Friendswood Active Transportation Plan



Adopted by the City of Friendswood City Council

June 1, 2026

Houston-Galveston Area Council

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City of League City

City of Pearland

Friendswood Chamber of Commerce

Friendswood ISD

Friendswood Methodist Church

Friendswood Police Department

Galveston County Consolidated Drainage District

Galveston County Precinct 3

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Executive Summary

The Houston-Galveston Area Council (H-GAC) and the City of Friendswood partnered to develop a City-wide Active Transportation Plan to help shape the future of the active transportation network in the community.

The study included public engagement to understand the challenges, opportunities, and priorities related to active transportation in Friendswood. To improve connectivity, efficiency, and safety, the study developed recommendations for active transportation projects that can be implemented by the City with strategic partnerships in the region to establish safe, multimodal connections within the community for residents and visitors to enjoy walking, biking, or rolling across Friendswood.

Recap of the Project Process

The Friendswood Active Transportation Plan was developed through a year-long planning process that began in spring 2025 and concluded in spring 2026. The project began with a review of the City's existing conditions. From there, a gap and opportunity analysis was completed and active transportation network established to determine recommendations. The preliminary draft recommendations were presented to the public in the winter of 2025 for prioritization. The Plan was developed in the spring of 2026, when the final recommendations and implementation strategy were completed. A timeline of the project is displayed in **Figure ES 1**.

Existing Conditions

The project team collected demographics data and created a series of maps to illustrate a variety of active transportation-related data, including demographic information, crash history and severity, existing sidewalk and trail networks, points of interest in the community, easement locations, health indicators, and the area's natural and built environment. Previous planning documents were reviewed so that recommendations align with prior planning efforts.

Analysis

Friendswood has approximately 200 miles of existing sidewalk in their city limits, one on-street bicycle lane along FM 528, and approximately 7.71 miles of off-street trails. Sidewalk coverage varies by neighborhood. Key barriers to active transportation include several creeks and drainage areas, which create crossing and connectivity challenges for pedestrians and bicyclists. Between 2020 – 2024, 85% of active transportation-related crashes occurred near key destinations (e.g., commercial corridors, grocery store parking lots, and schools). The most frequent contributing factor to crashes is driver behavior (e.g., failure to yield the right-of-way, driver inattention). The existing conditions revealed many opportunities for active transportation.

The existing infrastructure is disconnected, indicating there is a need for additional connectivity. Future population growth and demographic characteristics of the City indicate the need to accommodate a range of ages and abilities. This paves the way for opportunities to improve safety, improve connectivity, and reinforce healthy lifestyles.

The City of Friendswood is expected to continue growing through 2050, making active transportation infrastructure an increasingly important community and infrastructure asset for residents, employees, and visitors.



Figure ES 1. *Project Timeline*

Identified Opportunities and Gaps

The public and stakeholders were asked to document various active transportation opportunities in Friendswood, indicating where they would like to walk or bike, or areas where they felt unsafe to walk or bike. These opportunities were aggregated and reviewed to develop the draft Primary Active Transportation Network (PATN). A gap analysis was performed along the PATN to determine gaps in infrastructure that needed to be filled to complete the network.

Project Development and Draft Recommendations

The opportunity and gap analysis helped determine, refine, and establish 14 project recommendations along the PATN as well as 20 sidewalk infill segments that connect to the PATN. Additionally, several non-infrastructure recommendations were developed to help streamline city policy to support active transportation infrastructure development.

Prioritization

The project team developed a prioritization tool to support the recommendations. A data-driven needs-based analysis was conducted to determine project need based on 22 criteria across six weighted evaluation metrics (connectivity, safety, mobility, access, environmental factors, and public input). The results of the needs-based analysis were used as inputs to determine the final project recommendations.

The community was also asked to help prioritize the project recommendations by selecting their top five projects out of the 14 recommendations.

The final project prioritization was determined through a combination of the needs-based analysis, input from the City of Friendswood and H-GAC, and input from the community and stakeholders.

Final Recommendations

Five projects were selected for detailed development, including scope, preliminary cost estimates, engineering considerations potential funding partners, and key implementation steps.

A matrix was developed to group projects into packages that can be implemented together. For each package, the implementation matrix identifies specific action, potential funding partners and estimated timeframe.

Engagement and Schedule of Events

Efforts included:

- Three steering committee meetings (June 25, 2025; October 1, 2025; and March 10, 2026)
- Two stakeholder committee meetings (September 4, 2025 and April 7, 2026)
- Pop Up Event: identify opportunities for active transportation
- Walk Audit
- Project Website
- Two Online Surveys and interactive map
    - July – August 2025: asked about the main reasons people use active transportation and the ease of using modes of active transportation in Friendswood.
    - Dec 2025 – Jan 2026: mirrored in-person engagement event enabling those who were unable to attend the opportunity to select project recommendations.
- Public Meeting: the project team engaged with approximately 50 community members at the event. Participants had the opportunity to:
    - Rank evaluation metrics
    - Review and provide feedback on the PATN
    - Prioritize proposed projects

Online survey: Participants shared the types of active transportation they use, their reasons for walking, biking, or rolling, and how easy or difficult these activities feel in Friendswood. They also identified barriers such as safety concerns or lack of infrastructure and suggested improvements to make active transportation more comfortable and accessible. Some insights from the survey include:

- 213 responses to the Friendswood Community Survey (61% of respondents live in Friendswood)
- Main reasons for choosing active transportation: good for health, enjoy the outdoors, connect with community (e.g., walking children to school, walking dogs)
- Many find it difficult to walk / bike in Friendswood
- 54% of respondents find it difficult to walk, run, or jog
- 72% of respondents find it difficult to “roll” (e.g., bicycle, scooter, rollerblades, e-bikes)

Pop Up: The project team was able to gather feedback on areas of the community where residents wanted new active transportation infrastructure, including areas where they did not feel safe to walk or bike today. Overall, the project team engaged with approximately 60 community members and collected input through a tabletop mapping activity.

Recommendations and Implementation

Table ES 1. *Priority Projects (From PATN)*

Project Rank	Project Name	Project Limits
1	FM 518	From Whispering Pines Avenue to Silverstone Drive
2	FM 518	From Silverstone Drive to Eagle Lakes Drive
3	Castlewood Avenue Sidewalk	From just south of Greenbriar Drive at the existing sidewalk terminus to Sunset Drive
4	Greenbriar Drive Sidewalk	From Castlewood Avenue to just east of Buckingham Drive
5	Intersection of FM 528 and Bay Area Boulevard	Intersection of FM 528 and Bay Area Boulevard

Table ES 2. *Sidewalk Gaps on Local Streets Under 350 Feet*

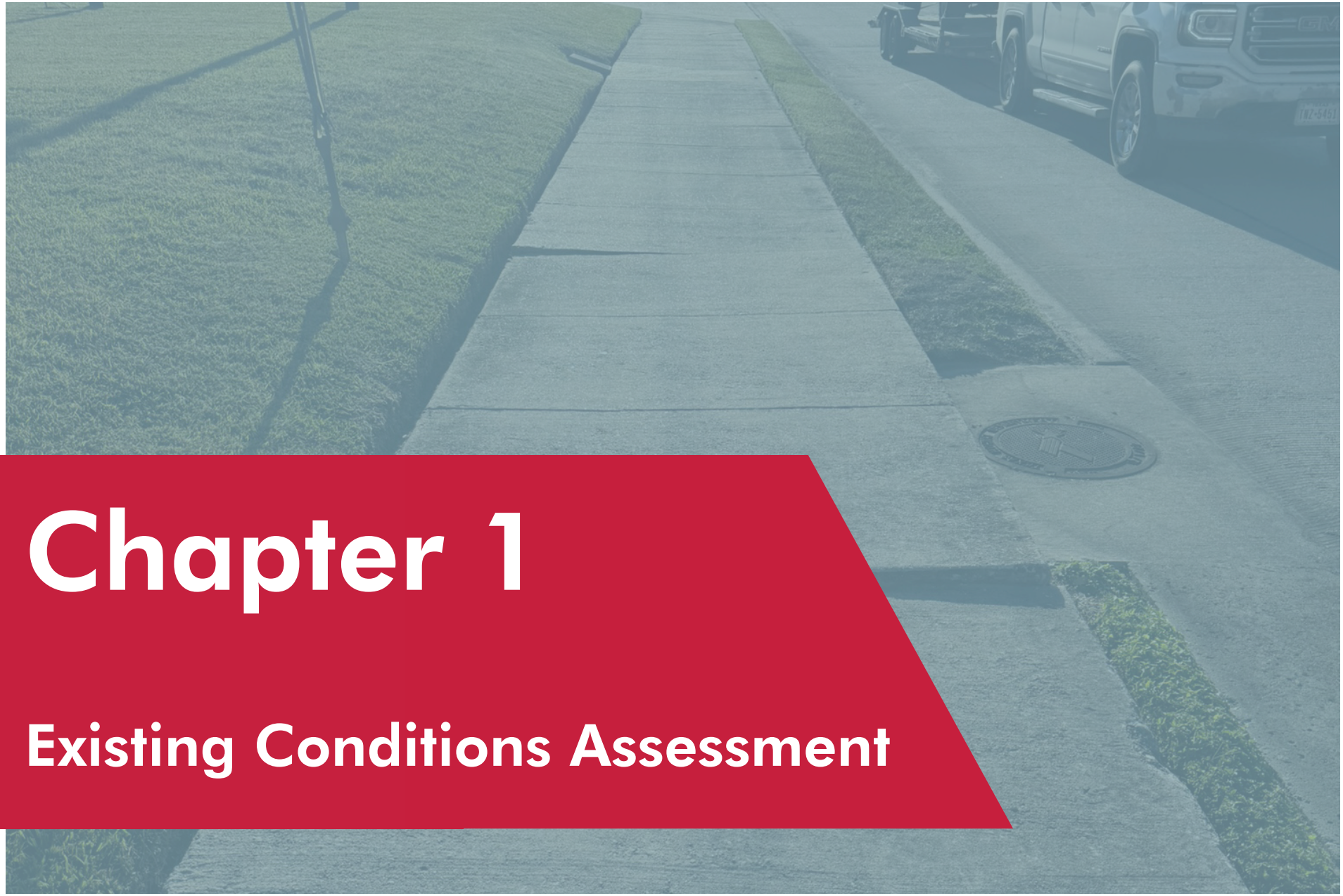
No.	Project Name	Project Length	Project Limits
1	Castlewood Avenue	200 ft.	From existing sidewalk terminus near Cedarwood Avenue to existing sidewalk terminus near FM 518
2	Townes Road	300 ft.	From existing sidewalk terminus (at multifamily internal street) to Laura Leigh Drive
3	Silverstone Drive	60 ft.	From existing sidewalk terminus to existing sidewalk terminus
4	Briarmeadow Avenue	330 ft.	From Osborne Drive to Sunset Drive
5	Winding Way Drive	200 ft.	From existing sidewalk terminus near Cedarwood Avenue to existing sidewalk terminus near FM 518
6	Leisure Lane	130 ft.	From existing sidewalk terminus to Talon Drive
7	Killarney Avenue	50 ft.	From existing sidewalk terminus to Greenbriar Drive
		25 ft.	From existing sidewalk terminus to Greenbriar Drive
8	Mossy Stone Drive	60 ft.	From existing sidewalk terminus to Friendswood Parkway
9	Crescent Drive	180 ft.	From existing sidewalk terminus to County Road 133

Table ES 3. *Sidewalk Gaps that are on or Adjacent to a TxDOT Facility*

No.	Project Name	Project Length	Project Limits
1	Blackhawk Boulevard	500 ft.	From Edgewood Avenue to existing sidewalk terminus
2	Mary Ann Drive	50 ft.	From existing sidewalk terminus to FM 518
3	Castlewood Avenue	80 ft.	From existing sidewalk terminus to FM 518
4	Falcon Ridge Boulevard	40 ft.	From existing sidewalk terminus to FM 528
		80 ft.	From existing sidewalk terminus to FM 528
5	W Oak Drive	180 ft.	From existing sidewalk terminus to FM 518
6	Friendswood Parkway	100 ft.	From existing sidewalk terminus to FM 528
7	Cypress Point Drive	50 ft.	From existing sidewalk terminus to FM 528
	San Joaquin Parkway	50 ft.	From existing sidewalk terminus to FM 528
8	Friendswood Trail	160 ft.	From existing sidewalk terminus to FM 528
		60 ft.	From existing sidewalk terminus to FM 528
9	Championship Drive	220 ft.	From existing sidewalk terminus to FM 528

Table ES 4. *Sidewalk Gaps that are Over 350 Feet*

No.	Project Name	Project Length	Project Limits
1	FM 518/N Friendswood Drive	Segment 1: 800 feet Segment 2: 240 feet Segment 3: 400 feet	• Segment 1: Brandywyne Drive to Mary Ann Drive • Segment 2: Existing sidewalk terminus near Annette Lane to existing sidewalk terminus near Lottie Lane • Segment 3: Existing sidewalk terminus near Friendswood Methodist Church to existing sidewalk terminus near Gulf Shore Orthodontics
2	Laura Leigh Drive	1,500 feet	From Forest Bend Park to Blackhawk Blvd.



