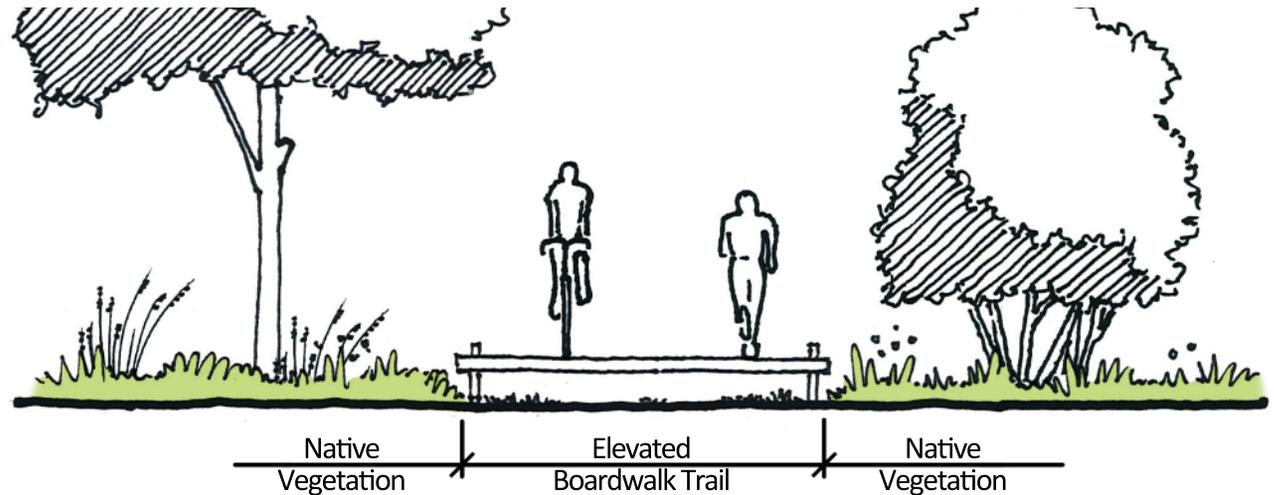




TREE PLANTINGS ADJACENT TO TRAIL

**Native plantings**

The utilization of native grasses or groundcovers or larger shrubs and accent plantings is recommended throughout the trails system. Planting should never hide the trail, but rather be utilized to highlight special areas along the trail, especially at trail heads and amenity areas. Balance the addition of plants along the trail with the city's maintenance program. Plants are to be chosen that do not need constant care or that will grow over the trail and require constant pruning.



NATIVE PLANTINGS ALONG BOARDWALK



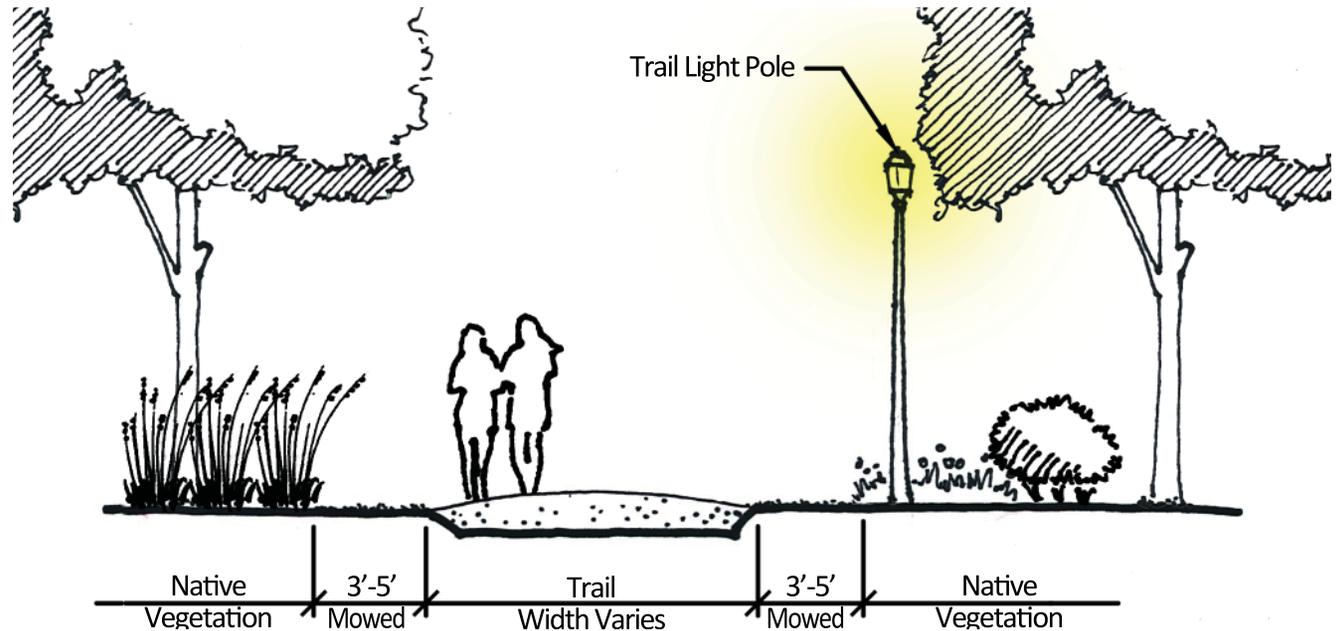


## Lighting

Lighting is recommended for safety at trail heads and along trails designated for night usage such as major park loops. Installation of lighting is expensive and continues to be a maintenance expense. The city should post hours of operation on their web site and on trail signage to inform citizens.

### Lights on Trails in Parks

Trails that are utilized by residents before daylight or after dark should be lit. Provide appropriate pedestrian lighting on the trails, in the amenity areas, trail heads and parking lots. This activity should be promoted by the city on its web site and park signs. In order to balance usage and the cost of installation and upkeep, the city can limit the number of parks available for nighttime usage.



LIGHTING ALONG PARK TRAIL LOOPS

### Lights on Trails Along Roadways

Lighting is not recommended on trails along roadways in League City. Most of the major 10-foot wide trails in this Trails Master Plan are located within county or state rights-of-way and are not controlled by the city.

### Lights on Trails in Easements

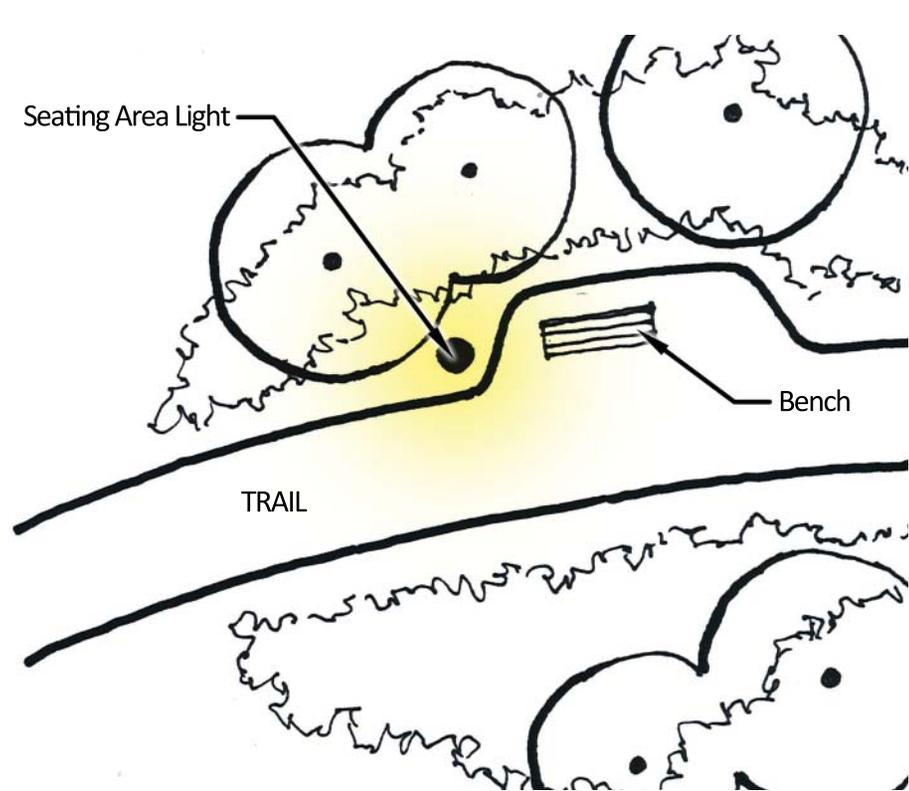
Lighting is not recommended on trails within easements in League City. These linear trails are located on property not owned by the city, are difficult to install and maintain, and are often located behind houses.

### Lights on Trails in Environmentally Sensitive Areas

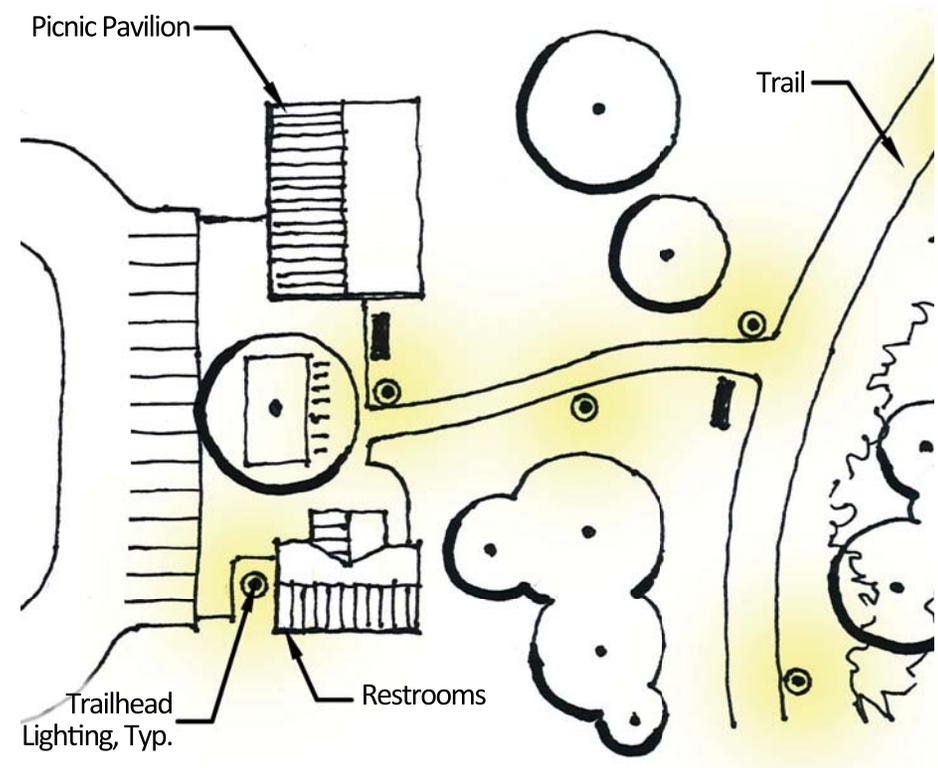
Lighting is not recommended on trails in environmentally sensitive areas. Natural areas are designed to be utilized during daylight hours only and lighting can be detrimental to wildlife in the area.

### Lights in Trail Heads and Amenity Areas

As a standard, the City should light trail heads along major spine trails for security. Facilities that need security lighting include restrooms, pavilions and parking lots. Unless along a lit trail, amenity areas other than those previously listed should not be lit.



LIGHT AT AMENITY AREA (IF TRAIL IS LIT)



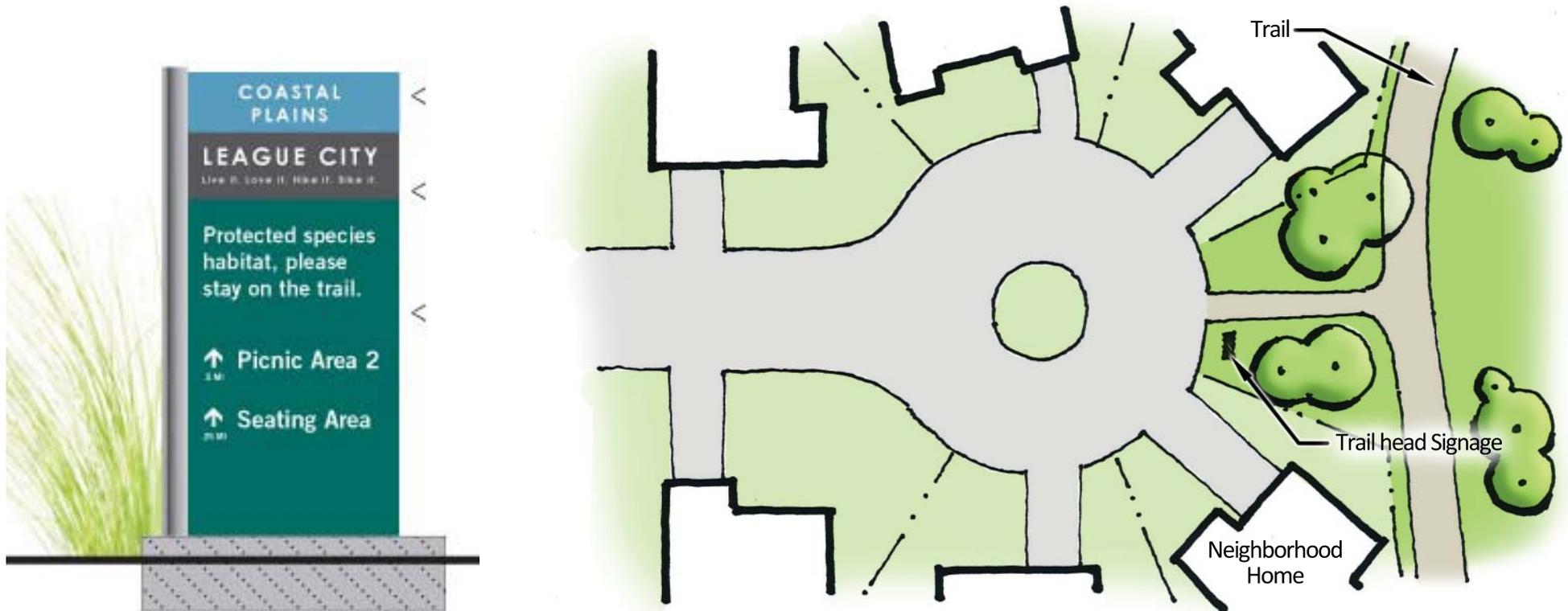
LIGHT AT TRAIL HEAD

# Chapter 5 - Trail Amenities

## Trail Heads

### Neighborhood Entry

Where a trail originates in a neighborhood or along a minor street a Neighborhood Entry is recommended. This type of trail head incorporates trail and directional signage and accent planting only. No additional amenities or parking is provided. Incorporated into the graphics of a Neighborhood Entry are thematic graphics that relate to the trail system's overall theming zones. These entries are not to be lit.



NEIGHBORHOOD TRAIL HEAD



### Minor Trail Head

This type of trail head is recommended along trails where city property is not available. Partnerships with schools and other facilities are to be negotiated by the City to accommodate joint use of parking. Beside parking, it is recommended that only signage is added to the trail head because the property is not owned by the City.

As with the Neighborhood Entry, the Minor Entries should incorporate the graphic theme of the area. At the actual trail, directional signage would be located indicating the trail name and directional guidance. These trail heads are located along the 8 or 10-foot wide trails.

As these trail heads are utilizing shared parking normally not under control of the parks department, lighting is left to the property owner's discretion.



MINOR TRAIL HEAD

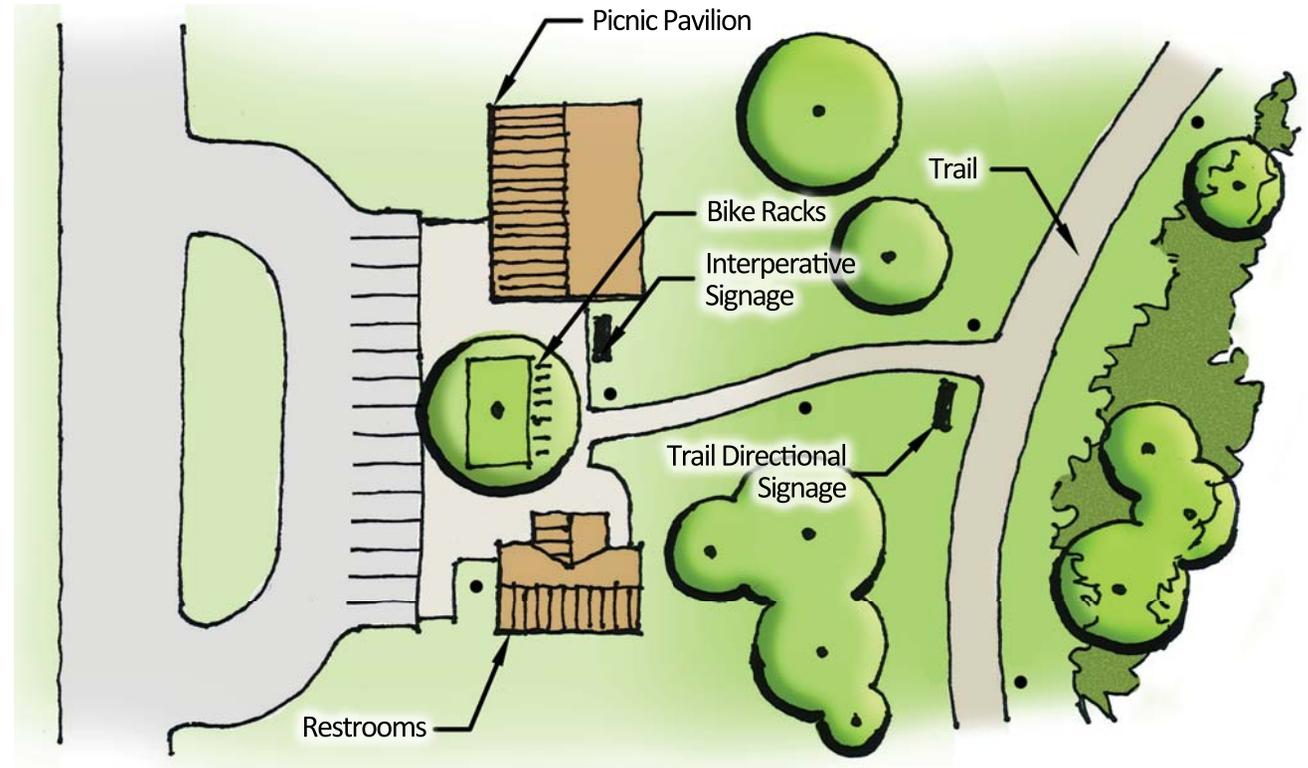




### Major Trail Head

Along the major trails or within parks with trails, a major trail head is recommended. A major trail head includes parking, restroom facilities, drinking fountains, benches, bike racks, exercise stations, picnic tables and shade pavilion. Graphics within the trail head explain the specific trail and the overall trail system. The trail head graphics introduce the theme of the trails and locations of interpretive graphics.

These trail heads are intended for citywide use and at major park facilities and should be sized accordingly and their locations well planned. Lighting of Major Trail Head facilities is recommended on trails with night time users or for security only along other trails.



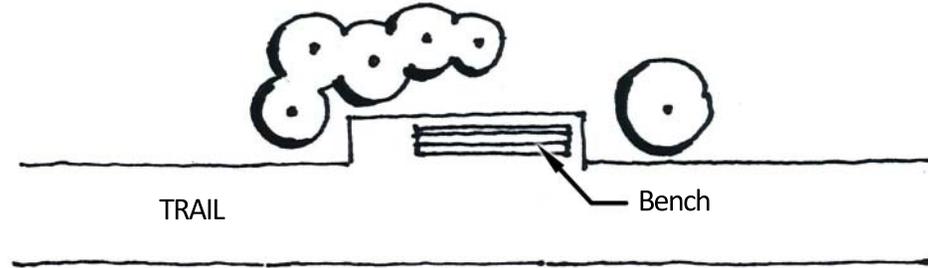
MAJOR TRAIL HEAD



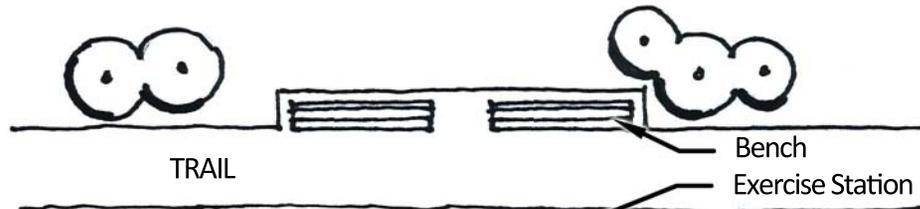


## Amenity Nodes

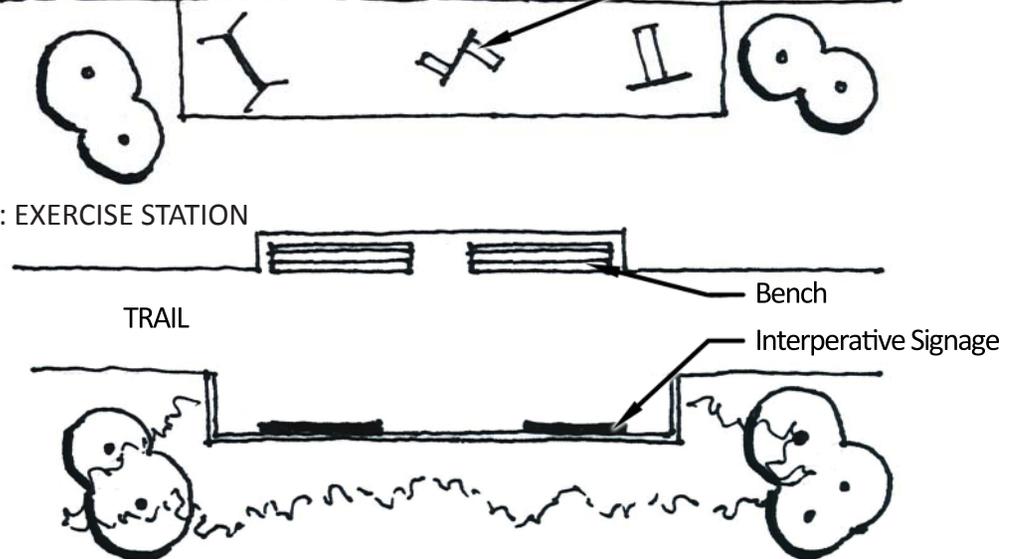
Amenity Nodes are located along the trails in locations other than trail heads. These nodes vary from a simple bench to more elaborate exercise stations or interpretive graphics. Where provided, these areas must be accessible for maintenance and security. Irrigation for planting must be limited to areas where water service is available.



AMENITY NODE: BENCH



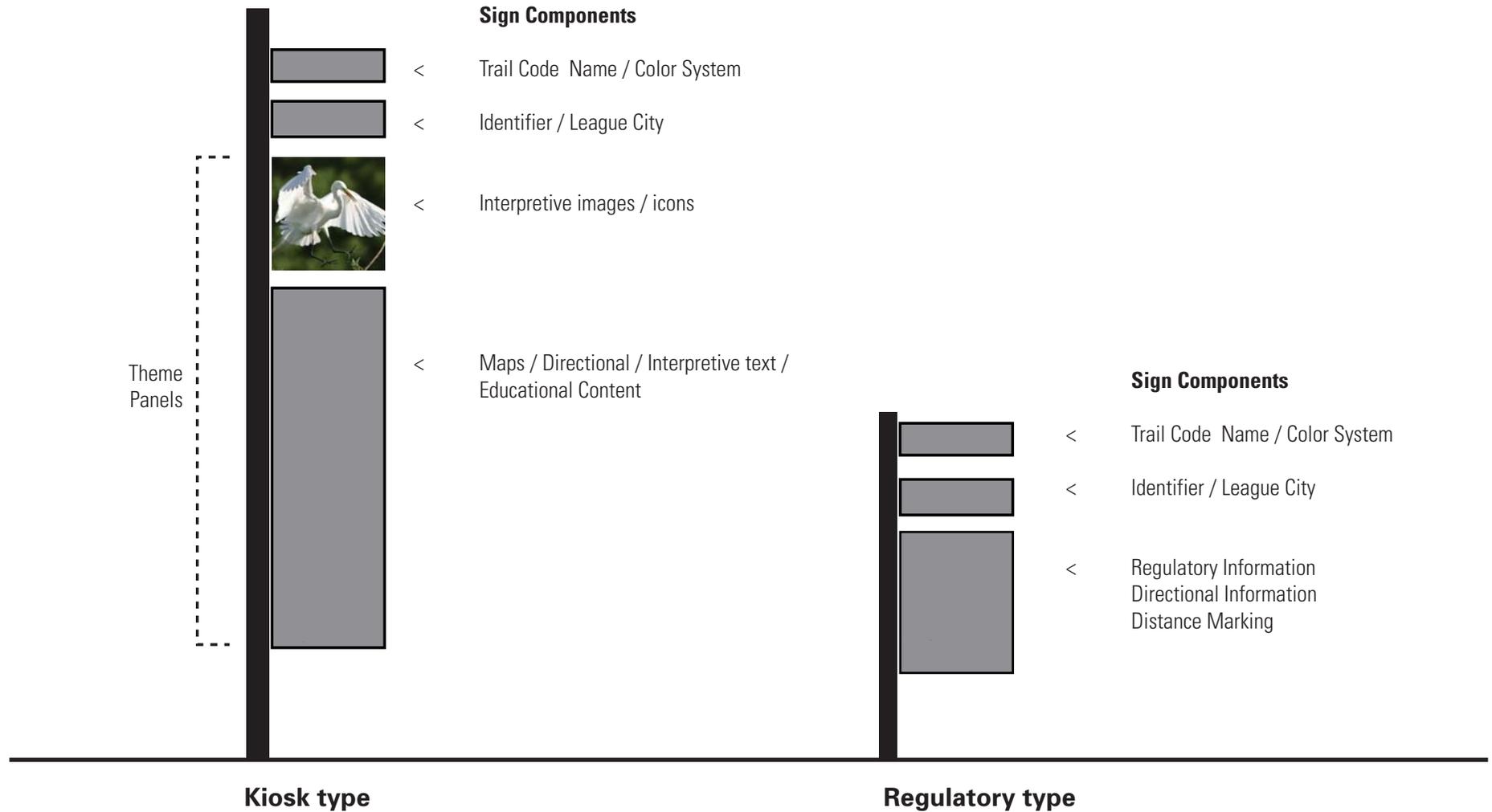
AMENITY NODE: EXERCISE STATION



AMENITY NODE: INTERPRETIVE SIGNAGE

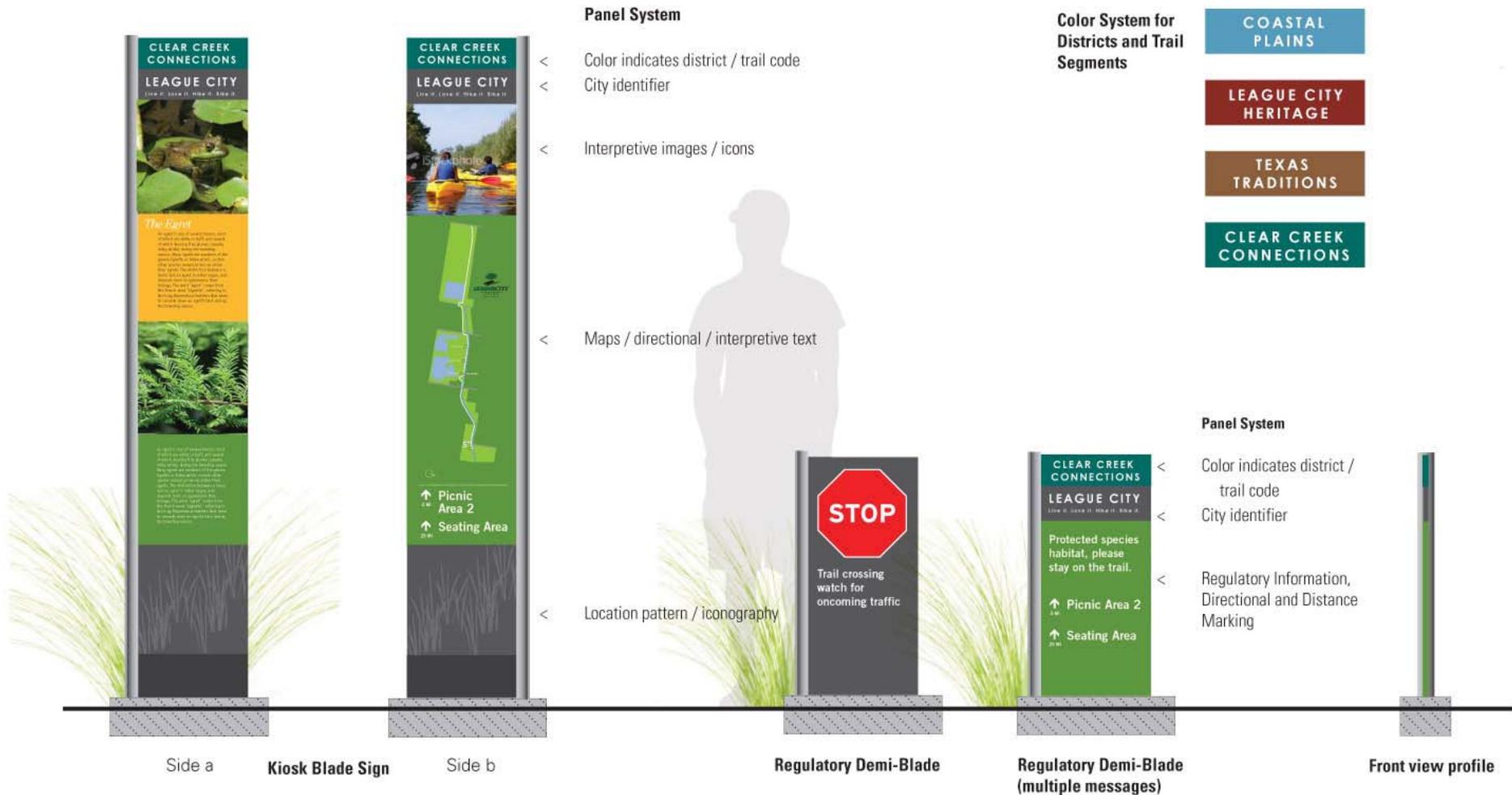
# Chapter 6 - Graphic Standards

## System Approach



# Clear Creek Connections

## LEAGUE CITY trail sign system



League City Texas

LIVE IT. LOVE IT. HIKE IT. BIKE IT.



# League City Heritage

## LEAGUE CITY trail sign system

### Panel System

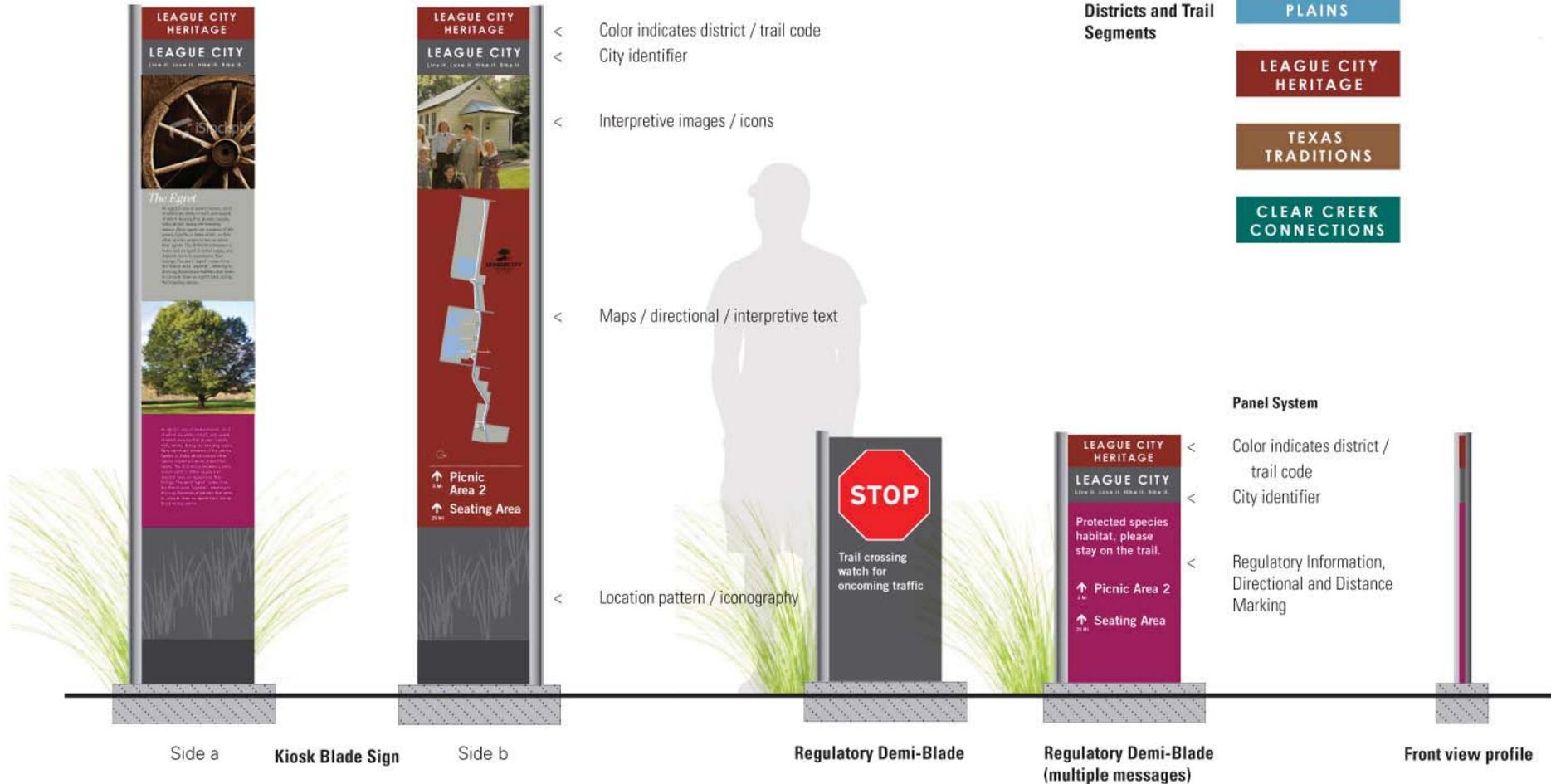
- < Color indicates district / trail code
- < City identifier
- < Interpretive images / icons
- < Maps / directional / interpretive text
- < Location pattern / iconography