Chapter 1

Existing Conditions Assessment

Chapter 1: Existing Conditions Assessment

Introduction and Plan Context

This chapter contains an overview of the Existing Conditions Assessment. For more details, refer to **Appendix 1**.

The City of Friendswood is a suburban community located southeast of the City of Houston and is in both Harris and Galveston counties. The city is mostly within Galveston County and is just south of Interstate 45 (I-45). **Figure 1** displays Friendswood in relation to the broader Houston region.

The City of Friendswood was founded in 1895 by a modest agricultural settlement of Quakers. The City was incorporated in 1960 and has evolved into a thriving suburban community over the decades.

According to the city's website, the community boasts well-maintained neighborhoods and a strong sense of civic pride that continues to attract families and professionals alike.
Students in the community attend schools in Clear Creek Independent School District (CCISD) and Friendswood ISD, both highly ranked school districts in Texas, making it an attractive community for families of school-aged children.

Figure 2 shows the study area boundary, city limits of the City of Friendswood and surrounding communities, schools, and parks, both important local destinations to connect to by walking, biking, or rolling.

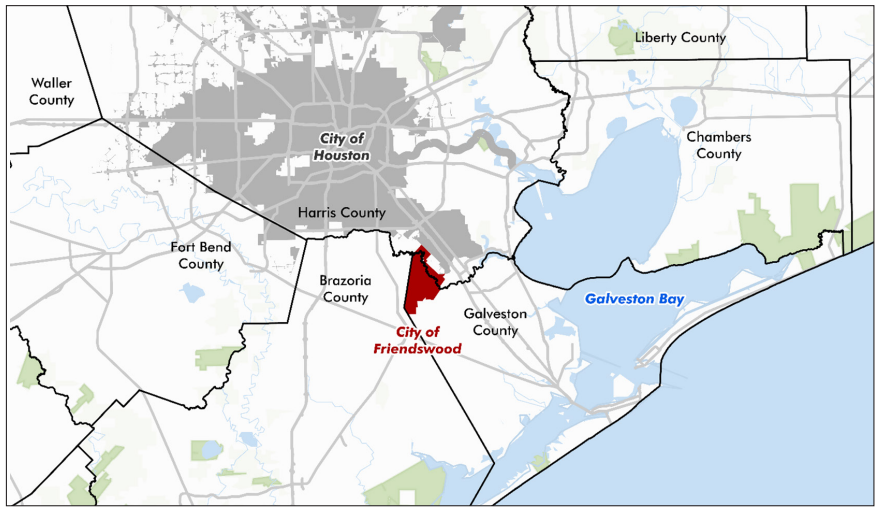


Figure 1. *Friendswood Location Map*

City of Friendswood

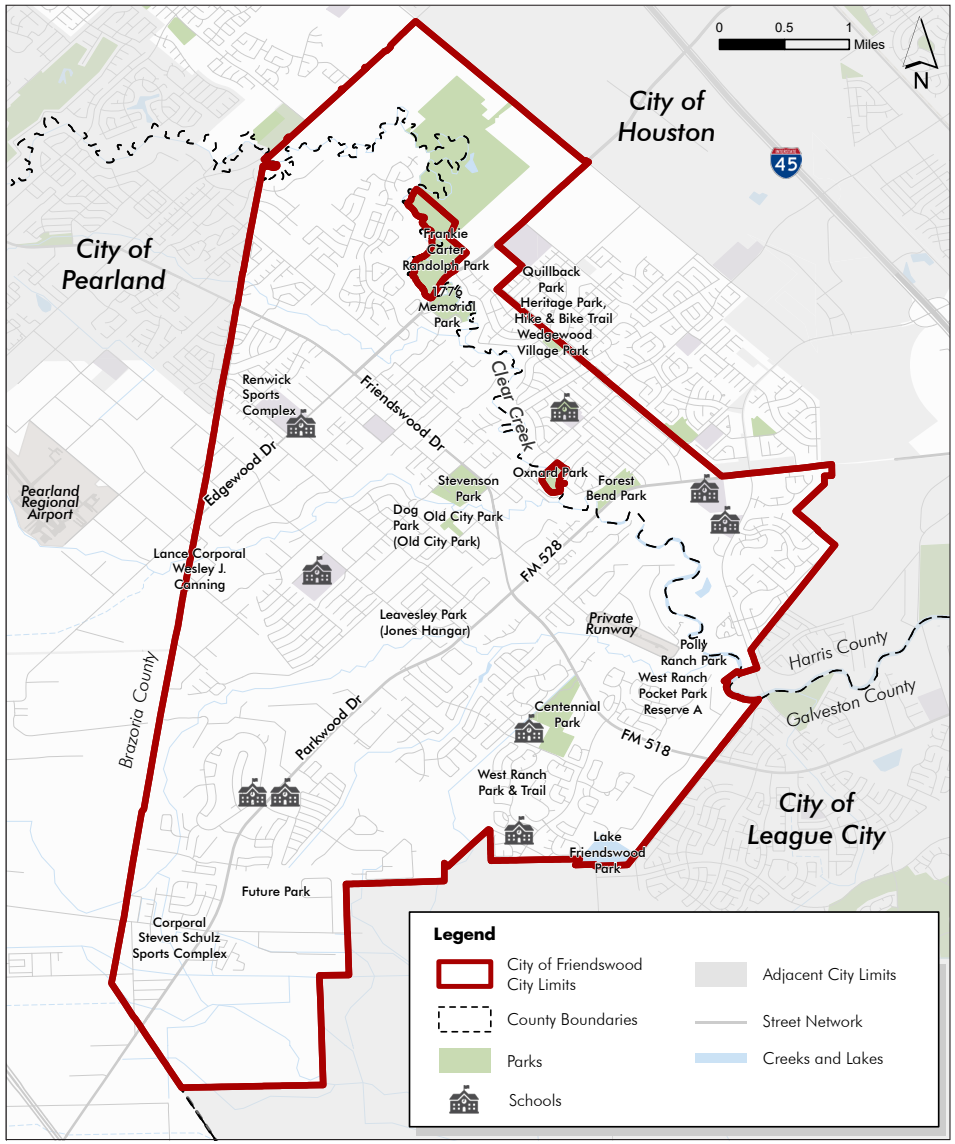


Figure 2. *Friendswood City Limit Map*

Friendswood Today

As of 2025, Friendswood has a population estimate of 42,051, and is expected to grow to almost 50,000 by 2050 as shown in **Figure 3**.

Table 1 provides a demographic snapshot of the City of Friendswood compared to neighboring cities, counties, and regional benchmarks. Friendswood stands out with high median household income levels, high homeownership rates, and larger household sizes.

As shown in **Figure 4**, Friendswood's age and gender distribution is relatively balanced, with lower shares of adults aged 24 - 44, and higher shares of adults over 65, and higher shares of children age 19 and under than the statewide average.

The City also exhibits high levels of educational attainment, shown in **Figure 5**, with over 80% of residents holding at least some college education, including 31% with a bachelor's degree and 19% with a graduate degree.

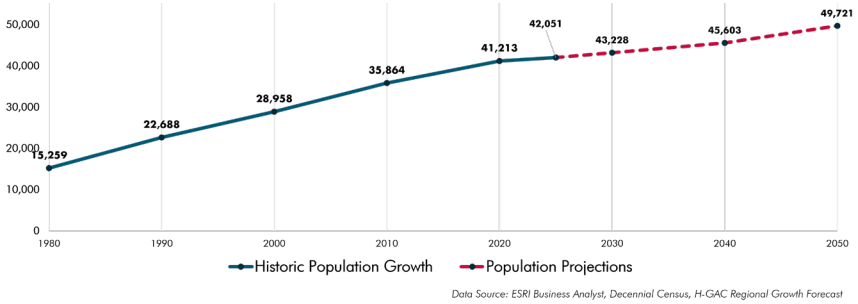


Figure 3. *Historic Growth and Population Forecast*

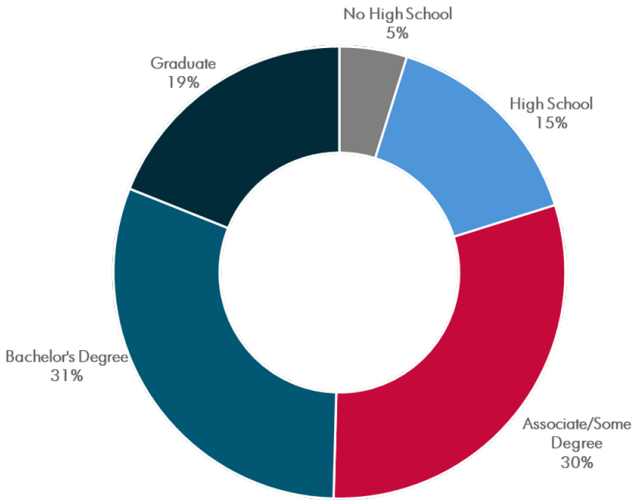


Figure 5. *Educational Attainment*

Table 1. *Friendswood and Comparison Geographies' Demographic Statistics*

	Median Age	Average Household Size	Median Income	% of Population Under 18	% of Population over 65	% Owner-Occupied	Average Commute Times in Minutes (one way)
City of Friendswood	39.7	2.85	$125,470	27.8%	15.8%	76.9%	28.8
City of Pearland	36.5	2.88	$112,470	27.8%	12.0%	76.6%	33.5
City of League City	37.7	2.67	$119,870	26.4%	12.4%	74.4%	29.8
Galveston County	38.5	2.52	$85,348	23.9%	15.3%	67.5%	27.7
Harris County	34.4	2.73	$73,104	26.1%	11.4%	54.8%	29
H-GAC Region	35.4	2.87	$89,163	26.2%	12.6%	61.0%	32
State of Texas	35.9	2.70	$76,292	24.7%	13.8%	63.0%	26.7

Data Source: ACS 2019 – 2023 Five-Year Estimates

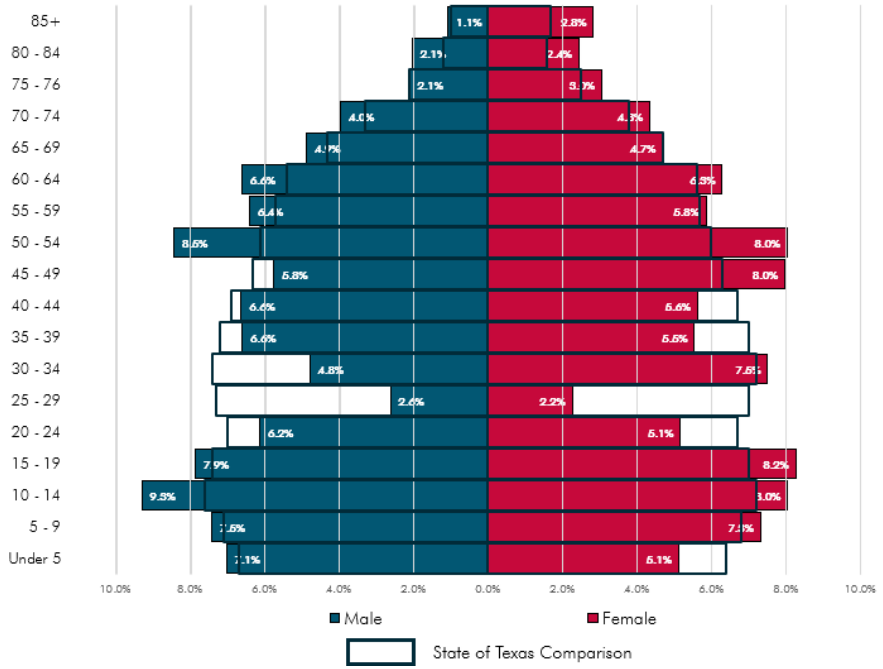


Figure 4. *Age Distribution*

Public Health Status

Several public health factors were evaluated, such as general health status, physical activity, mobility disability, and high cholesterol. Neighborhoods in northern and central Friendswood report worse general health and lower levels of physical activity, illustrated in **Figure 6**. High cholesterol rates are common across the city, as shown in **Figure 7**, reinforcing the need for environments that support heart-healthy lifestyles. **Figure 8** displays the City's general health status by census block groups. Friendswood's residents generally report better overall health than those in surrounding communities, but disparities do exist across the city.

Figure 9 shows the mobility disability rates by block group across the community. The same areas that report lower general health status and lower levels of physical activity also have a higher prevalence of mobility-related disabilities, with the highest rates found in central Friendswood.

For residents who use mobility aids or do not drive, accessible walking and rolling infrastructure, such as smooth sidewalks, curb ramps, and safe crossings, is essential to ensure everyone can benefit from a connected and inclusive transportation network.

Physical Inactivity

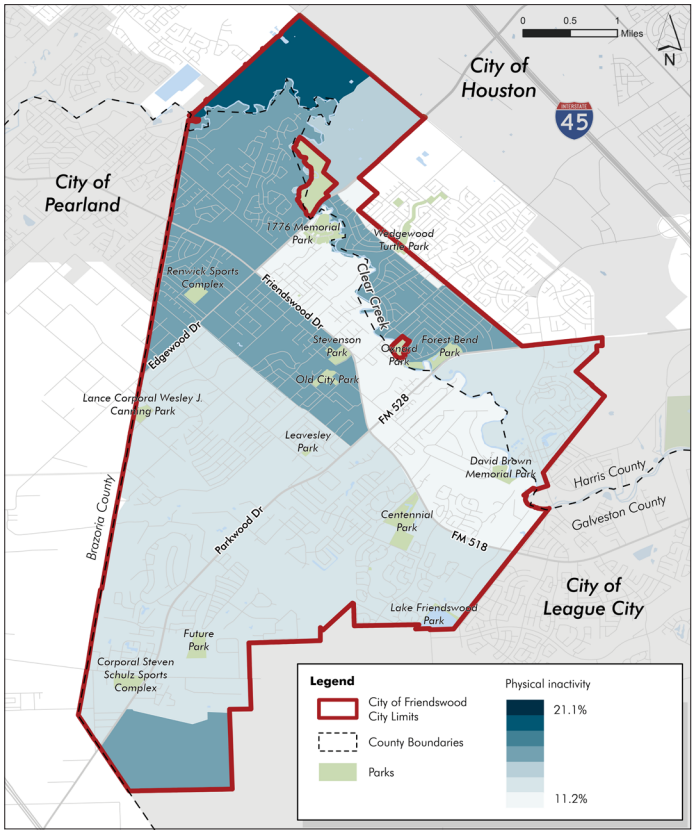


Figure 6. *Physical Inactivity by Block Group*

High Cholesterol

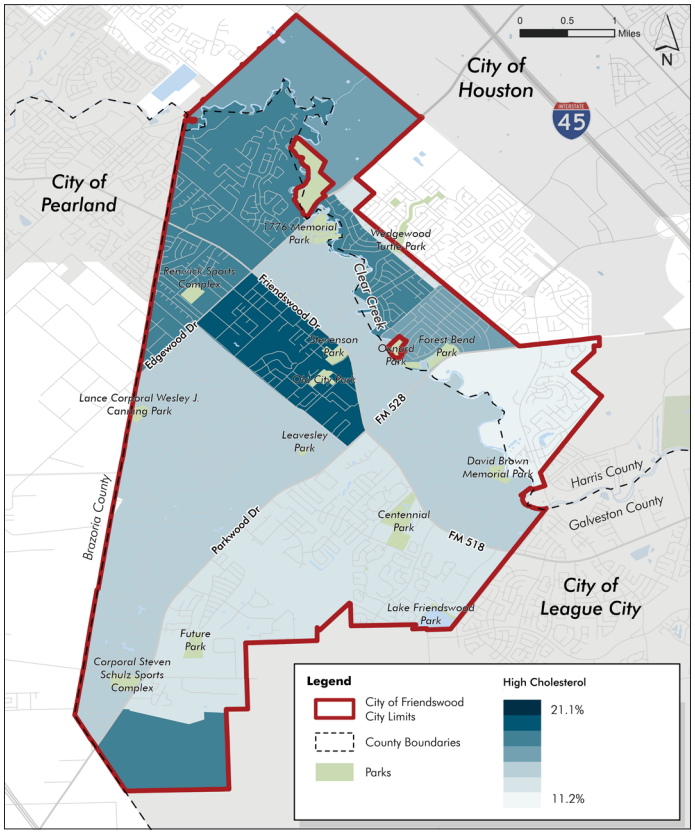


Figure 7. *High Cholesterol Rates by Block Group*

General Health Status

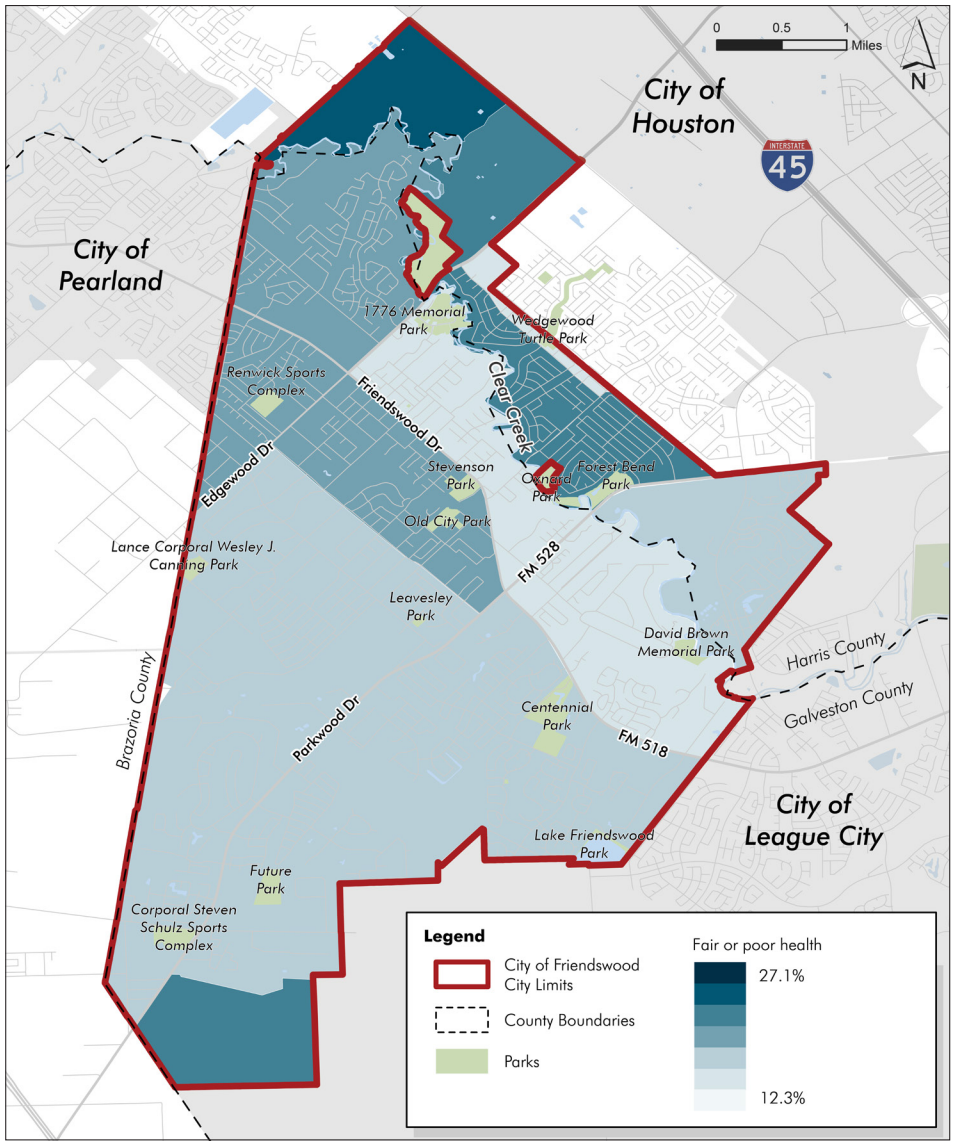


Figure 8. *General Health Status by Block Group*

Mobility Disability

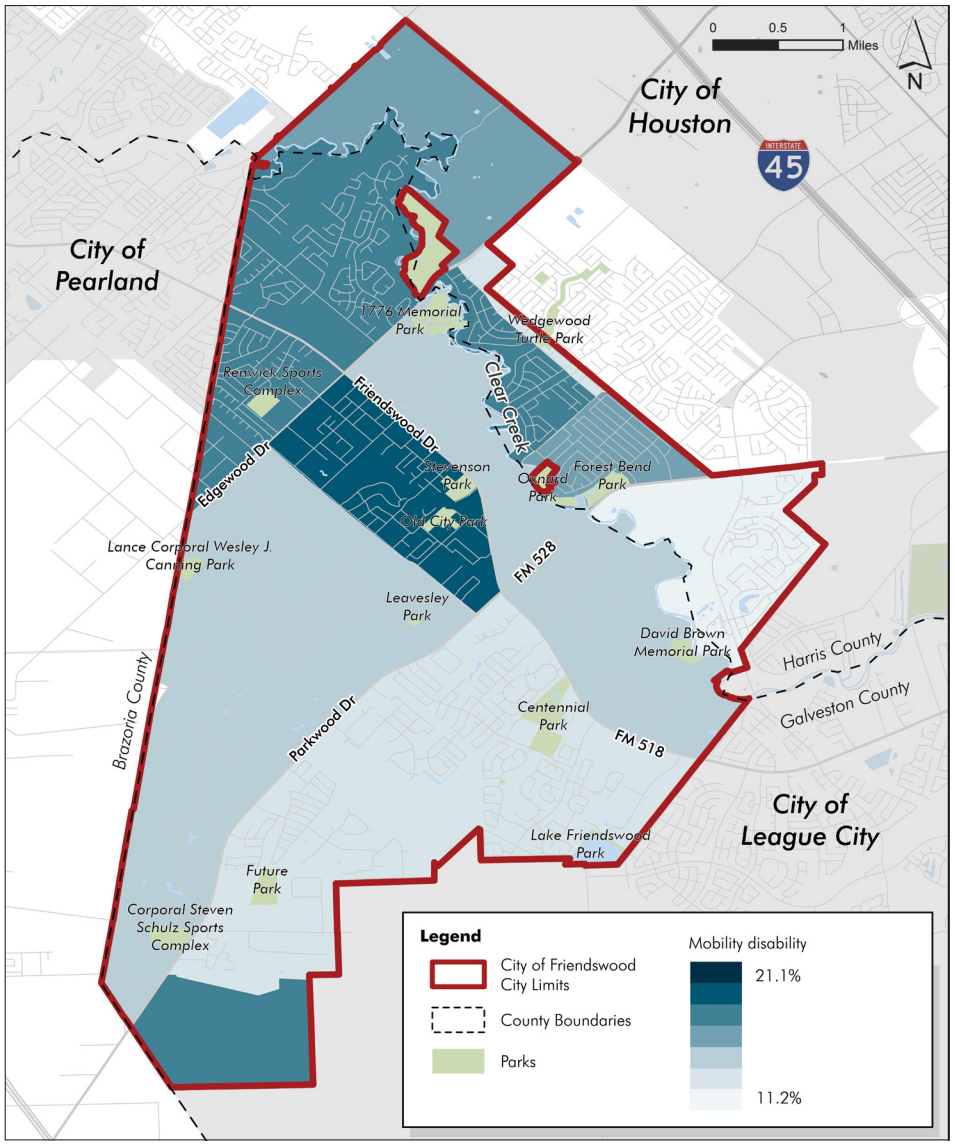


Figure 9. *Mobility Disability by Block Group*

Points of Interest

There are several major activity centers and points of interest located in Friendswood, shown in **Figure 10**, including commercial areas, parks, schools, and religious centers. There are several existing and planned infrastructure opportunities, including key activity centers and destinations in Friendswood that are pertinent to active transportation infrastructure opportunities:

- The City's two main commercial corridors are also TxDOT facilities – Friendswood Drive (FM 518) and Parkwood Drive (FM 528).
- Friendswood's historic downtown area, also home to Stevenson Park where many of the community's local events are held, are both located along FM 518.
- Friendswood features 11 public parks within its city limits, as well as three private parks maintained by local homeowners associations (HOAs), and two Harris County Precinct 2 parks: Oxnard Park and Frankie Carter Randolph Park.
- There are 9 schools in Friendswood, including both public and private schools.
- The city also is home to religious centers.
- The Friendswood City Center development, located along FM 528 in the east side of Friendswood, is a planned 106-acre development that will feature a hotel, retail, and other mixed-use buildings.