### Color System for Districts and Trail Segments



### Panel System

- < Color indicates district / trail code
- < City identifier
- < Regulatory Information, Directional and Distance Marking



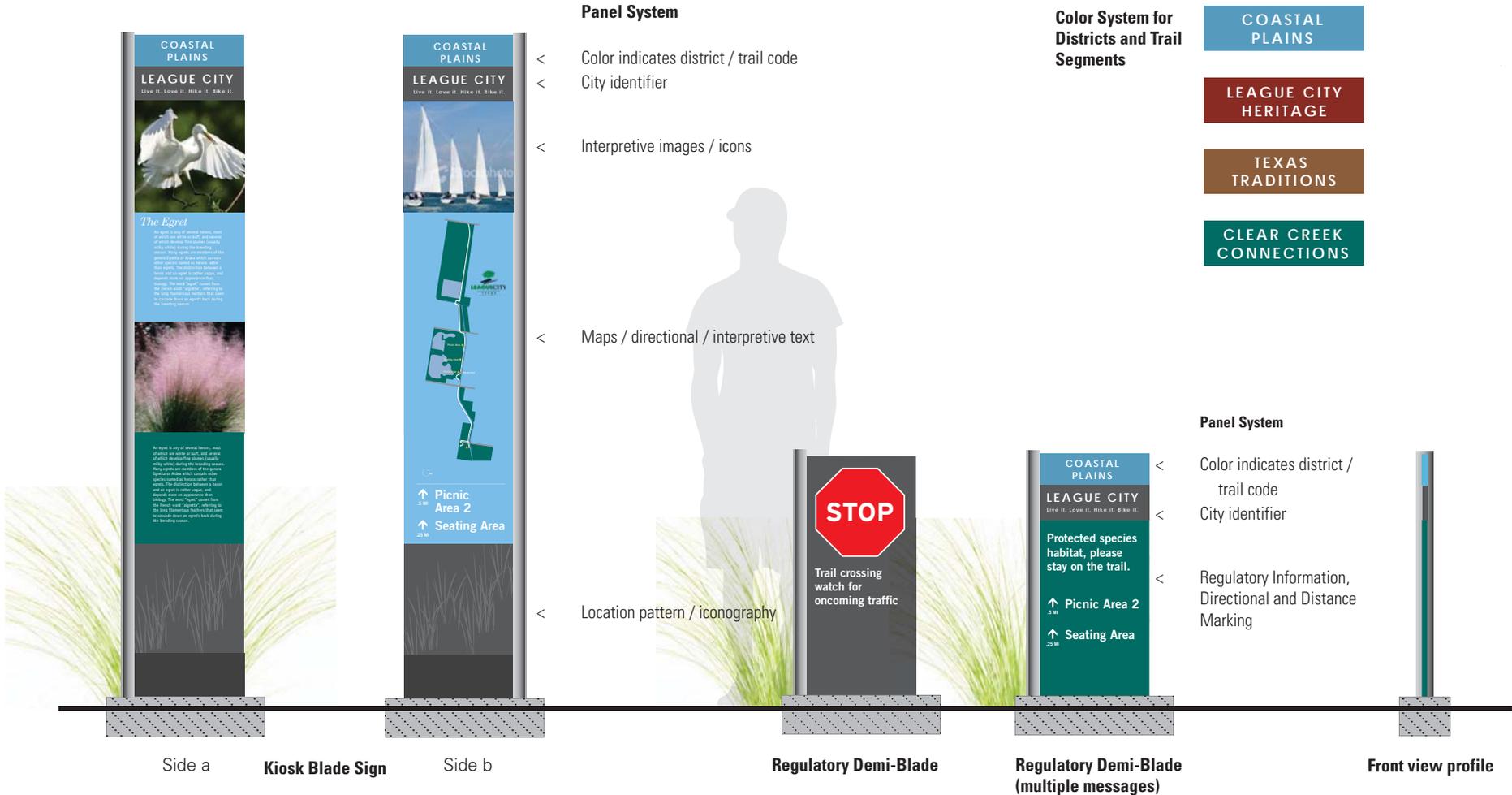
League City Texas

LIVE IT. LOVE IT. HIKE IT. BIKE IT.



# Coastal Plains

# LEAGUE CITY trail sign system



League City Texas  
Master Trails Plan, Signage



# Texas Traditions

## LEAGUE CITY trail sign system

### Panel System

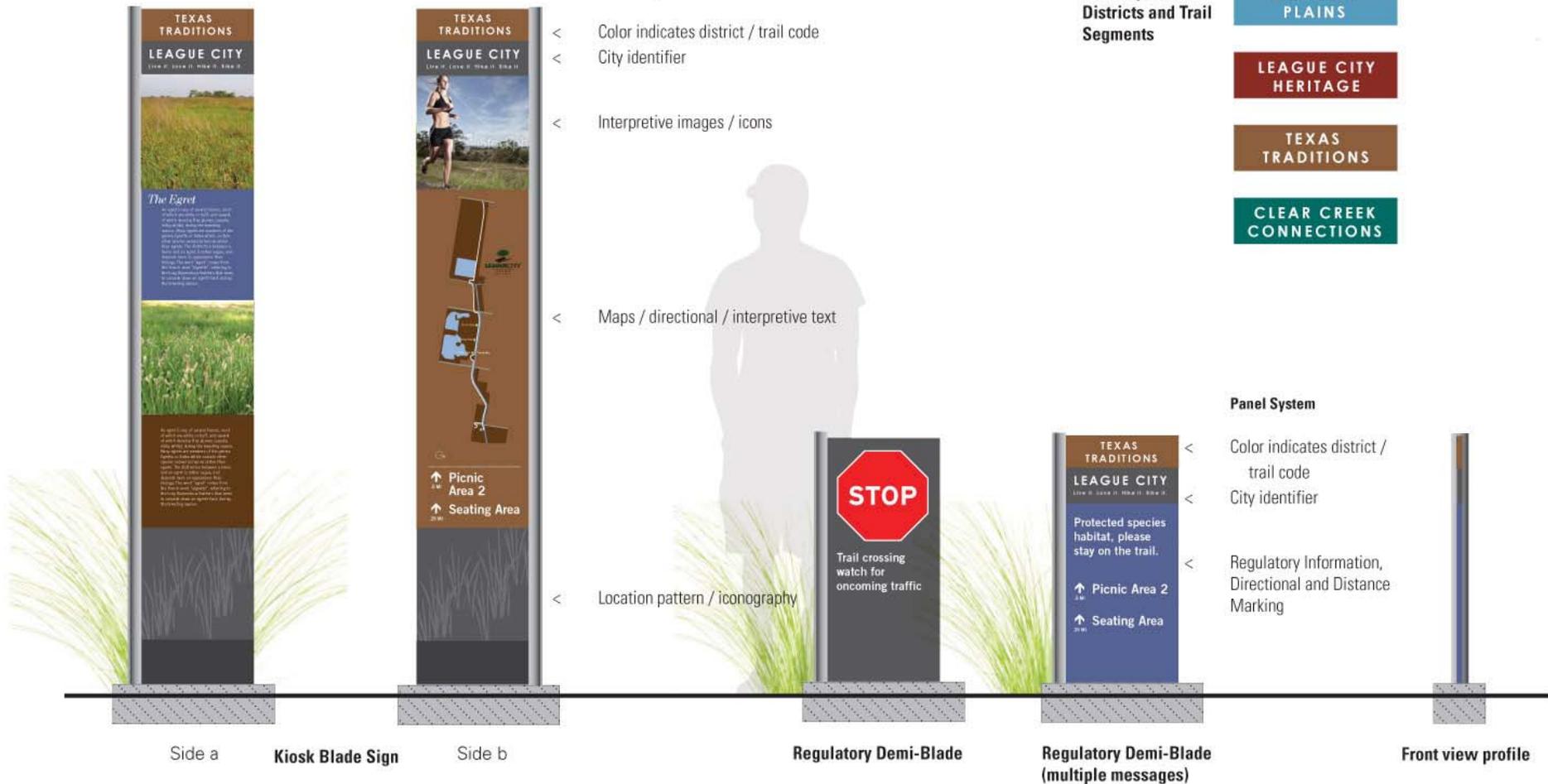
- < Color indicates district / trail code
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### Panel System

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League City Texas

LIVE IT. LOVE IT. HIKE IT. BIKE IT.



# Chapter 7 - Environmental Considerations

The main potential for environmental concerns for the trail system is associated with the filling of Waters of the United States (“Waters”, which is inclusive of wetlands and streams) and oil/natural gas well production and processing.

## Wetlands

Principal Waters in the MTP area include Clear Creek, Magnolia Creek, Robinson Bayou, Cedar Creek and their tributaries and adjacent wetlands. Jurisdictional Waters are subject to U.S. Army Corps of Engineers (USACE) permitting requirements if filled. The USACE is the sole agency in determining whether a Water is in fact jurisdictional. The USACE and the Environmental Protection Agency (EPA) concurrently determine whether a Water is non-jurisdictional and is determined by conducting a significant nexus evaluation. We believe the aforementioned Waters, tributaries and adjacent wetlands would be deemed jurisdictional by the USACE.

Non-jurisdictional Waters do not require a permit if filled. Most of the wetlands and drainage ditches located along, or that cross proposed trail routes, are likely not jurisdictional but may be subject to the significant nexus evaluation.

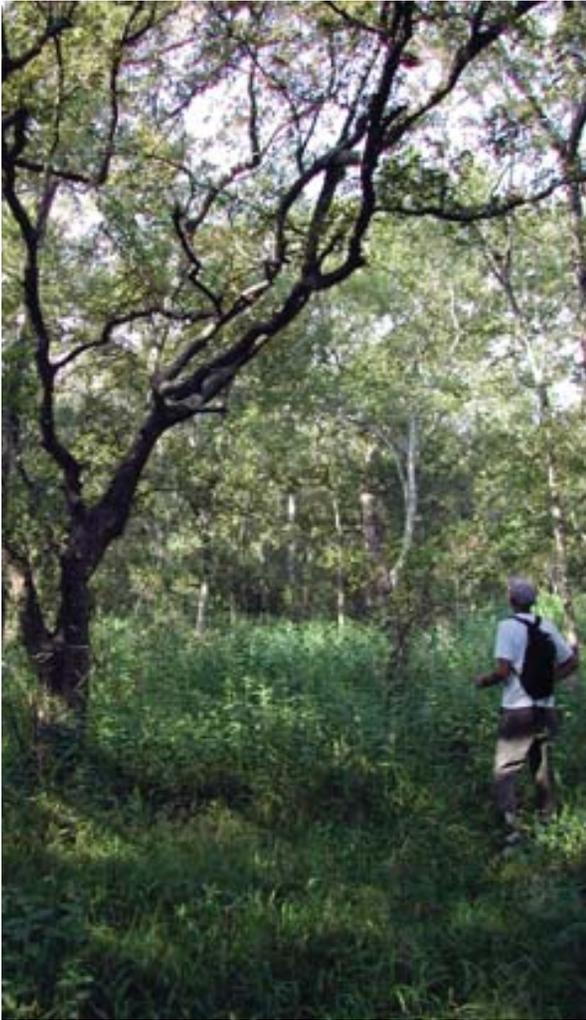
The applicable USACE permits for the project would fall under one or a combination of the following permits:

- Section 404 Standard/Individual Permit;
- Section 404 Nationwide Permit No. 14 – Linear Transportation Projects;
- Section 404 Nationwide Permit No. 18 – Minor Discharges;
- Section 404 Nationwide Permit No. 25 – Structure Discharges;
- Section 404 Nationwide Permit No. 46 – Discharges in Ditches; and/or
- Section 10 Permit

Standard/Individual permits are required for the placement of fill of greater than 0.50 acres of non-tidal Waters. To secure a Standard/Individual permit, the following (at a minimum) will be required:

- Delineation of Waters/Wetlands;





- Verification of the Waters/Wetlands boundaries by the USACE;
- Preparation of the Standard Permit application;
- Completion of Texas Commission on Environmental Quality (TCEQ) Tier 1 or Tier II Section 401 Water Quality Questionnaire/Certification;
- Mitigation plan;
- Federal, state, local, and public notification; and,
- Other potential requirements (e.g., archeological survey, threatened and endangered species survey, etc.).

The Standard/Individual permit process is complex and up to 24-months can elapse before a permit is issued by the USACE. Archeological surveys are commonly required by the USACE for projects along named waterways such as Clear Creek. Less common is the requirement for the completion of a Threatened & Endangered Species survey on a small project.

Nationwide permits are for designed for small-scale projects where the application of fill is 0.50 acres or less, or less than 300 linear feet of impact to a stream bed. To secure a Nationwide Permit, the following, at a minimum, will be required:

- Delineation of Waters/Wetlands;
- Verification of the Waters/Wetlands boundaries by the USACE; and,
- Preparation of the applicable Nationwide Permit application.

Under the Nationwide Permit program, the USACE may require a mitigation plan to offset the impacts and the completion of an archeological survey and/or threatened and endangered species survey. The USACE has a 45-day time frame to process the application but can be stopped if the application is not administratively complete or other potential studies such as an archeological survey are required.

Section 10 permits are required for structures placed into navigable/tidal Waters and the placement of fill adjacent to navigable/tidal Waters. The requirements for a Section 10 Permit are similar to that of the Standard/Individual Permit if wetlands are filled and similar to nationwide permits if only structures such as a boardwalk or piers and pilings are constructed.

The proposed trail route along Clear Creek would be subject to either a Section 10 or Standard/Individual Permit, and the remaining trail routes would be subject to one or a combination of the aforementioned Nationwide Permits if they fall within jurisdictional Waters. As previously stated, most of the wetlands and drainage ditches located along, or that cross proposed trail routes, are likely not jurisdictional. The placement of trails to avoid jurisdictional Waters, where possible, is always recommended.



## Oil/Natural Gas Production & Processing

Present-day and historic oil and natural gas wells are located in the generally undeveloped area on the southwest portion of the city, in particular, that area generally west of Calder Road, north of FM 517, south of Ervin Road and extend west to the city limits.

Surface pits such as drilling mud pits, production pits, and brine pits are known to exist in this area as well as active and inactive wells. Potential oil-field related contamination may be present in and around the surface pits and well heads. Certain trail routes may cross over or near these areas. Soils excavated from these areas should be properly handled and characterized according to governmental standards.

Inactive oil and gas wells may need to be plugged and abandoned and the area assessed for potential soil and/or groundwater contamination. The Trails Master Plan may be modified should any of these be encountered and deemed too costly to proceed.

# Chapter 8 - Subdivision Regulations



## **Existing Ordinance:**

Found within Section 102-5 (20), the current subdivision regulations require a four foot wide sidewalk along street and roadway frontages within residential and commercial developments. It is the desire of the City to provide a mechanism in which future developments contribute to the expansion of the City's trail system.

## **New Development Areas:**

The City will require developers to construct Hike and Bike Trails in accordance with the Trails Master Plan (width, material, etc.). A trail within a right-of-way alignment can be constructed in lieu of a sidewalk on the same side of the street. The trail alignments shall be coordinated with the Trails Master Plan, neighboring developments, schools, parks, etc. to maximize connectivity.

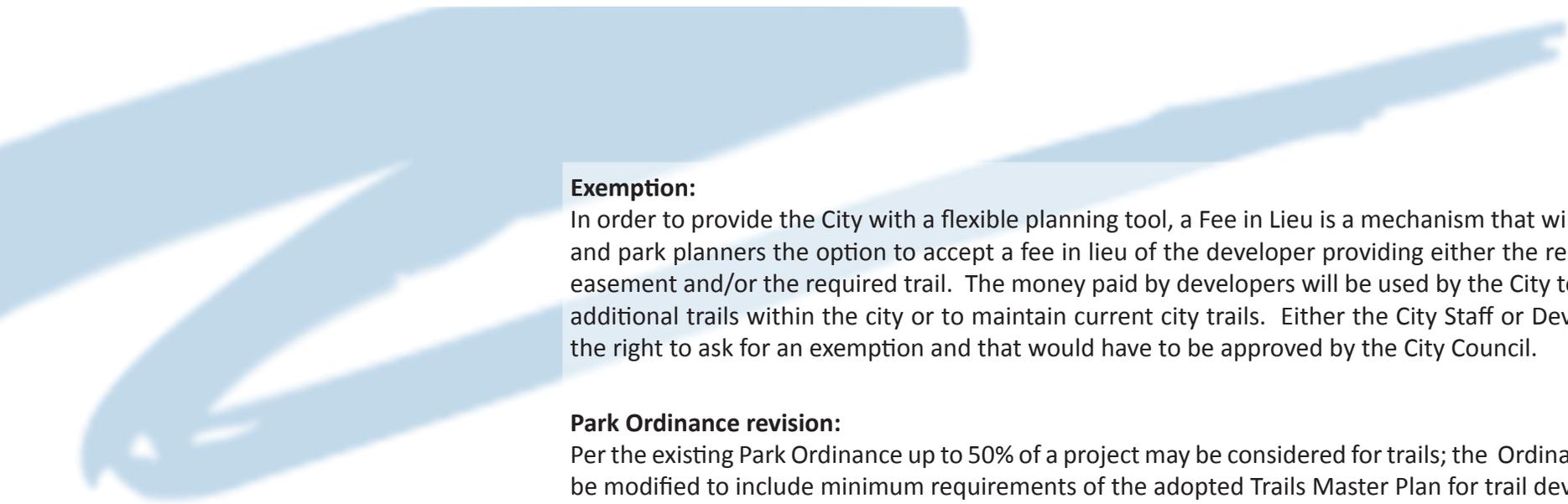
Trails along collector roads (without single family home frontages) shall be constructed with the roadway. Trails along interior streets (with single family home frontages) can be constructed along with home building. A bond may be required to ensure the trail is completed in front of vacant lots.

In this alternative, the developer would construct the trail surface improvements, any associated drainage improvements, and any associated traffic improvements. The City would follow behind the developer and implement the trail markers, amenities and signage.

## **Re-Development Areas:**

This section is intended to address redevelopment in the older portions of the City, and to facilitate implementation of the trail master plan ahead of or instead of City-funded trail projects. As property along a defined trail within the Trail Master Plan is redeveloped, any existing sidewalk shall be removed, and a trail shall be constructed in accordance with the Trails Master Plan. Special attention shall be paid to connectivity to adjacent parcels and developments, as well as transitions from new trail widths to the existing adjacent sidewalks.

In this scenario, the developer would construct the trail surface improvements, any associated drainage improvements, and any associated traffic improvements. The City would follow behind the developer and implement the trail markers, Amenities and signage.



**Exemption:**

In order to provide the City with a flexible planning tool, a Fee in Lieu is a mechanism that will allow city and park planners the option to accept a fee in lieu of the developer providing either the required trail easement and/or the required trail. The money paid by developers will be used by the City to construct additional trails within the city or to maintain current city trails. Either the City Staff or Developer has the right to ask for an exemption and that would have to be approved by the City Council.

**Park Ordinance revision:**

Per the existing Park Ordinance up to 50% of a project may be considered for trails; the Ordinance should be modified to include minimum requirements of the adopted Trails Master Plan for trail development.



# Chapter 9 - Trails Master Plan

From a collection of almost 12 twelve miles of disjointed trails in 2009 to a unified system of trails that connect us to our environment, our heritage, our traditions and our future, the 212 miles of trails shown in this chapter are the beginning point of a grand vision to improve the Quality of Life for the citizens of League City. Each with a story to tell, these trails allow League City to connect and commute, provide community well being and athletic training.

The trails are shown within their four thematic zones celebrating:

- Clear Creek Connections
- League City Heritage
- Coastal Plains
- Texas Traditions

## Existing Trails

### 11.5 Miles

Trail Name	Distance
• Westover Park	1.1 Miles
• Magnolia Creek	1.0 Miles
• Magnolia Creek Ln.	1.5 Miles
• Palomino Ln.	0.5 Miles
• Calder Rd.(North)	0.6 Miles
• Walker St.	1.1 Miles
• FM 518	2.7 Miles
• Austin St.	1.3 Miles
• FM 646	1.7 Miles

## Funded Trails

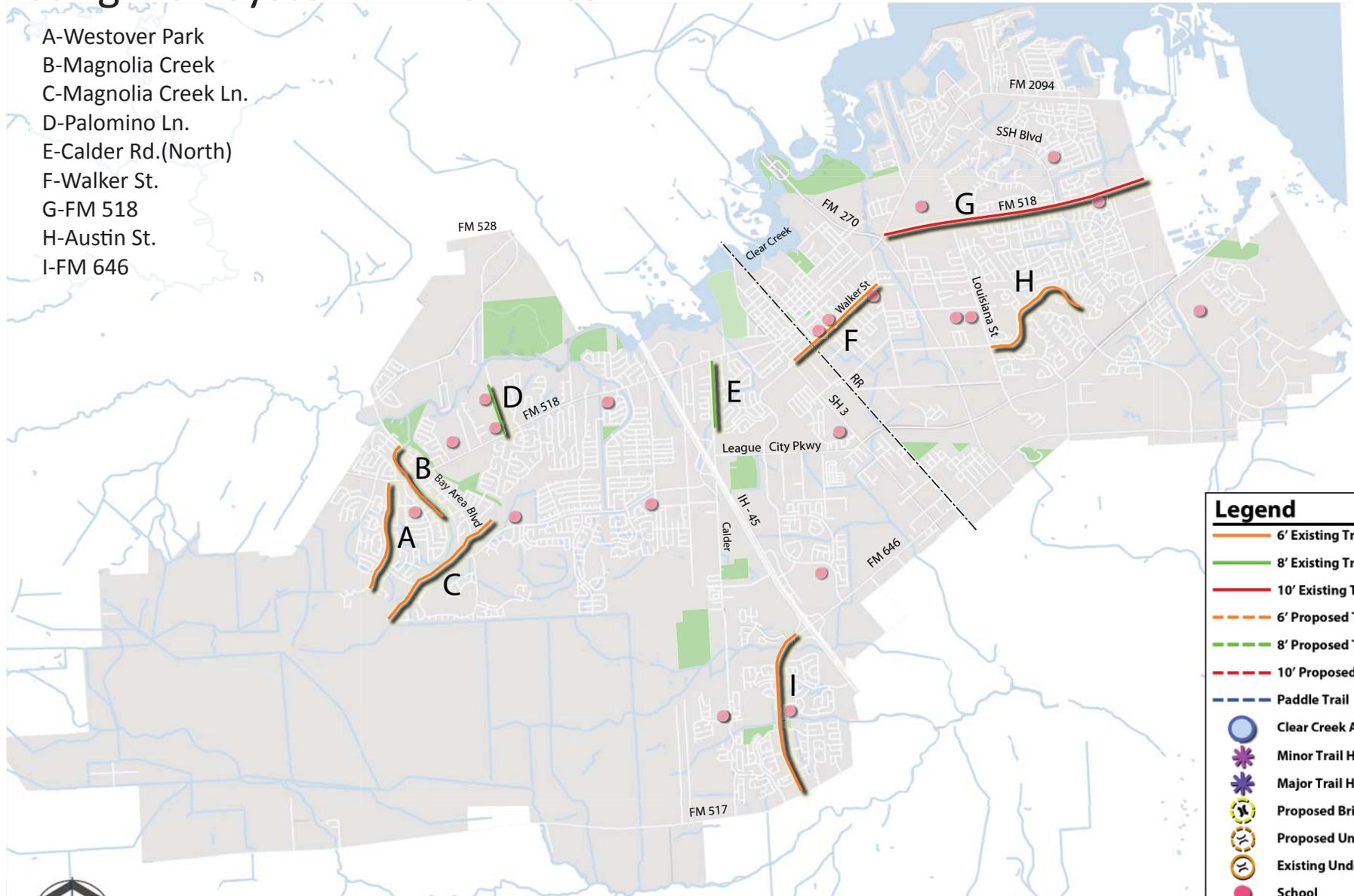
### 5.5 Miles

Trail Name	Distance
• Magnolia Creek Extention	0.5 Miles
• Calder Rd. (South)	1.0 Miles
• Lousiana St.	1.9 Miles
• FM 270	1.1 Miles
• FM 518 Bypass	1.0 Miles



# Existing Trail System - 11.5 Miles

- A-Westover Park
- B-Magnolia Creek
- C-Magnolia Creek Ln.
- D-Palomino Ln.
- E-Calder Rd.(North)
- F-Walker St.
- G-FM 518
- H-Austin St.
- I-FM 646



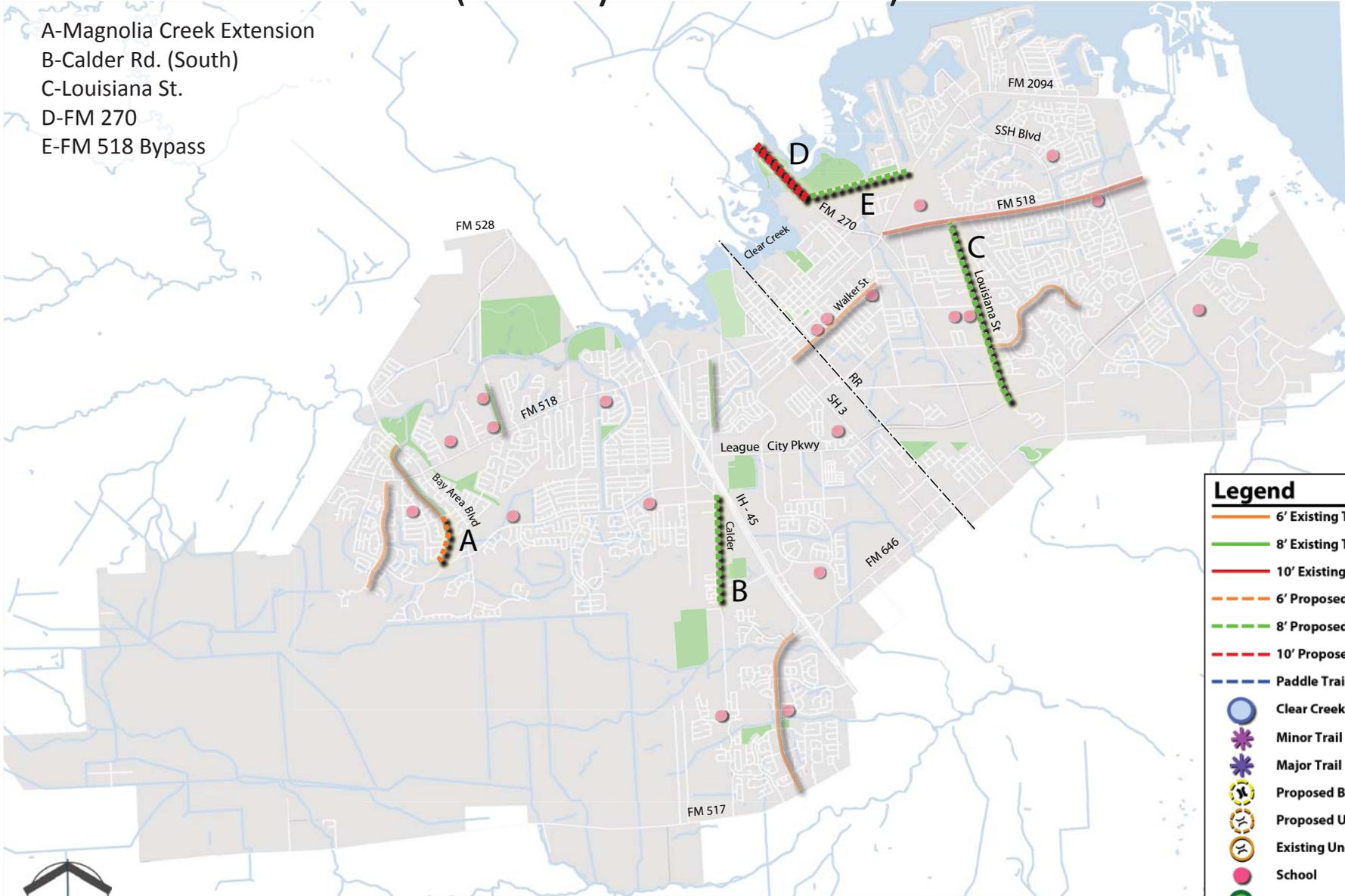
**Legend**

- 6' Existing Trails
- 8' Existing Trails
- 10' Existing Trails
- - - 6' Proposed Trails
- - - 8' Proposed Trails
- - - 10' Proposed Trails
- - - Paddle Trail
- Clear Creek Access
- ✿ Minor Trail Head
- ✿ Major Trail Head
- ⚙ Proposed Bridge
- ⚙ Proposed Underpass
- ⚙ Existing Underpass
- School
- External Connections
- Existing Park



# Funded Trails - 5.5 Miles (Total System 17 Miles)

- A-Magnolia Creek Extension
- B-Calder Rd. (South)
- C-Louisiana St.
- D-FM 270
- E-FM 518 Bypass

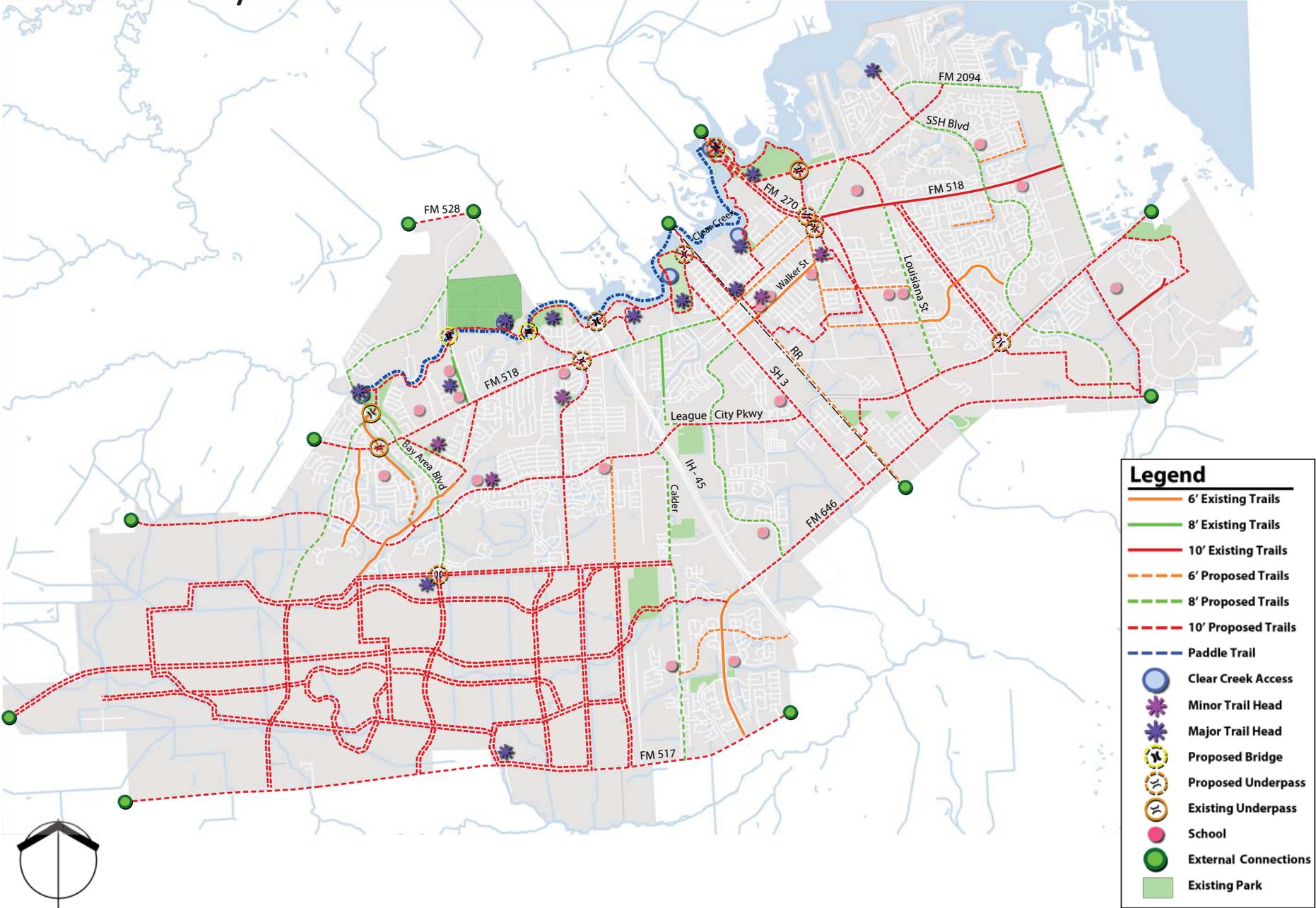


**Legend**

- 6' Existing Trails
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- - - 10' Proposed Trails
- - - Paddle Trail
- Clear Creek Access
- ✿ Minor Trail Head
- ✿ Major Trail Head
- ⊗ Proposed Bridge
- ⊗ Proposed Underpass
- ⊗ Existing Underpass
- School
- External Connections
- Existing Park