Existing Zoning

Existing zoning provides a picture of Friendswood's current land use composition. Friendswood's existing zoning is illustrated in **Figure 11**. Commercial and retail areas are generally along FM 518/Friendswood Drive and FM 528/Parkwood Drive. A portion of the northern area of Friendswood is zoned industrial, where a Superfund site and golf course are located. Portions of the east and southeast of Friendswood are zoned Planned Unit Development (PUD).

Future Land Use

Future land use plans help guide decisions on where to add new active transportation infrastructure. The Future Land Use Plan indicates the location of future public or semi-public land, which includes government buildings and school facilities. These are important locations to connect to via active transportation infrastructure. Friendswood's Future Land Use Plan is displayed in **Figure 12**.

Popular Walking and Biking Destinations

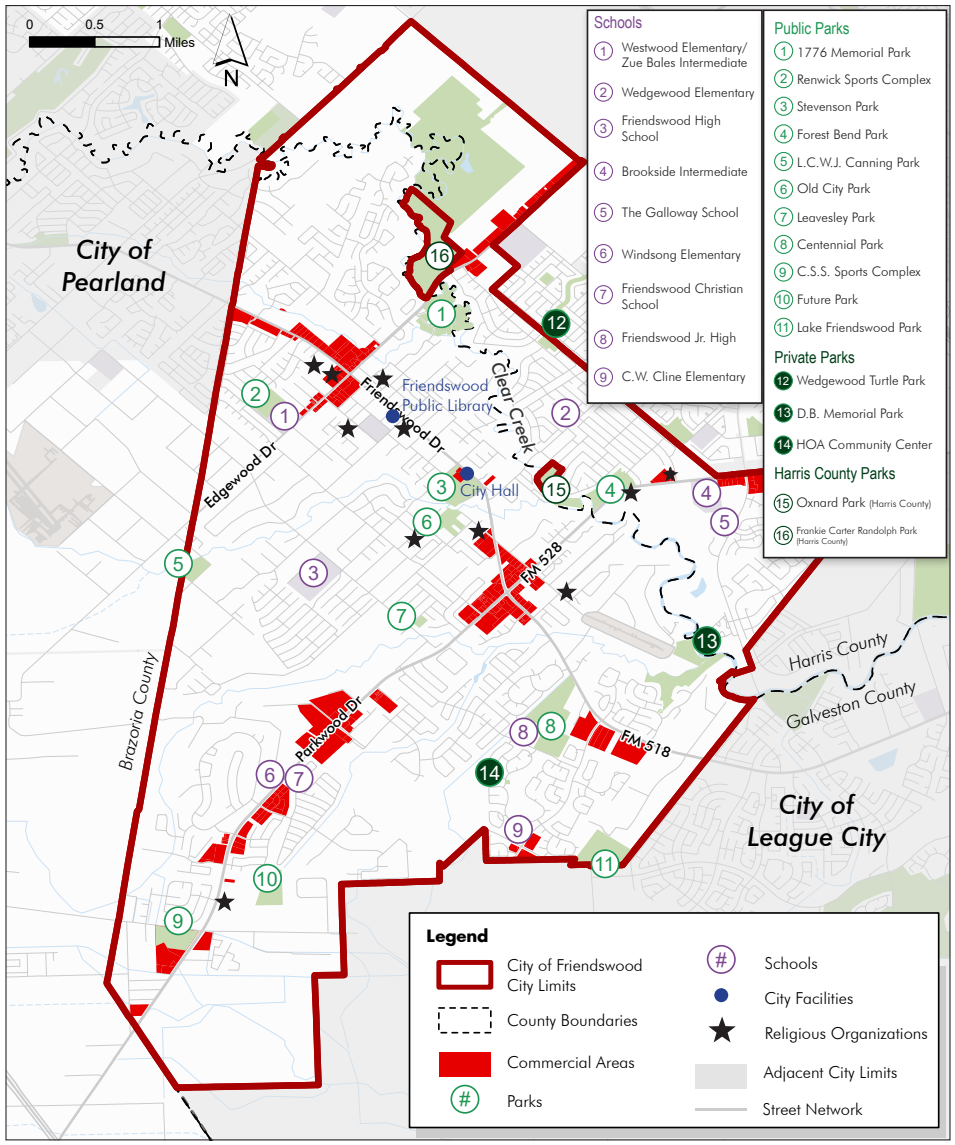


Figure 10. *Points of Interest*

Friendswood Zoning Map

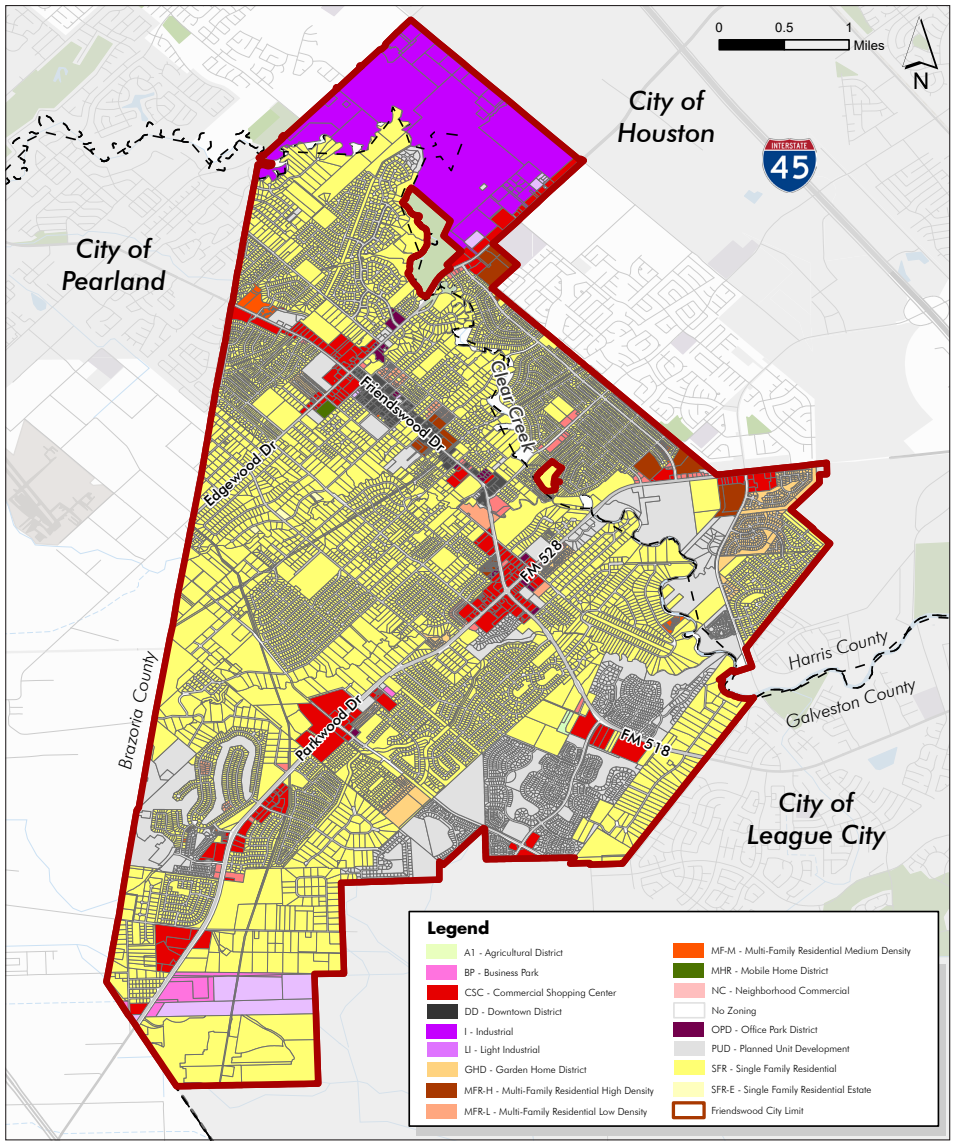


Figure 11. *Existing Zoning (Last updated August 2024)*

Friendswood Future Land Use Map

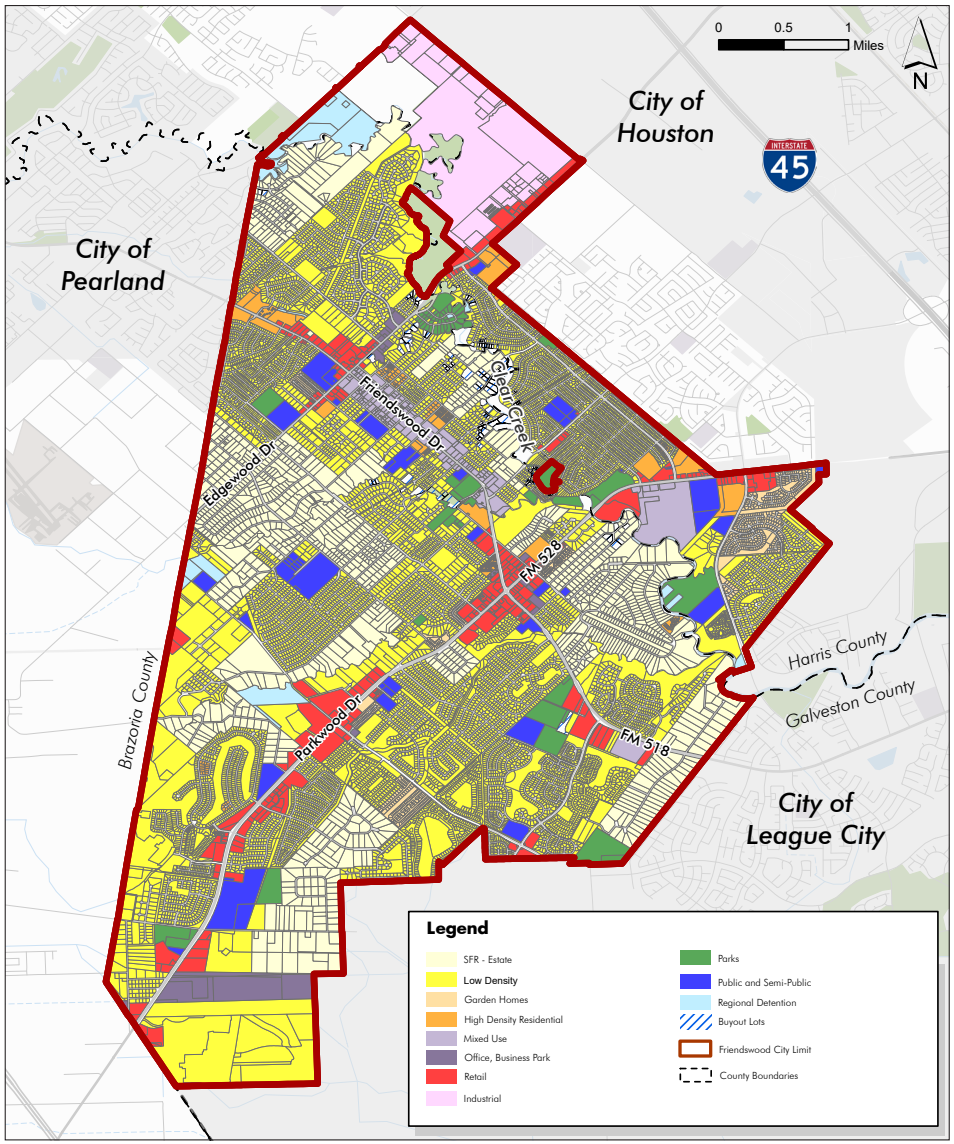


Figure 12. *Future Land Use Map (Adopted in 2021)*

Active Transportation Infrastructure

Bicycle and Pedestrian Commuter Analysis

A bicycle and pedestrian commuter analysis was conducted on Friendswood's thoroughfare network using H-GAC's Activity-Connectivity Explorer tool, which identifies areas with untapped potential for walking and bicycling by analyzing short-distance work trips and existing active-mode usage. This tool estimates how many trips could be converted to walking or biking trips, if improvements are made.