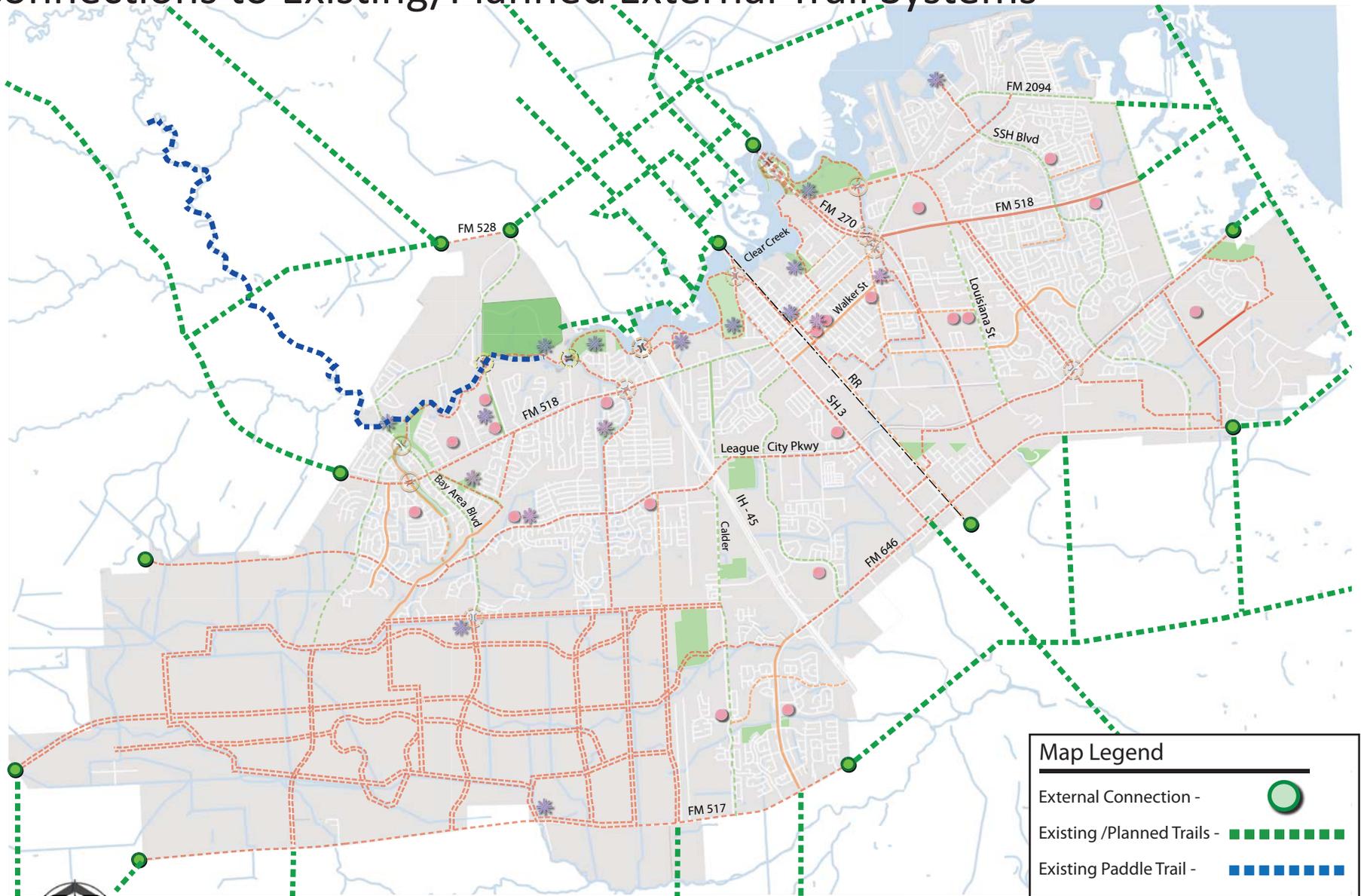
# Planned Trail System - 212 Miles



Legend	
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	8' Existing Trails
	10' Existing Trails
	6' Proposed Trails
	8' Proposed Trails
	10' Proposed Trails
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	Clear Creek Access
	Minor Trail Head
	Major Trail Head
	Proposed Bridge
	Proposed Underpass
	Existing Underpass
	School
	External Connections
	Existing Park



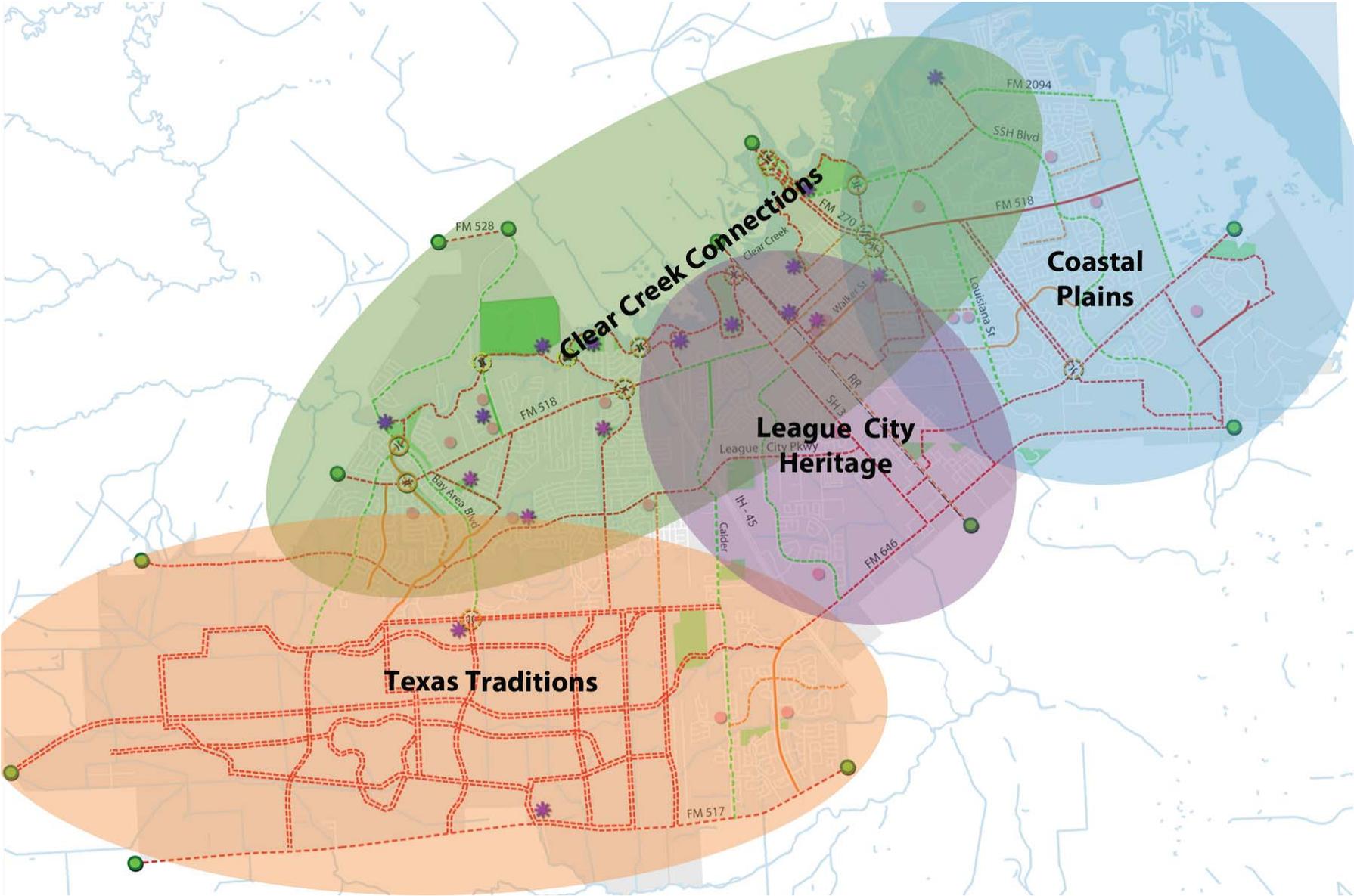
# Connections to Existing/Planned External Trail Systems



Sources: HGAC  
City of Webster Master Plan  
Harris County  
Houston Parks & Recreation Department



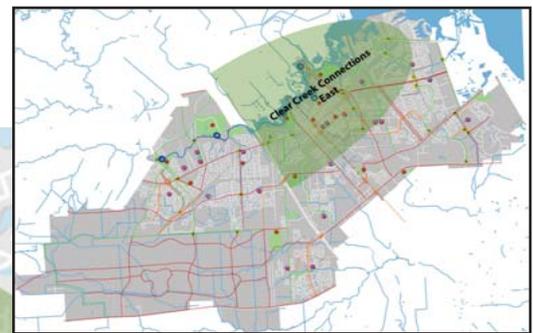
# Citywide Thematic Zones



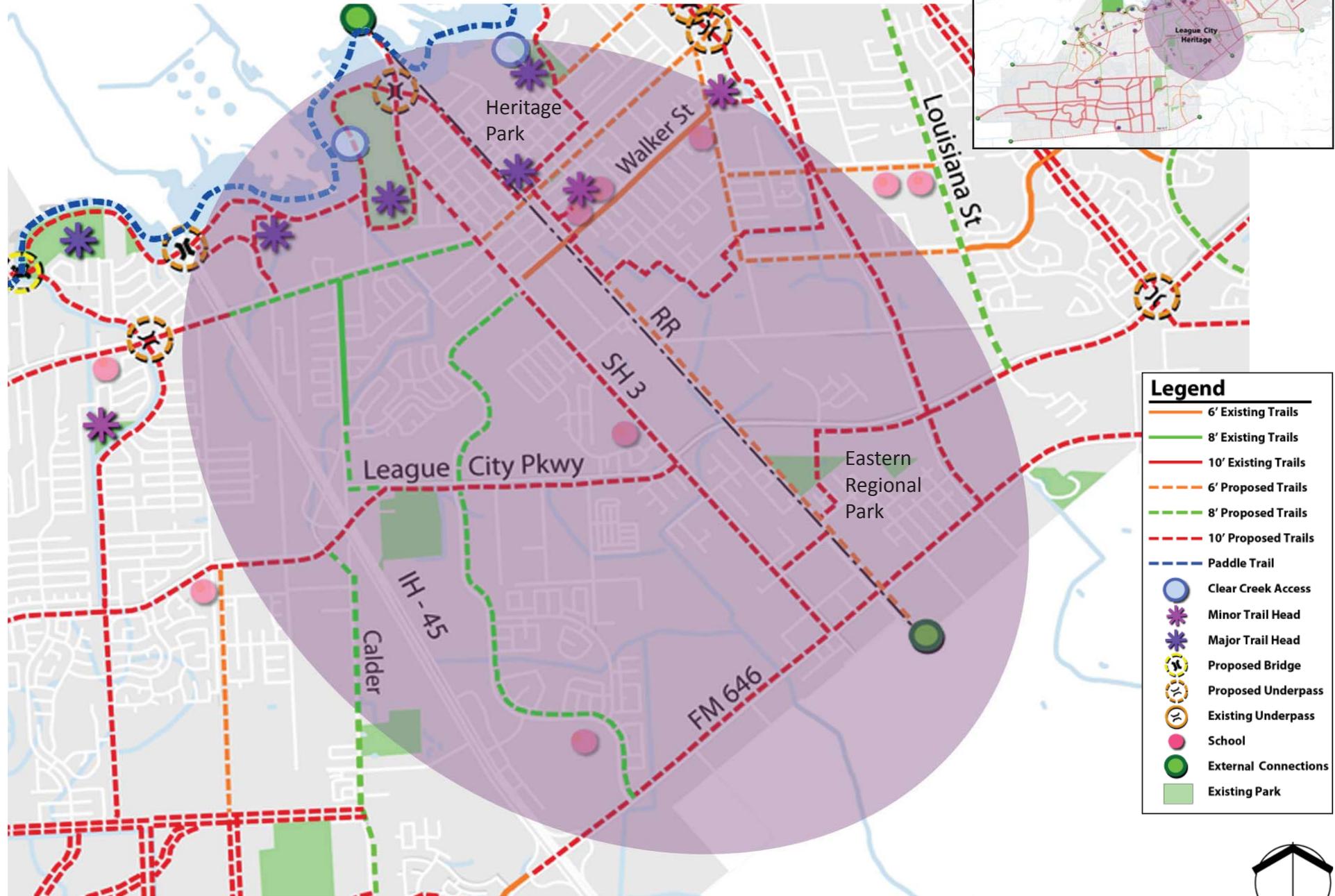
# Clear Creek Connections (West)