In total, 16 streets were analyzed, including Friendswood's Major Arterials, Boulevards, and Collectors. FM 518 and FM 528 show the greatest overall impact, with 116 potential new bicycle commuters and a combined reduction in vehicle miles traveled (VMT) by 548 miles per day.

FM 518 also scores high in both potential pedestrian and bicycle commuting, with 70 potential new cyclists and a reduction of 263.2 vehicle miles traveled per day. Both corridors lack complete sidewalks, emphasizing the importance of addressing infrastructure gaps to unlock mode shift potential.

Origin-Destination Analysis

An origin-destination (O-D) analysis was conducted in Friendswood to further understand where people are walking and biking within the community. The analysis utilized Replica data provided by H-GAC. Replica is an O-D online analysis tool that models travel behavior using aggregated and anonymized location data. The O-D analysis should be interpreted alongside local knowledge, on-the-ground observations, and community feedback to get a fuller picture of unmet mobility needs.

As expected, areas of Friendswood with a well-connected sidewalk network show the most pedestrian trips. However, this does not necessarily mean that people do not want to walk to parts of the community showing a small number of walking or biking trips; it could mean they have trouble getting there on foot or bike. Conversely, an area showing a small number of walking or biking trips could indicate that this is not a popular destination for active transportation users (e.g., an industrial park or warehousing area).

Areas showing high numbers of active transportation trips may reflect the presence of key destinations like schools, parks, or retail centers – or they could be highlighted simply because sidewalk infrastructure exists in that area.

Existing active transportation infrastructure in Friendswood is illustrated in **Figure 13**. Several areas are well-connected with active transportation infrastructure, particularly in the southern and eastern parts of the city. Several off-street trails also provide recreational and active transportation options, primarily serving single-family neighborhoods. Sidewalk coverage is limited in older, more central parts of the community.

Existing Sidewalks

Today, the City of Friendswood has approximately 200 miles of existing sidewalks. Sidewalks in Friendswood are generally concentrated in residential neighborhoods, but vary in condition, design, and width. Sidewalks are present along Texas Department of Transportation (TxDOT) facilities, including FM 518 (Friendswood Drive) and FM 528 (Parkwood Drive). However, gaps in the network exist, both along TxDOT roadway facilities and within the community in general. Newer subdivisions more consistently feature sidewalk infrastructure. In contrast, more established, gridded neighborhoods often lack basic sidewalk infrastructure.

Existing Bicycle Infrastructure

Friendswood has one marked on-street bicycle lane along FM 528/Parkwood Drive. Generally, the higher the roadway facility's speed and functional classification, the greater the separation that is needed for cyclists to feel safe and comfortable to utilize the bicycle lane facility. The TxDOT Bikeway Guidance states that bike lanes with higher speed limits need additional separation for cyclists to feel comfortable, especially for the general population to use. This existing bicycle lane is narrow and has a low level of comfort for cyclists.

Existing Trails

The City of Friendswood has approximately 7.71 miles of existing off-street trail facilities. Trails in Friendswood largely serve recreational purposes, and do not connect to many destinations. The existing trail facilities in Friendswood are very well-maintained and in excellent condition, and can be categorized as trails located in parks, such as Stevenson Park and Old Friendswood City Park, and trails along easements in single-family neighborhoods.

Planned and Surrounding Active Transportation Infrastructure

Friendswood shares a municipal boundary with the City of Pearland to the northwest, and the City of League City to the southeast. The city is also split between Harris and Galveston counties and is adjacent to Brazoria County to the west. It is important to understand adjacent cities' planning efforts to make more informed recommendations that potentially can connect to adjacent cities' facilities for a seamless walking or biking experience. Pearland and League City's existing and planned active transportation infrastructure are mapped in **Figure 14**, as well as H-GAC's planned trail network.

Existing Active Transportation Infrastructure

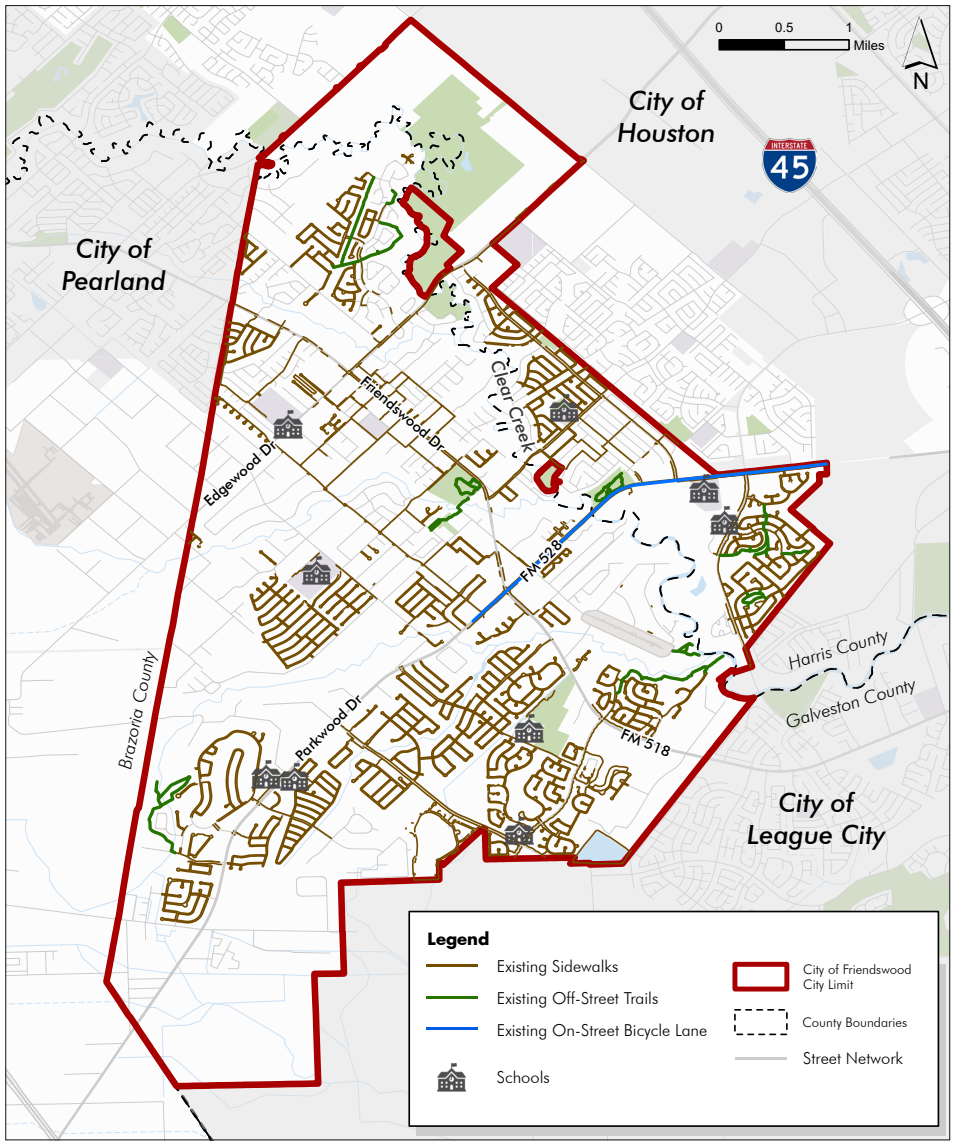


Figure 13. *Existing Active Transportation Infrastructure*

Planned and Surrounding Infrastructure

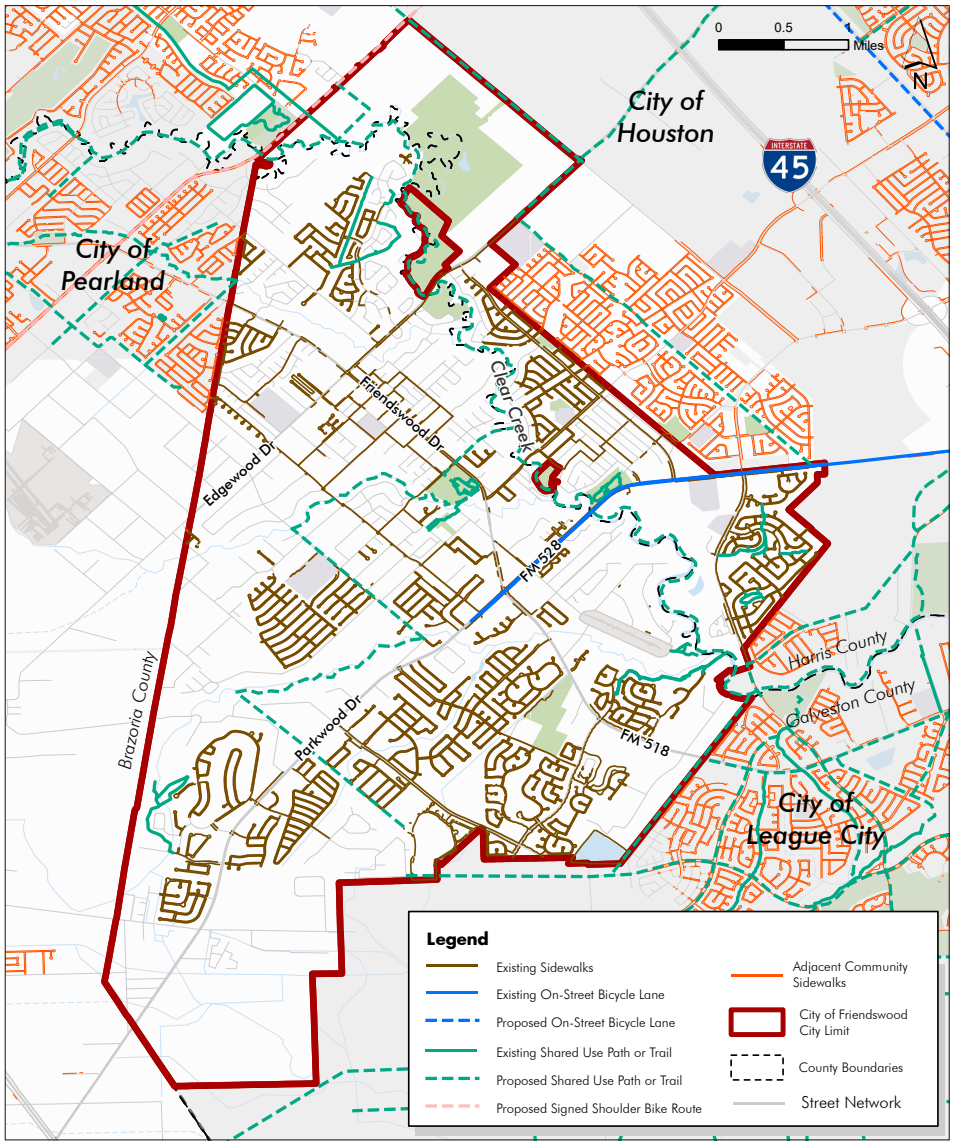


Figure 14. *Planned and Surrounding Active Transportation Infrastructure*

Transit Information

Friendswood currently does not have a fixed-route transit service. However, there are several nearby and regional transit options. METRO, Houston's primary transit provider, operates a park-and-ride facility just northeast of the city limits, near the Heritage Park neighborhood along I-45. Residents of Friendswood can also access shared-ride services through the Harris County RIDES program, which allows eligible customers to purchase transportation services at a significant discount. Additionally, the Gulf Coast Transit District (GCTD) (existing services offered displayed in **Figure 15**) offers demand-response and microtransit services for residents of Brazoria and Galveston counties. GCTD has fixed park-and-ride facilities in League City and Texas City, but microtransit and demand response services are the only transit services available in Friendswood.