# Clear Creek Connections (East)

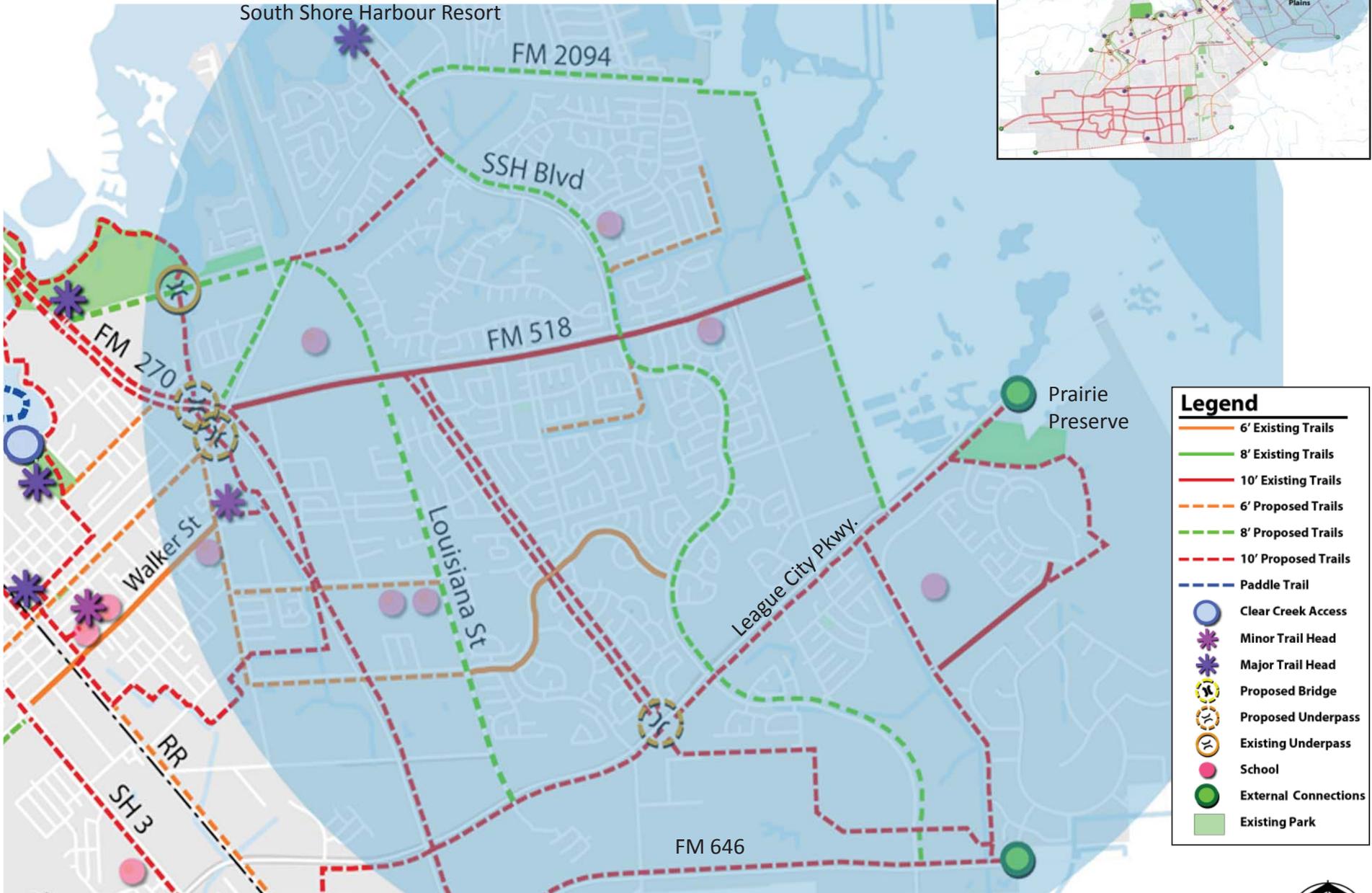


# League City Heritage



# Coastal Plains

South Shore Harbour Resort

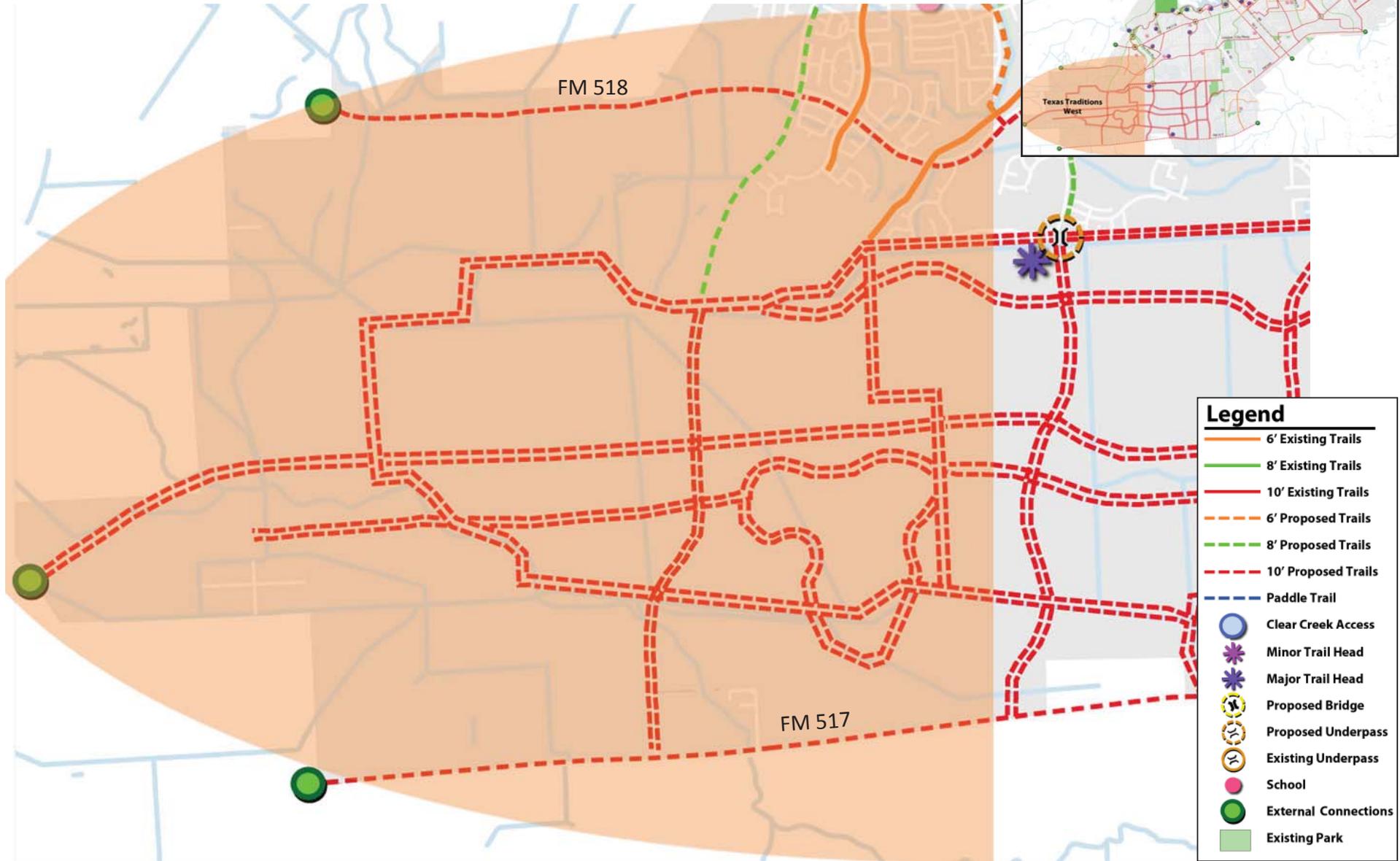


**Legend**

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- - - 10' Proposed Trails
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- ⊗ Proposed Bridge
- ⊗ Proposed Underpass
- ⊗ Existing Underpass
- School
- External Connections
- Existing Park



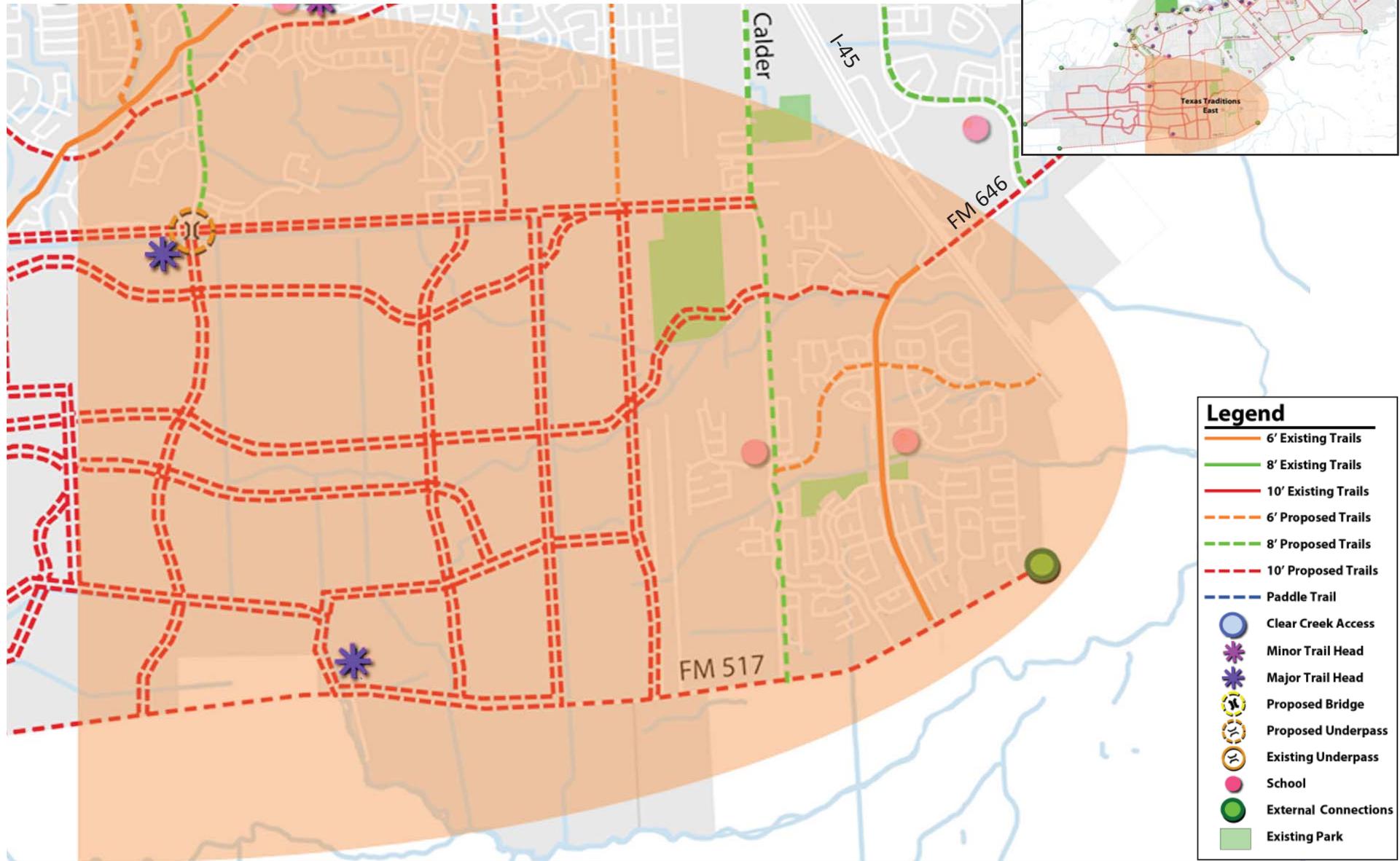
# Texas Traditions (West)



Legend	
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	8' Existing Trails
	10' Existing Trails
	6' Proposed Trails
	8' Proposed Trails
	10' Proposed Trails
	Paddle Trail
	Clear Creek Access
	Minor Trail Head
	Major Trail Head
	Proposed Bridge
	Proposed Underpass
	Existing Underpass
	School
	External Connections
	Existing Park



# Texas Traditions (East)



# Chapter 10 - Phasing

A system of trails encompassing over 200 miles of built trails is not constructed at once. The adoption of the Trails Master Plan expresses an interest by the City to fund the expansion and maintenance of its trail system. The completion of the trails network can be a 20-year effort and will take the concerted efforts of the city, county, state and private developers to complete. The phasing of the trails network is proposed as follows:

- 11.5 miles of existing trails
- 5.5 miles of funded trails

There are 195 miles of trails to construct of which 63 miles of trails are proposed along future roads. The remaining 132 miles of trails is shown as Phase I or Future Phase trails below:

- 23.5 miles of Phase I trails
- 108.5 miles of Future Phase trails

Construction cost will vary per trail segment, but as a rule of thumb, in 2010 construction dollars there should be approximately \$500,000\* per mile budgeted for the trail and associated graphics and amenities. Estimated construction costs do not include land acquisition costs or professional services.

In addition to construction costs the City must allocate additional funding for trail maintenance which will again vary per trail but range in 2010 costs between \$12,000 per mile for concrete trails and \$30,000 per mile for decomposed granite trails. These maintenance costs not only factor in mowing and edging of the trails, but also incorporate a pro-rated resurfacing cost of the different trail types based on their anticipated life-span.

The City has or will soon have 17 miles of trail and therefore should be allocating roughly \$200,000 per year for maintenance of its current system. Maintenance costs may be offset by county and state maintenance programs on the existing trails as well as maintenance programs within private developments (ie. master planned communities) which already provide for some of the maintenance including mowing and edging of the trails.

See Appendix A for a breakdown of typical construction and maintenance costs.



## Construction Phasing

2010 through 2030

Construct 132 miles of trails at an estimated construction cost of \$69,950,000 (Future Road Developments trails will be built when new roads and development occur in the southwest portion of the city).

**Phase One (2010 - 2015)**

23.65 Miles = \$4,630,000

**Future Phases (2015 - 2030)**

108.35 miles = \$65,320,000

**Future Road Developments Trail Expansion (Timeline Not Applicable)**

63 miles = \$31,500,000

### Phase One

2010 - 2015

23.65 Miles = \$4,630,000

Trail Name	Distance	Material	Cost
<b>Signature Trails:</b>			
<b>Clear Creek Connections (Clear Creek Trail)</b>			
• South Shore Harbour	.65 Mile	Concrete	\$189,000
<b>Coastal Plains (Tall Grass Prairie Trail)</b>			
• Pipeline Loop	3.55 Mile	DG	\$722,000
• League City Pkwy. (Pipeline to Prairie Preserve)	1.5 Mile	Concrete	\$525,000
<b>League City Heritage (Heritage Trail)</b>			
• Downtown Connector	.77 Mile	Concrete	\$268,000



**Other Trails:**

<b>Trail Name</b>	<b>Distance</b>	<b>Material</b>	<b>Cost</b>
• Clear Creek Paddle Trail	9.5 Mile	Waterway	\$300,000
• League City Pkwy. (E. Regional Park to Pipeline)	1.5 Mile	Concrete	\$525,000
• Walker St.	3.01 Mile	Concrete	\$875,000
• Rustic Oaks Trail	1.24 Mile	Concrete	\$432,000
• League City Pkwy. (Sports Park to Walker St.)	.38 Mile	Concrete	\$162,000
• Calder Rd.	1.25 Mile	Concrete	\$363,000
• League City Pkwy. (Westover Pk. to Magnolia Ck.)	.3 Mile	Concrete	\$100,000
• Magnolia Creek Trail (Upgrade Existing)			\$169,000

**Future Phases**

(2015 - 2030)

108.4 miles = \$65,320,000

<b>Trail Name</b>	<b>Distance</b>	<b>Material</b>	<b>Cost</b>
<b>Signature Trails:</b>			
<b>Clear Creek Connections (Clear Creek Trail)</b>			
• Remainder	12.5 Mile	Concrete	\$16,580,000
<b>League City Heritage (Heritage Trail)</b>			
• Remainder	5.0 Mile	Concrete	\$2,500,000
<b>Coastal Plains (Tall Grass Prairie Trail)</b>			
• Remainder	5.0 Mile	Concrete	\$2,500,000
<b>Texas Traditions (Texas Traditions Trail)</b>			
• Complete Trail	30.0 Mile	DG/Conc.	\$15,000,00



**Other Trails:**

<b>Trail Name</b>	<b>Distance</b>	<b>Material</b>	<b>Cost</b>
• Chargers Trail	4.0 Mile	Concrete	\$2,000,000
• Challenger 7 Park Loop	3.0 Mile	DG	\$1,500,000
• South Shore Harbour Trail	8.0 Mile	Concrete	\$4,000,000
• W. Main Trail (west of I45)	2.0 Mile	Concrete	\$1,000,000
• W. Main Trail (RR to I45)	1.5 Mile	Concrete	\$750,000
• E. Main Trail	1.0 Mile	Concrete	\$500,000
• FM 2094 Trail	1.5 Mile	Concrete	\$750,000
• League City Parkway Trail (west of I45)	1.3 Mile	Concrete	\$1,000,000
• League City Parkway/Railroad Connector	4.5 Mile	Concrete	\$2,500,000
• Bay Area Boulevard Trail	2.5 Mile	Concrete	\$1,250,000
• Riverbend Trail	0.5 Mile	Concrete	\$250,000
• Austin Trail	1.0 Mile	Concrete	\$500,000
• FM 646 Trail	4.0 Mile	Concrete	\$2,000,000
• FM 270 Trail	1.0 Mile	Concrete	\$500,000
• Coryell Trail	0.5 Mile	Concrete	\$250,000
• FM 517 Trail	6.0 Mile	Concrete	\$3,000,000
• Cross Colony Trail	1.5 Mile	Concrete	\$750,000
• Maple Leaf Trail	1.0 Mile	Concrete	\$500,000
• Grissom Trail	2.5 Mile	Concrete	\$1,250,000
• FM 528 Trail	0.5 Mile	Concrete	\$250,000
• Calder Trail	2.0 Mile	Concrete	\$1,000,000
• Dickinson Road Trail	3.0 Mile	Concrete	\$1,500,000
• SH3 Trail	1.5 Mile	Concrete	\$750,000
• Texas Ave. Trail	1.0 Mile	Concrete	\$500,000
• Louisiana Trail	0.5 Mile	Concrete	\$250,000

**Future Road Development Trail Expansion  
Timeline Not Applicable**



# Phase I Trails

- 23.65 Miles

- \$4,630,000

## Signature Trails

### Clear Creek Connections

A-Clear Creek Trail (South Shore Harbour Blvd.)

### Coastal Plains

B-Tall Grass Prairie Trail - Pipeline - (DG)

C-Tall Grass Prairie Trail - (League City Pkwy. Pipeline-Prairie Preserve)

### League City Heritage

D-Heritage Trail (Downtown Connector)

### Other Trails

E-Clear Creek Paddle Trail

F-League City Pkwy. (East Regional Park -Pipeline)

G-Walker St.

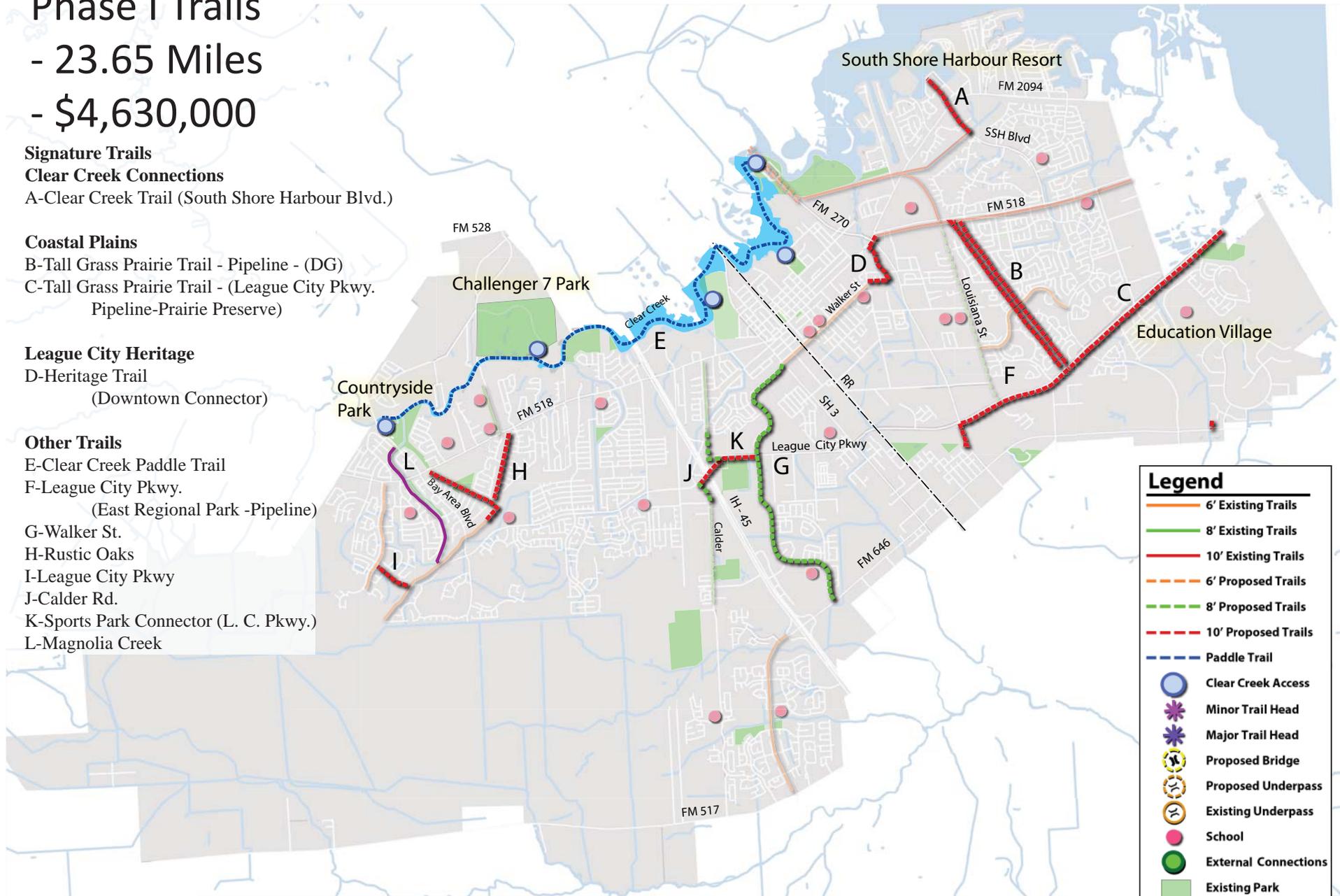
H-Rustic Oaks

I-League City Pkwy

J-Calder Rd.