Figure 15. *Gulf Coast Transit District (GCTD)*

Emergency Evacuation Routes

In the event of a hurricane, several designated emergency evacuation routes are identified by H-GAC, displayed in **Figure 16**. For Friendswood, key evacuation routes include FM 518 and FM 528 both connect to I-45, one of the main evacuation routes in this area. State Highway 6 is also designated as an emergency evacuation route. Friendswood residents can access this route via FM 528 to SH 35, then to the SH 6 emergency evacuation route in Alvin.

Traffic Counts

TxDOT maintains a Statewide Planning Map that includes traffic counts throughout the state of Texas. Annual average daily traffic (AADT) counts were gathered in and around the Friendswood community and are displayed in **Figure 17**. Individual traffic counts collected and displayed on the map are for the years 2021 – 2023. FM 528/ Parkwood Drive shows an AADT of 20,000 – 24,000 vehicles. FM 518/ Friendswood Drive has similar annual vehicle numbers, with an average of 20,000 – 26,000 vehicles per day.

Thoroughfare Plan

Figure 18 displays Friendswood's existing Thoroughfare Plan, adopted by the Friendswood City Council in 2018. Streets in Friendswood are divided into Major Roads, Boulevards, and Collectors. Major Roads include FM 518, FM 528, and Edgewood Drive/FM 2351, each owned and operated by TxDOT. There are four designated Boulevards in Friendswood: Blackhawk Boulevard, W Bay Area Boulevard, West Boulevard, and Friendswood Parkway.

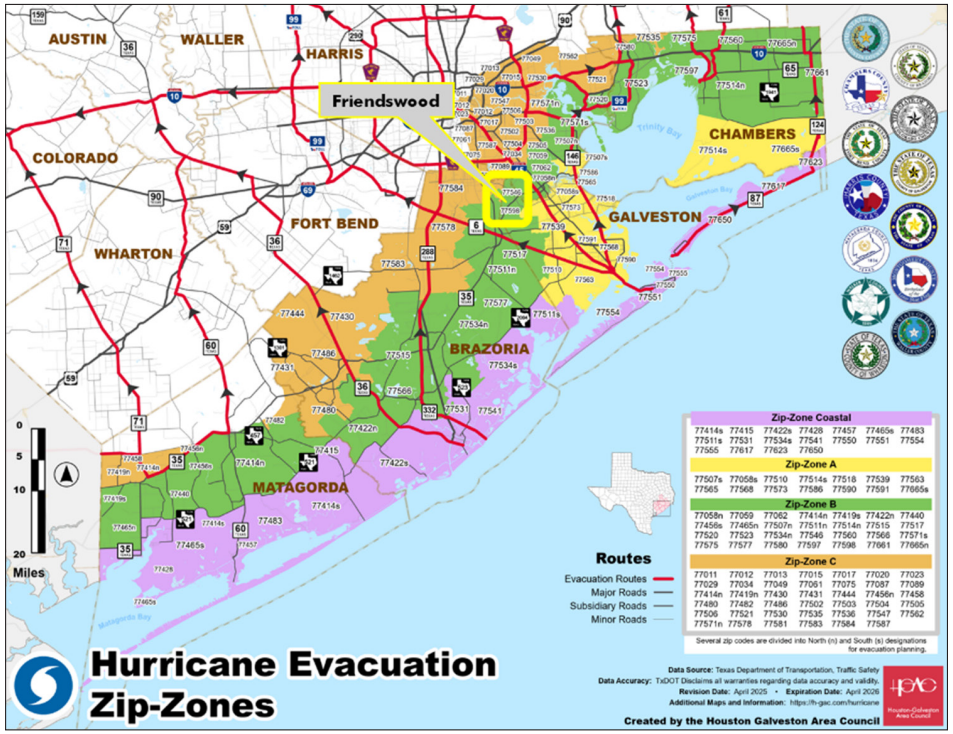


Figure 16. *Emergency Evacuation Routes*

Traffic Counts

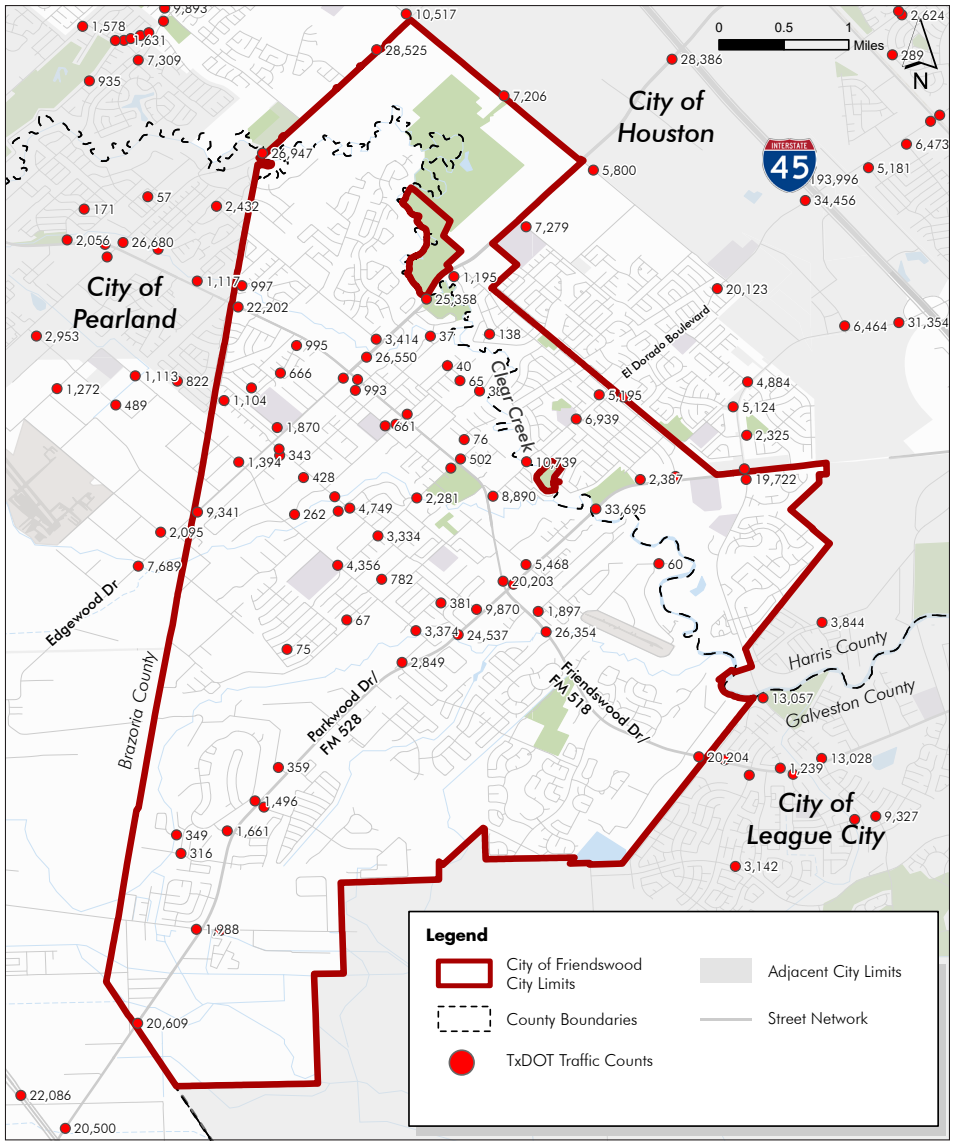


Figure 17. *Traffic Counts*

Friendswood Thoroughfare Plan

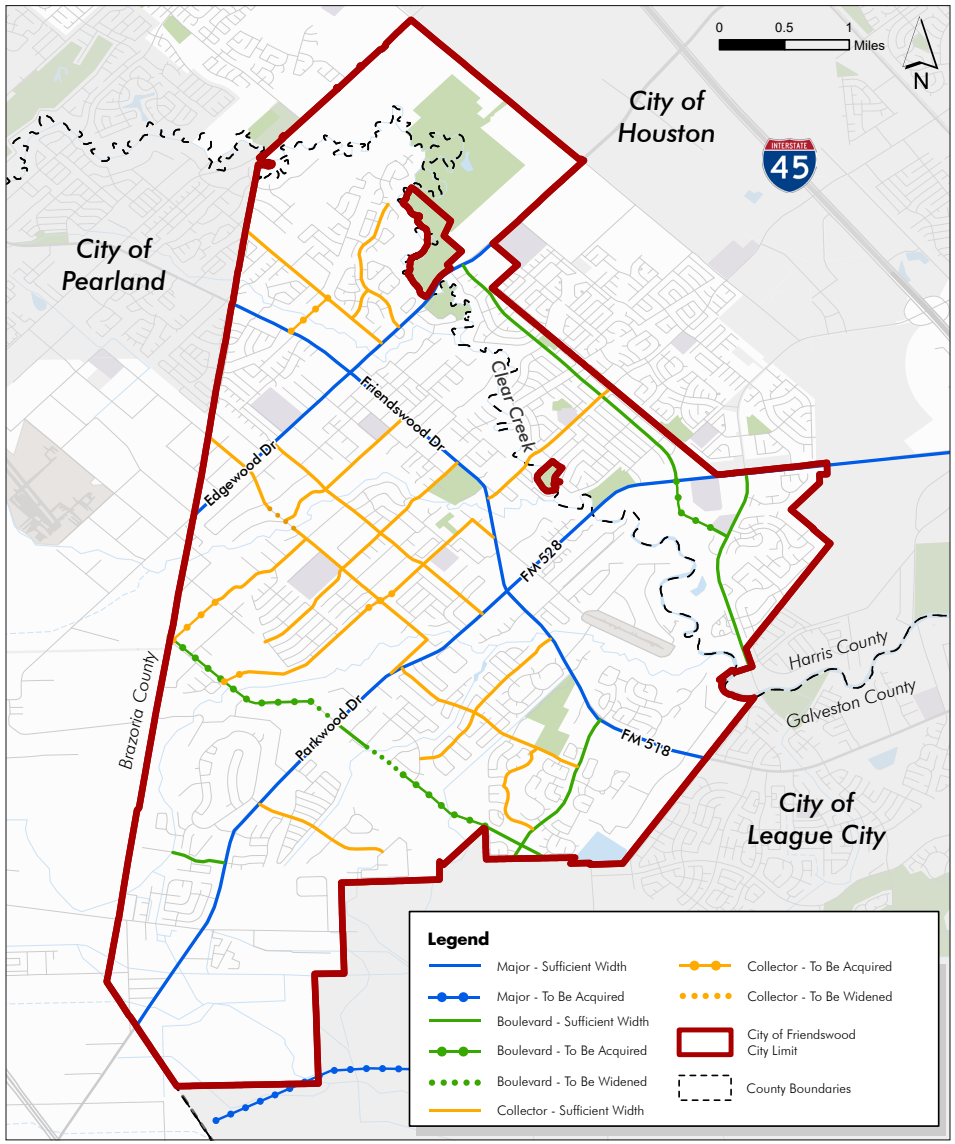


Figure 18. *Thoroughfare Plan (2018)*

Existing Easements

Easements can play an important role in active transportation planning. They help identify locations where new active transportation facilities could be located off-street, instead of alongside a busy roadway. Easements can represent feasible locations for off-street trail facilities, which is why easements were evaluated in the existing conditions assessment.

Easements are illustrated in **Figure 19**. Existing easements are divided into several categories, showing where access, drainage, pipeline, utility, multi-purpose easement, and other easement sites are located within the community. There are multiple easements that traverse the community. The community's existing pipeline, utility, and drainage easements create a network of corridors or rights that may support future sidewalks and trails, subject to ownership and access constraints.

Rights-of-way and public easements are extremely limited along Clear Creek and the other creeks within the community. This can create challenges for identifying off-street trail opportunities since much of the land adjacent to the creek is privately owned. Without dedicated public access, trail development must either avoid these areas or rely on easement acquisition and property owner coordination, which can add complexity, cost, and time to project implementation.