K-Sports Park Connector (L. C. Pkwy.)

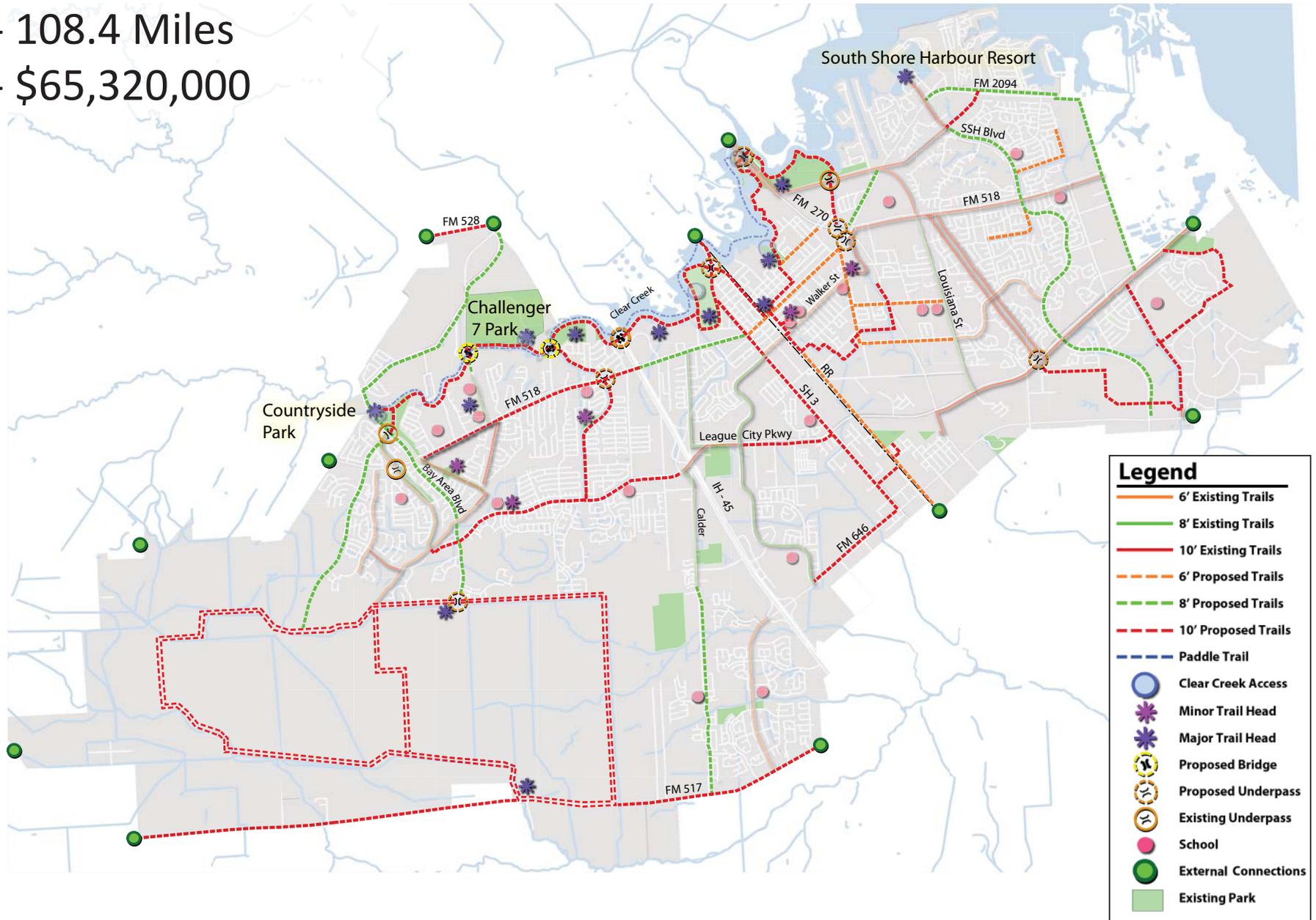
L-Magnolia Creek



# Future Phases Trails

- 108.4 Miles

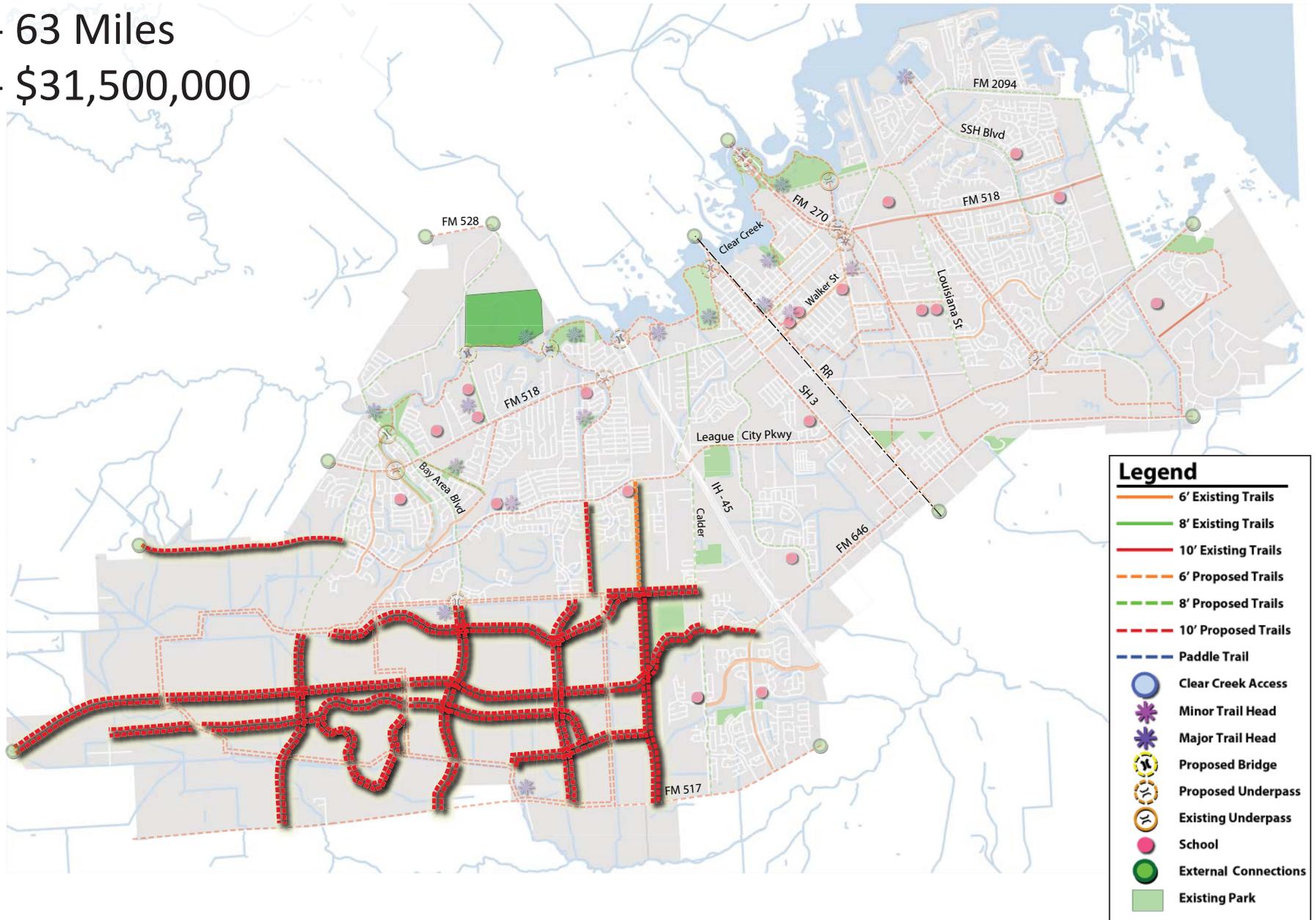
- \$65,320,000



# Future Road Development Trail Expansion

- 63 Miles

- \$31,500,000



# Chapter 11 - Implementation and Funding

## Implementation

Once the City has decided to move forward on the implementation of the next trail or trail phase City staff will become involved in determining funding sources for the project. Many funding sources exist for trail construction and staff should be proactive and look at future projects for potential funding partners prior to the design kick off.

The Planning and Public Works Departments along with the Parks Planning and Development Department should keep on top of proposed state and county road projects to insure the inclusion of trail segments within these construction efforts. As private developers present Planned Unit Developments to the City for review and approval trails should be considered for construction by the private sector. All sectors of city government as well as public and private entities must buy in to the concept of **Trails – Live It, Love It, Hike It, Bike It!** so that trails become an integral part of life in League City in order to accomplish the major goals of this Master Plan.



## Funding

The City staff will determine a scope and budget and then determine funding sources for the design and construction. If land acquisition is needed for a trails project the City should begin that process. Additional upfront investigation includes environmental assessments and surveying which can be included in the consultant team's work or can be a stand alone contract with the City.

Based on the funding source(s) the project may be all designed and constructed by the City or the project may be designed and constructed through one of the partnering entities such as TxDOT, Galveston, Harris County or a private developer. If the trail is being designed and implemented by another entity the City may still be required to design, construct and pay for the added amenities on the project including standard city graphics, site furnishings, trail heads and plantings.



**Potential Funding Sources:**

City funding including:

- City Parkland dedication fees
- City 4B Board - Sales Tax
- City general obligation bond funds
- Future capital improvements
- Community volunteer groups
- Utility company partnerships

County funding including:

- County CIP projects (including new or improved roadway projects)
- Park bond funds
- Trail development within county parks
- Municipal Utility District – funding through Parks Bonds
- School District

State funding including:

- TxDOT roadway projects (including new or improved roadway projects)
- TxDOT Transportation Enhancement Program (80% state/20% local)
- Texas Parks & Wildlife matching grants (50% state/50% local)

Federal funding including:

- Safe Routes to School program
- Community Development Block Grants
- Congestion Mitigation and Air Quality (Alternate Transportation Route funding)

Private developer funding including:

- Subdivision or Parkland Dedication Ordinance
- Private developer amenity improvements
- PUD requirements
- Home Owners Associations



## **The Design Process**

The start of the process will vary. The City may work through the master plan by phases or another entity may present a trail opportunity that the City will need to act on. Several time consuming efforts can face the City and need to be addressed early in the process. Those include grant applications and funding opportunities outside of known City funding sources; environmental/archeological determinations along the trail corridor; and land or easement acquisitions.

The design process will be consistent with other City design and construction projects if the City is the sole funder of the project. Additional design requirements and permits may be necessary if the trails are within county or state rights of ways or along utility or drainage corridors. If the trail project falls within the jurisdiction of the Corps of Engineers there will also be federal guidelines and permits required.

When a trails project is being funded wholly or partially by an entity other than the City whether public or private, the design process will be modified to meet their requirements. However, it is still the intent of the master plan that trails with the City's system have a set of standard amenities and graphics so coordination by the City during the design process is imperative.



# Appendix A - Trail Costs

## Construction

The following estimated budgets for trail construction are based on 2010 construction prices and are to be used as a planning tool to determine conceptual budgets for trail segments. Variables on each trail will be determined through the scoping of individual projects and segments.

## Trail Cost

The cost associated with each surface type includes: clearing, construction cost (site preparation, aggregate base, trail surface material and finish), signage and landscaping. These general costs are subject to change and will vary as each specific trail's design dictates.

### Concrete Trail (6" Concrete Surface W/ Broom Finish)

- |    |                    |                |
|----|--------------------|----------------|
| 1. | 10-foot wide trail | \$265,000/Mile |
| 2. | 8-foot wide trail  | \$245,000/Mile |
| 3. | 6-foot wide trail  | \$190,000/Mile |

### Decomposed Granite Trail (6" DG Surface)

- |    |                    |                |
|----|--------------------|----------------|
| 1. | 10-foot wide trail | \$185,000/Mile |
|----|--------------------|----------------|

### Paver Trail (Paver on Concrete Base)

- |    |                    |                |
|----|--------------------|----------------|
| 1. | 10-foot wide trail | \$530,000/Mile |
| 2. | 8-foot wide trail  | \$455,000/Mile |
| 3. | 6-foot wide trail  | \$350,000/Mile |

### Concrete Trail with Paver Bands (6" Concrete Surface W/ Broom Finish and 8" Paver bands 10' O.C.)

- |    |                    |                 |
|----|--------------------|-----------------|
| 1. | 10-foot wide trail | \$345,000/Mile  |
| 2. | 8-foot wide trail  | \$270,000/Mile  |
| 3. | 6-foot wide trail  | \$215,000/ Mile |

### Wood Boardwalk with Handrails (will vary by site and construction access)

- |    |                    |            |
|----|--------------------|------------|
| 1. | 10-foot wide trail | \$1,000/LF |
|----|--------------------|------------|



### Trail Amenity Cost

Each Amenity Cost includes the estimated prices for the materials and construction.

- |    |                         |              |
|----|-------------------------|--------------|
| 1. | Major Trail Head        | \$200,000 EA |
| 2. | Minor Trail Head        | \$15,000 EA  |
| 3. | Neighborhood Trail Head | \$5,000 EA   |
| 4. | Amenity Area            | \$15,000 EA  |
| 5. | Interpretive Site       | \$15,000 EA  |

### Civil Engineering Costs

The associated costs will the civil engineering components are from current related projects and are subject to change due to variable site and construction conditions.

- |    |                       |            |
|----|-----------------------|------------|
| 1. | Bridge (varies)       | \$2,000/LF |
| 2. | Culvert (small)       | \$5,000    |
| 3. | Culvert (large)       | \$7,000    |
| 4. | Crosswalk/regulatory  | \$10,000   |
| 5. | Crosswalk/directional | \$25,000   |



## Maintenance Cost

A community's trail system must have an extensive and effective maintenance plan in place to be successful. Continuous maintenance will prolong the life of the trail and will improve the overall safety for the user. The annual trail budgets below not only account for the maintenance that needs to be done on a regularly scheduled basis but also disperses the cost to replace trails and amenities over their expected life.

### **Concrete Trail/ Concrete Trail with Paver Bands - Annual Maintenance \$12,000 per Mile**

A typical concrete trail has a life span cycle of 15 to 30 years with proper base and protection from drainage and vegetation.

Weekly/As Needed:	Grass Mowing/Weed Control, Trash Disposal and Watering
Monthly/As Needed:	Plant Pruning/Trimming, Drainage Cleaning and Furnishing Repair
Annual/As Needed:	Periodic Repair of Cracks, Debris Removal and Repairing Water Damage
Special Cost:	Sign Replacement, Fallen Trees, Graffiti Removal and Trail Replacement

### **Decomposed Granite Trail - Annual Maintenance \$30,000 Per Mile**

A typical DG Trail has a replenishment life of 2 to 5 years with proper quick repair of eroded areas.

Weekly/As Needed:	Grass Mowing/Weed Control, Trash Disposal and Watering
Monthly/As Needed:	Trail Raking, Erosions Patching, Plant Pruning/Trimming, Drainage Cleaning and Furnishing Repair
Annual/As Needed:	Topping Bare Spots, Debris Removal and Repairing Water Damage
Special Cost:	Sign Replacement, Fallen Trees, Graffiti Removal and Trail Replenishment



**Wood Boardwalk with Handrails - Annual Maintenance/Inspection \$30,000 Per Mile**

A typical wood boardwalk has a replacement life cycle of 10 to 15 years with adequate weathering protection and damage replacement.

- Weekly/As Needed: Weed Control and Trash Disposal
- Monthly/As Needed: Plant Pruning/Trimming and Furnishing Repair
- Annual/As Needed: Repair of Damaged Boards, Repairing Water Damage and Inspection
- Special Cost: Sign Replacement, Fallen Trees and Structure Replacement

**Bridge and Tunnel - Annual Maintenance/Inspection \$25,000 EA**

A typical wood boardwalk has a replacement life of 10 to 15 years with adequate weathering protection and damage replacement.