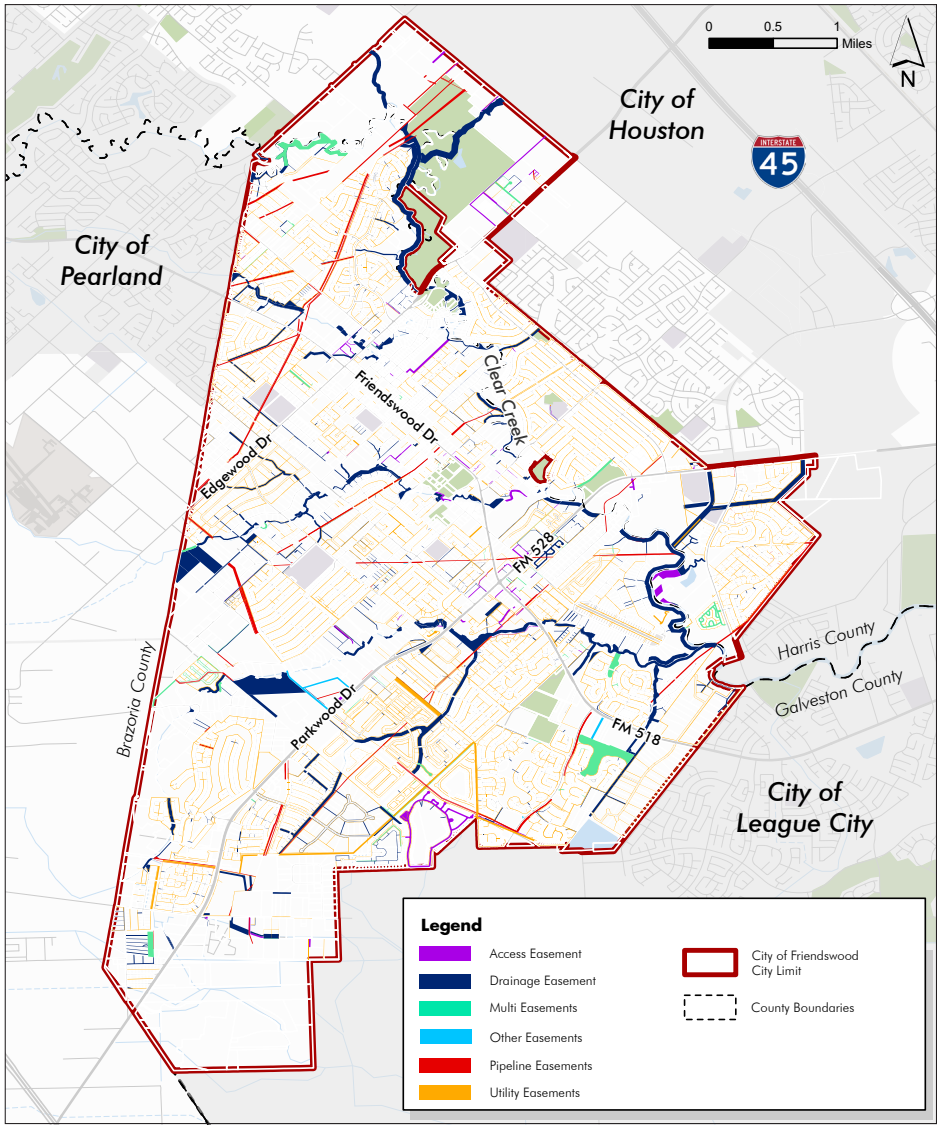


Figure 19. *Existing Easements*

The Houston metropolitan area, including Friendswood, has a hot and humid climate, with regular periods of high temperatures, intense storms, and occasional hurricanes. These conditions are important to consider when planning infrastructure that supports comfort, safety, and year-round usability.

Urban Heat

Friendswood's pattern of development has created pockets of urban heat islands, displayed in **Figure 20**, with three areas experiencing particularly pronounced conditions. On the eastern edge of the city, two newer single-family housing developments register higher temperatures than surrounding neighborhoods, which is likely due to recent construction and a younger, less-established tree canopy. Elevated heat is also observed in commercial zones and denser development along Friendswood Drive, particularly between Whispering Pines Avenue and Edgewood Drive.

Tree Canopy

Tree canopy and structural shade play a vital role in enhancing comfort and usability across Friendswood's active transportation network. The existing tree canopy is displayed in **Figure 21**. In Friendswood, tree canopy distribution generally reflects single-family development patterns and is relatively uniform across residential areas. Canopy cover becomes denser near waterways like Clear Creek and its tributaries, where riparian forests provide natural shade. In contrast, southern parts of the city have lower canopy coverage and greater heat exposure.

Urban Heat Island Effect

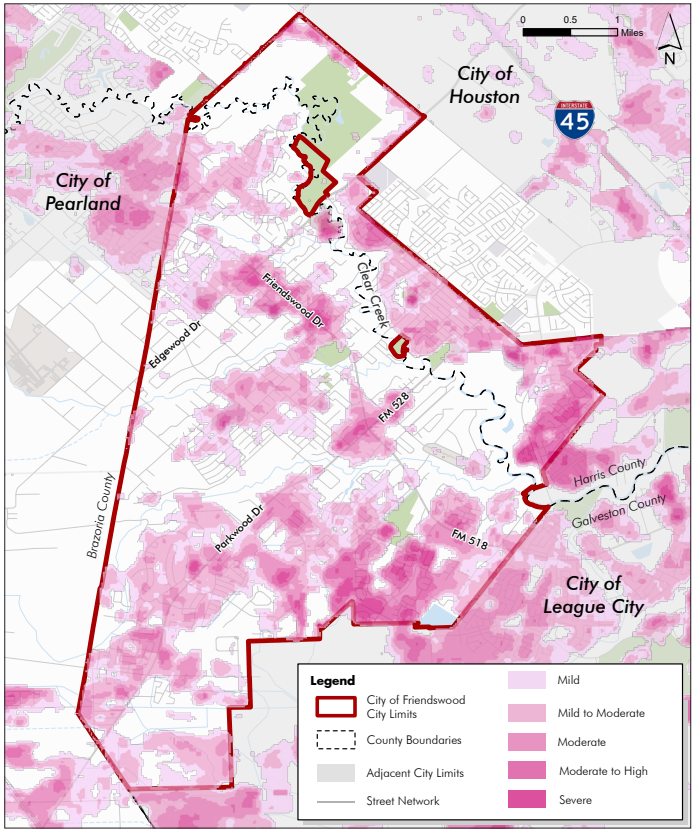


Figure 20. *Urban Heat*

Friendswood Tree Canopy Coverage

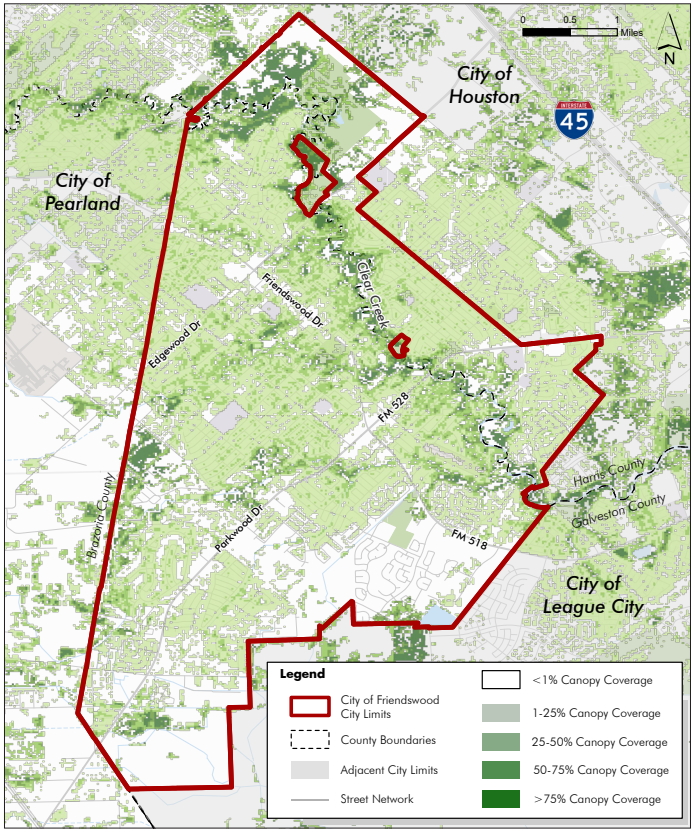


Figure 21. *Tree Canopy*

Drainage and Flooding

Figure 22 illustrates the key drainage and flood-related findings based on Federal Emergency Management Agency (FEMA) flood mapping, hydrologic data, and local infrastructure inventories.

Friendswood is traversed by multiple natural waterways that form the city's primary drainage system. Major watercourses include Clear Creek, Cowarts Creek, Chigger Creek, Mary's Creek, and Cedar Gully. In total, more than 10 distinct streams and tributaries flow through the city, including primary and secondary branches of the Clear Creek watershed. The area is prone to several types of flooding, including riverine flooding from creek and bayou overflows, sheet flow flooding caused by shallow overland runoff during intense rainfall, and urban (storm sewer) flooding due to undersized or overwhelmed drainage systems.

There are approximately 27 major bridge and culvert crossings over Friendswood's stream network. These locations are critical for both vehicular movement and potential active transportation routes. Bridges and culverts are marked with a common symbol in **Figure 22** due to their shared function as stream crossings. Although structurally distinct, both may serve as opportunities or barriers for pedestrian and bicycle access.

Ecoregion

Ecoregions are areas with geographically distinct climate, landform, and ecological characteristics, including plant and animal communities. Friendswood is located in the Northern Humid Gulf Coastal Prairie, a flat region with poor drainage due to clay-heavy soils. Historically, this area supported tallgrass prairies and scattered oak mottes. Soil types vary between the higher, sandier Lissie Formation with mima mounds and the lower, clay-rich Beaumont Formation with gilgai features. These variations create diverse microhabitats that shape local plant communities. Friendswood's landcover types and vegetative communities are mapped in **Figure 23**.