- Weekly/As Needed: Weed Control and Trash Disposal
- Annual/As Needed: Drainage Cleaning and Inspection
- Special Cost: Structure Replacement



# Appendix B - Public Input Comments

**MEETING DATE:** September 10, 2009

**ISSUE DATE:** September 11, 2009

**PROJECT:** League City Trails Master Plan

**CCA PROJECT No:** 109-046

**ATTENDEES:** Public

**DISTRIBUTION:** file

## **Public Meeting – 1:00 p.m.**

### I. Materials

1. Mixture of materials based on location
2. DG for off street – maintenance, water
3. Asphalt – expansive soils
4. Match materials to character of environment
5. 518 – historical pavers
6. Special materials based on the area.
7. Concrete borders?
8. Elevated trails – raised/perforated
9. Recycled rubber
10. Spray
11. Multiple materials

### II. Uses

1. Historic in walking

### III. Concerns

1. Oak trees issues
2. Tall grass, coastal prairie, most endangered eco-system
3. Maintenance – level?

### IV. Amenities

1. Theming image brightness

### V. Miscellaneous

1. Green vs. cost – like if we can afford
2. Width of trail
3. Location of trails



**MEETING DATE:** September 10, 2009

**ISSUE DATE:** September 11, 2009

**PROJECT:** League City Trails Master Plan

**CCA PROJECT No:** 109-046

**ATTENDEES:** Public

**DISTRIBUTION:** file

**Public Meeting – 6:00 p.m.**

I. Security

1. Bike officers – on trails
2. Security – from cars

II. Materials

1. Soft trail – how can we get DG trail as high priority
2. Smooth flat
3. Material – prefer DG or dirt on loops too
4. Bikes on DG okay
5. Composite trail – DG and concrete
6. Anything better than concrete – asphalt

III. Uses/Locations

1. Running club meets at Clear Creek High School – use 518 also 270 to 96 then through neighborhoods; 270 has wide shoulder, but security is issue
2. Connections – look at connections to 518
3. Trail – bike/hike share – width and signage
4. Centerpoint – neighborhood to school 96/Hwy 3 – no safe path
5. Connect Heritage Park to creek to create loop
6. Connection from sports park on creek to neighborhood on south
7. Hobbs Road – connect to 646?
8. Egret Bay connect to NASA Rd. 1
9. Road bikes stay on streets
10. Calder and Hwy 3 on 518
11. Triathlon – water, bike-road, run – speed, smooth, straight
12. HGAC – Hwy 3, bike lane – check
13. Straight vs. curves – runners don't need wiggly/curvy trails
14. Pipeline east side – easements usable for off-road
15. No imprints into ground plane
16. Concrete joints a problem
17. Clear Creek – take advantage of as many miles as possible
18. Some trails close at dark



IV. Cooperation

1. Name the trails – get community involved
2. Adopt a trail – corporate sponsors

V. Amenities

1. Signage – maps of system with mileage, signs can show map of entire system
2. Parking – need to be sufficient at trail heads – running groups have 100 runners
3. Water fountains
4. Bathroom
5. Security lighting – safety, light pollution
6. Low key signs

VI. Concerns/Miscellaneous

1. Vandalism – Seabrook problems – amenities too far off main road
2. Amenities located well
3. Nature, wildflowers, grasses
4. Lane dividers on wider trails
5. Watch cross slope
6. Landscape of trails – trees, shade



**MEETING DATE:** September 14, 2009

**ISSUE DATE:** September 15, 2009

**PROJECT:** League City Trails Master Plan

**CCA PROJECT No:** 109-046

**ATTENDEES:** Public

**DISTRIBUTION:** file

**Public Meeting – 6:00 p.m.**

I. General Concerns/Opportunities

1. Balance between users – don't forget the walkers
2. Safety – visibility
3. Visibility of trails
4. Divided roads – need better crossings
5. Access for maintenance – enough width
6. Kids to school
7. Separation cars/people
8. Road edges – bikers
9. Not too curvy
10. Drainage – elevations
11. Off street – drainage areas
12. Combine roads with trails
13. Restore greenways – birds
14. School connections
15. Variety of trail types/sizes/uses
16. Safety concern when trails are too isolated
17. Inclusion of undeveloped area

II. Opportunities for Cooperation

1. Partnering groups to maintenance - Homeowners Associations, adopt-a-trail program
2. TxDOT's Safe Routes to Schools program
3. Coordination with schools
4. Neighboring communities – Clear Creek Village
5. Charity walks
6. Charity rides – markers, money source, organized rides
7. Trails – off road ROW – Texas NM power line easements
8. Some CenterPoint easements are not their property
9. Amenities by civic groups – above minimum standard
10. Who does maintenance?
11. Partnering with groups/volunteers for maintenance
12. Acquiring land – maintenance easement - access



### III. Specific Concerns/Opportunities

1. 518/2094 – go across to Kemah
2. Floyd Road – now easement
3. Rails to Trails – 146/Hwy 3
4. Inter urban ROW
5. 518 Traffic
6. West side I-45-Calder Drive
7. Connect to NASA
8. Paddle trails – Friendswood – Countryside – has restrooms
9. Paddle to nature center toward Davis Road
10. 270 – barricades
11. 518 corridor– no trails, still heavily used, not safe – kids, safety – connections for kids
12. Magnolia Creek – low spots
13. Austin Town Lake good example
14. Water tower connection to Bay Area – Gilmore School detention ponds
15. I-45 to 270 commute to Kemah
16. Cross Clear Creek to Challenger Pak
17. Clear Creek Nature Park connect across Robinson Bayou to Davis Road
18. If a trail is for a specific use then it's not part of connectivity
19. Connect to Davis Road – points west
20. 518/2094 loop through Clear Lake Shores and Kemah
21. Elevation problems – need to be higher than surrounding areas because of water and mud

### IV. Materials

1. DG – maintenance
2. Asphalt – don't rule out
3. DG trail – also – go elsewhere because doesn't exist here
4. DG/Asphalt/Concrete – best to worst for runners/walkers joints
5. Runners – asphalt
6. DG – more maintenance
7. DG deters skateboarders
8. DG rutted up by bikers
9. Multiple materials
10. Gravel hard to use for joggers, bikes/kids, strollers, dogs
11. Concrete better for bikes
12. Concrete okay – low maintenance – best use?
13. Some DG – joggers

### V. Uses

1. Mountain biker – want rougher terrain, single track, mountain bike section – ex. Jack Brooks Hitchcock
2. 10' too wide – 8' maximum
3. Off-road bike trails – mountain bike area
4. Bicycle lanes – not same as off-road in ROW



## VI. Amenities

1. Water fountains
2. Trail markers
3. Trail crossing signs
4. Lighting – maintenance – keep the lights on
5. Mile markers – colors of trails – without numbers, just to mark off ½ mile or 1 mile
6. Emergency contact info on signs
7. Markings on trails at roadway crossings
8. Graffiti proof
9. Basic amenities – parking, drinking fountain, benches – spend money on trails

## VII. Miscellaneous

1. Tax money allotment
2. Variation of money and themes
3. Maintenance of natural trails – shrub growth
4. If trail is removed what's required putting it back?
5. Drainage to ditches



**MEETING DATE:** September 17, 2009  
**ISSUE DATE:** September 18, 2009  
**PROJECT:** League City Trails Master Plan  
**CCA PROJECT No:** 109-046  
**ATTENDEES:** Public  
**DISTRIBUTION:** file

**Public Meeting – 6:00 p.m.**

- I. General Concerns/Opportunities
  1. Connections into neighborhoods to the trail
  2. Mark trails for security
  3. Environmental impact on trails
  4. Preserve nature
  5. Build trails where there is no environmental impact
  6. Want some trails away from roads – too many drives and street crossings
  7. Can't walk on Main Street
  8. Create 30' off road
  9. Shade along trails
  10. No 4-wheelers/motorized vehicles
  
- II. Opportunities for Cooperation
  1. "Economic development" around trails – neighborhood friendly, businesses, corporate education
  2. Runners or bikers clubs adopt trails
  3. Sponsor race to fund system construction/maintenance
  
- III. Specific Concerns/Opportunities
  1. Drainage ditch laterals
  2. Can we get grants for street lights?
  3. Trails promote environmental concerns – you save gas
  4. Change culture to more sustainable – city hike/bike
  5. Create "greenbelt"
  6. Blue light phones
  7. Commuter trails lit
  8. Wider than 6' for walk/bike combo, especially where sight-line is limited
  9. Hills – sight-line issues
  10. Existing private trails behind church along creek
  11. Elementary at 96 and 3 – connections to places they use every day, schools, libraries, grocery store
  12. Extension of Austin Street trail
  13. Countryside trail – some places eroding – well used



14. Main Street from CCHS need trails
15. Create a straight shot from Clear Creek to Austin Street
16. Get from League City to NASA

#### IV. Materials

1. DG trails near water to limit environmental impact
2. DG is problem with road bikes
3. Are asphalt trails too hot? DG too muddy?
4. Asphalt better for runners
5. Asphalt – something everyone can use
6. Multiple materials

#### V. Uses

1. Would like to ride bike to offices
2. Road bikes “if” we have longer mileage trails
3. Interurban rail line
4. Bikers don’t like barriers because trash collects
5. Use Dickinson Road – runners use the asphalt road
6. Road bikes – can there be a loop in park?

#### VI. Amenities

1. Paddle trail – boat launch – parking
2. Butler Museum has boat launch
3. Map of canoe trail
4. Parking at trail heads
5. Bike racks
6. Benches
7. Keep them up/maintaining
8. Placement for observation and cleaning
9. Select specific trails for theming
10. Concentrate amenities
11. Maps on trails
12. Orientation (N,S,E,W)
13. Mile markers
14. Water fountains
15. Sandy beaches for paddling trail boat launch
16. Shade

#### VII. Miscellaneous

1. Look at Paul Hopkins Park in Dickinson for history
2. Immigrant history/agricultural history
3. Seabrook trails – look at
4. Connect to Seabrook trail system



(The following has been typed exactly as written, with no edits spelling or grammatical edits.)

'I have read that your firm is doing planning on bicycle and pedestrian routes for the City of League City. There were recent public meetings that I did not get a chance to attend. I have some input and ask that you forward this message to the appropriate associate at Clark Condon Associates.

I am an experienced bicycle rider, age 73. I have ridden over 9000 miles so far this year including having ridden from New York City to Los Angeles in the summer of 2009. I have averaged over 8000 miles per year on a bicycle for the previous 5 years. I live at 912 Davis Rd, League City, TX 77573. My phone is 281-554-6150

The city of Houston has been implementing an ambitious program of bicycle routes starting some years ago. Unfortunately, there are no good north/south routes through League City and the southern portion of Harris County to connect to the system of bike routes Houston is creating.

In the past, the shoulders of state highway 3 were the best north/south routes between League City and Houston in my opinion. Although the shoulders were narrow, at least there was some place to ride out of the motor vehicular traffic.

More recently the state "improved" state highway 3 both north and south of League City turning the best (although relatively unfriendly) north/south bicycle route into more bicycle unfriendly route. South of League City (actually south of Dickinson) the two lane highway with relatively narrow shoulders was rebuilt as a 4 lane highway with curbs and no shoulders. North of League City, the four lane highway was resurfaced and rumble strips added on the narrow shoulders. In some spots the shoulders are so narrow that the rumble strips make the shoulders impassable to bicycles in these spots, requiring that bikes cross the rumble strips to ride in the traffic lanes.

The news article on the recent League City public meetings mentioned that better east/west routes for bicycles in League City was a goal. Please also consider better north/south routes and particularly how a League City system of bicycle routes might connect to the Houston system of bicycle routes.

Other comments:

Where possible, bikes and walkers should be separated for the safety of both.

Bike paths with stop signs at every intersection are not of interest to many more experienced bicyclists



who will tend to favor riding on the roads for reasons of safety and speed over riding on such bike paths.

Please consider that bicycles are potentially a viable and environmentally friendly mode of transportation. Where bicycle friendly routes exist, bicycle are not merely a form of recreation. In my travels, I have passed through a number of cities where bicycle transportation is quite practical. Tuscon, AZ comes to mind off hand. The most bicycle friend city I have ridden in has been Copenhagen, Denmark.'

'This is an excellent project. Ask me about the old Interurban Rail line. I have done some research on possibly of using it for a Houston to Galveston bike path.'

'I'm not a road cyclist that trains for anything, however I do go fast enough that sharing a path with walkers/runners is not practical because of the speed difference. I'm concerned about how 518 was redone with curbs. Please do not do this to 270 & 96. The wide shoulder without curbs is ideal to road cycling.

P.S. We don't need any government mandated bike racks. If the customers tell the merchants they can decide if they can afford bike racks.'

'Fantastic idea to put a trail down 518→2094 – to 146. Tie the businesses together. Charity maker. Asphalt gives more miles for the \$. Keep safety/visability in mind. Mark trails – distance stop areas.

Go for grants – Get those senators & congress members on board'

'Connectivity between parks

- Dudsey Nature Park – Galveston County Park→Countryside→Challenger
- Soft (lower impact) trails specifically for connecting with Nature
- Connectivity to destinations Eastside with Nodes thru neighborhood to creek front'

'I think you have done in covering most of the issues. I am very happy to city is addressing this. There was a Master Plan for the Parks Department put together by UH (1995) Rafael Longoria it did address some of the issues you are covering I am concerned about what would be implemented due to the city's political Nature.'



**MEETING DATE:** December 7, 2009

**ISSUE DATE:** March 16, 2010

**PROJECT:** League City Trails MP

**CCA PROJECT No:** 109-046

**ATTENDEES:** City Staff – Larry Bigelow, Chien-Hung Wei, Heidi Shannon, LaShondra Holmes,  
Clark Condon – Sheila Condon, Richard McNamara, David Papst  
SSCI – David Klebieko

**DISTRIBUTION:** File

**4B Board Meeting-6:00pm**

- I. Presentation of Trails Master Plan.
- II. Comments

TOPICS OF DISCUSSION BY BOARD – NO ACTION WAS TAKEN

Costs/Funding  
Availability of Grants

Opportunities to Phase Construction

Trail Surfaces to Accommodate Variety Of Users  
Concrete – Multi-use  
Decomposed Granite – Preferred By Runners  
Boardwalk – In Wetland/Environmental Sensitive Areas

Maintenance  
Cost

Order of the Phases/Routes  
Trails along Ditches – Would Trails End Up In Front Yards Or Along Edge of Street  
In The Right Of Way  
Safe Routes to School

Another Potential Funding Source

Lighting of the Trails  
Master Plan Is Not Recommending Lighting



**MEETING DATE:** December 14, 2009

**ISSUE DATE:** March 16, 2010

**PROJECT:** League City Trails MP

**CCA PROJECT No:** 109-046

**ATTENDEES:** City Staff – Larry Bigelow, Chien-Hung Wei, Heidi Shannon, LaShondra Holmes, Jack Murphy  
Clark Condon – Sheila Condon, Richard McNamara, Jamie Hendrixson  
SSCI – David Klebieko

**DISTRIBUTION:** File

**Joint: Planning and Zoning/Park Board Meeting-6:00pm**

- I. Presentation of Trails Master Plan.
- II. Comments

Trails, Signs And Trail Amenities Will Respect Floodplain Restrictions

Trail Sign, Though Not Lit Can Be Made Of Reflective Material

Conversations With Staff Are On-going To Address Potential Changes To The Subdivision Ordinance Or Park Ordinance To Accommodate Development Of Future Trails Along Future Roadways

Cost And Phasing Of Complete Trail System - How Many Miles Does League City Need

The Community Investment Committee Noted That The Group Has Chosen "Trails At The Water's Edge" As The City's Official Brand

They Also Suggested That The Trail System Should Connect Future City Famer's Market, Water Sports, Dog Parks And Amphitheater

Opposition Stated That The City Should Consider A Smaller Circuit Of Quality Trails Instead Comprehensive System Of Connecting Trail To Not Burden The Tax Base

Suggested Alternate Phasing Would Build Smaller Connecting Trails First Before Constructing The Major Signature Trails

Trails Should Be An Experience For The Residents Not Just Connectivity

Trail System Can Be Incorporated Into The Main Street Plan



**MEETING DATE:** January 26, 2010

**ISSUE DATE:** March 16, 2010

**PROJECT:** League City Trails MP

**CCA PROJECT No:** 109-046

**ATTENDEES:** City Staff – Larry Bigelow, Chien-Hung Wei, Heidi Shannon, LaShondra Holmes, Clark Condon – Sheila Condon, Richard McNamara, David Papst  
SSCI – David Klebieko

**DISTRIBUTION:** consultants, file

### **City Council Meeting**

I. Presentation of Trails Master Plan.

II. Comments

Maintenance Cost for Non-ROW Trails

Why is the Clear Creek Connections Trail along private property? Check for Compatibility Issue with former River Market Plans. Has there been communications with Property Owners.

Make sure Trails incorporate the Vision/Marketing Plan for the City

Funding HGAG Contact

Does the Texas Tradition Trail Need to be in Phase One?

Priority is Safe Roads Connections. Canoe Trail Phase One

City Branding Committee will make presentation in 1-2 months.



**MEETING DATE:** March 8, 2010

**ISSUE DATE:** March 23, 2010

**PROJECT:** League City Trails MP

**CCA PROJECT No:** 109-046

**ATTENDEES:** City Staff – Larry Bigelow, Chien-Hung Wei, HLaShondra Holmes  
Clark Condon – Sheila Condon, Richard McNamara, David Papst

**DISTRIBUTION:** File

**4B Board Meeting-6:00pm**

- I. Presentation of League City Trails Phase One Recommendation.
- II. Comments

Concern over Trail Maintenance Cost:

Not a consideration for 4B Board but for City Council approval

Will exhibited prices for maintenance remain stable or rise

Phase One Trails

Original Section (F) is no feasible since the existing overpass is narrow with traffic concerns

West side parks funds will expire soon and can be used for trail construction on that side of the city.

Board asked that the Master plan list all trails, distances and materials as in phase one

Calder Rd:

The trail will no longer bow around I-45 with construction of new overpass

Current Trail under construction under I-45 overpass (TxDOT)

- III. Motion to Approve Phase One Trails

Passed (4-0)