Floodplains and Culvert Crossings

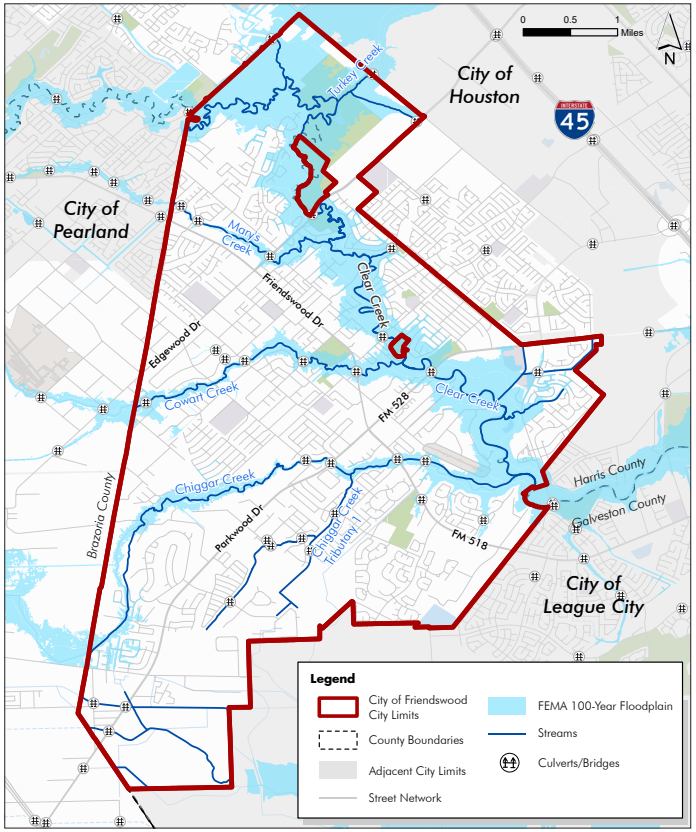


Figure 22. *Drainage and Flooding*

Landcover Types

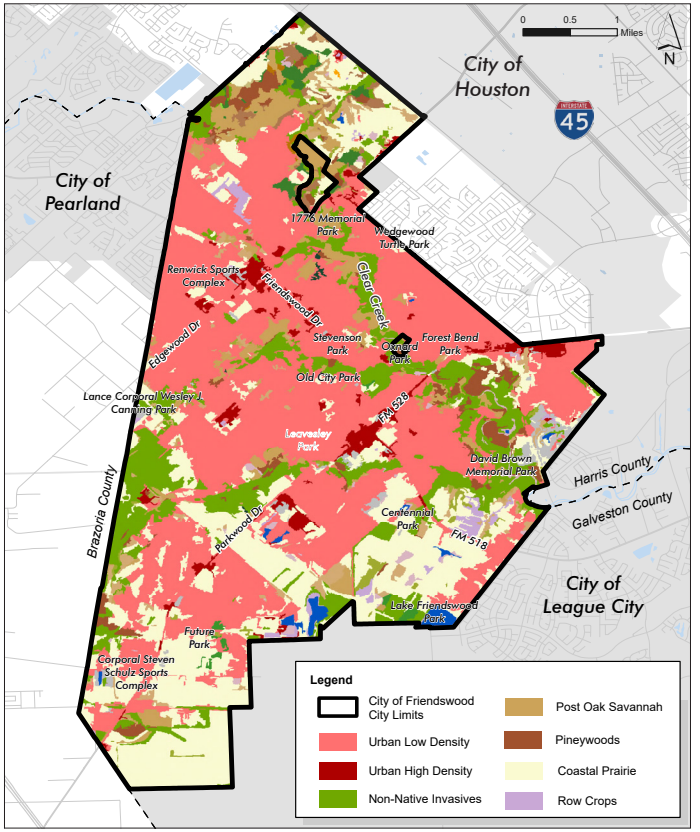


Figure 23. *Landcover Types and Vegetative Communities*

Active Transportation Safety

The Texas Department of Transportation maintains a centralized database of all motor vehicle crashes reported by law enforcement agencies across the state. Data from the Crash Records Information System (CRIS) was analyzed to identify pedestrian- and bicycle-related crashes within the City of Friendswood between 2020 and 2024. During this five-year period, there were 2,522 reported traffic crashes, of which 14 involved pedestrians and 20 involved bicyclists. Of these 34 crashes (pedestrian and bicyclist), three resulted in fatalities, five caused serious injuries, and nineteen led to minor injuries, highlighting the safety risks faced by pedestrians and cyclists. This information is displayed in **Table 2**.

Figure 24 describes the manner of collision for the 34 bicycle and pedestrian crashes that occurred in Friendswood. Of these 34 crashes, 56% of crashes resulted from one motor vehicle going straight.

Figure 25 displays the contributing factors to the active transportation crashes in Friendswood. Driver behavior is the most frequently cited contributing factor for pedestrian and bicycle crashes; 38% of crashes were due to the driver failing to yield the right-of-way and 35% due to driver inattention. Additional causes include backing without safety (12%), disregard for traffic control signals (3%), and other miscellaneous factors (12%).

Between 2020 - 2024, there were 14 pedestrian crashes and 20 bicycle-related crashes in Friendswood.

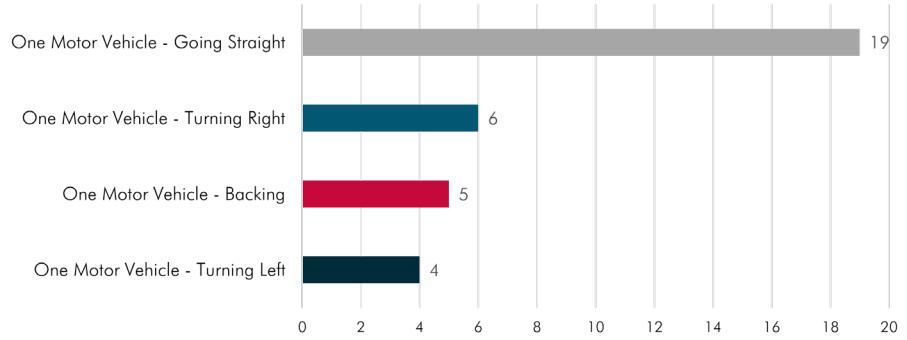


Figure 24. *Manner of Collision*

Table 2. *Friendswood Active Transportation Crashes by Severity*

Year	Fatal	Suspected Serious Injury Count	Suspected Minor Injury Count	Possible Injury	Unknown Severity
2020	1	0	3	1	1
2021	0	0	4	1	1
2022	2	2	7	0	1
2023	0	1	4	1	0
2024	0	2	1	0	1
Total	**3**	**5**	**19**	**3**	**4**

Data Source: TxDOT Crash Record Information System

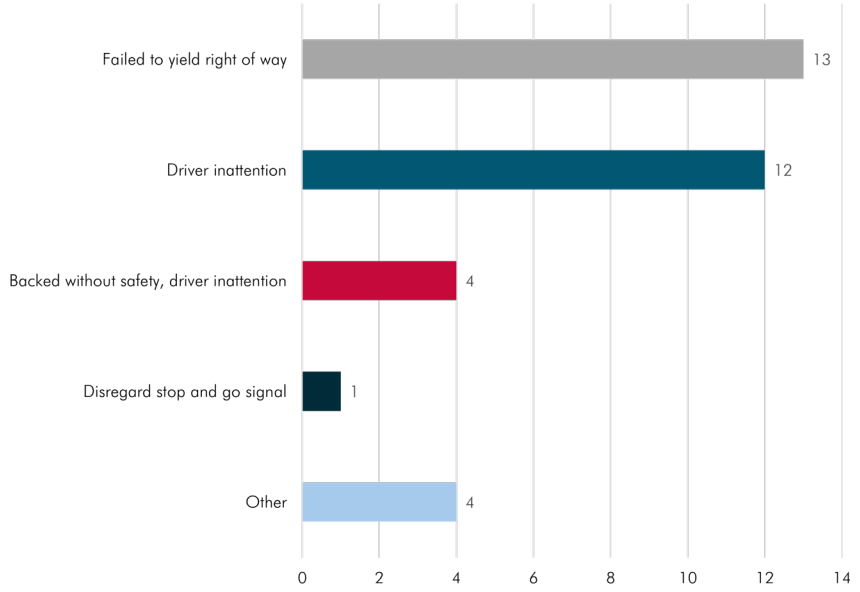


Figure 25. *Contributing Factors to Active Transportation Crashes*

Figure 26 shows the location distribution of active transportation crashes in Friendswood. Of the 14 pedestrian crashes and 20 bicycle crashes, crash patterns indicate that 53% of all crashes happened at non-intersection locations, compared to 29% at intersections and 18% at driveway access points, pointing to the need for targeted improvements beyond standard intersection safety measures.

Among pedestrian crashes, 36% occurred in parking lots, 29% took place on city streets and 21% on Farm-to-Market roads. Bicycle crashes were heavily concentrated on Farm-to-Market roads (60%), followed by city streets (35%). The highest number of crashes occurred along FM 518 and FM 528, both of which serve as key corridors with high vehicular volumes.

Figure 27 displays the location by severity of vulnerable roadway user crashes in Friendswood. It shows concentrations of crashes near commercial corridors, grocery store parking lots, and schools. These trends suggest that crashes are not only a function of street design but also land use and trip generators.

Fifteen crashes (44%) occurred within 0.5 miles of schools and in areas where people frequently walk or bike for daily errands. In total, 85% of crashes occurred within a quarter mile of walkable destinations, including schools, parks, grocery stores, and churches.

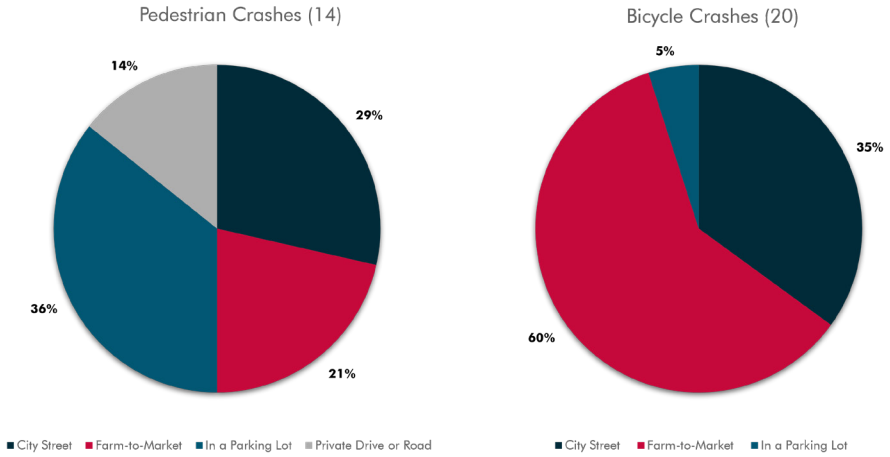


Figure 26. *Active Transportation Crash Location Distribution*

Active Transportation Crash Locations

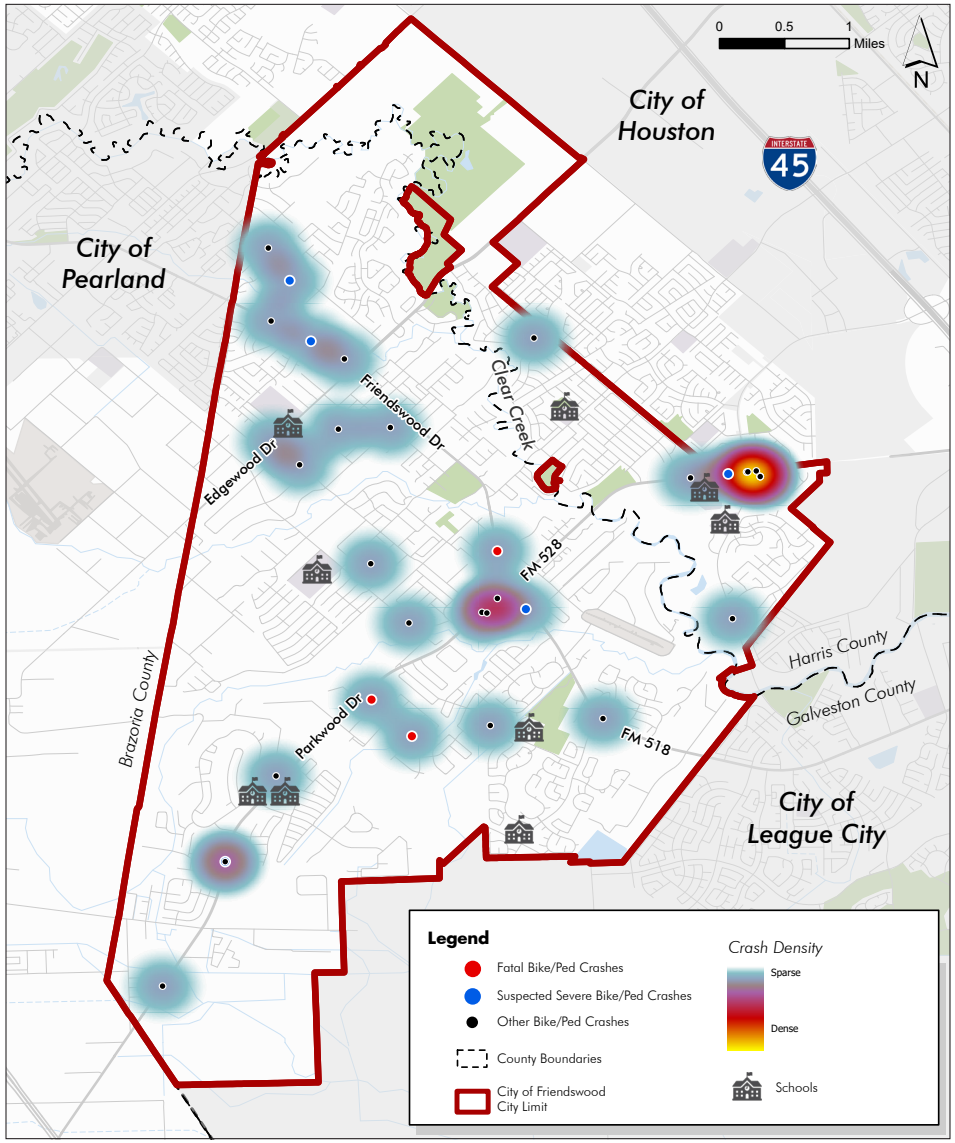


Figure 27. *Friendswood Active Transportation Crash Locations*

Walksheds help us understand how accessible key destinations are on foot. **Figure 30** shows 5- and 10-minute walks from several schools in Friendswood, as well as from the intersection of Edgewood Drive and Friendswood Drive. While some schools are surrounded by homes and have sidewalk networks that support safe, direct walking routes, others lack even basic pedestrian infrastructure.

Figure 28 and **Figure 29** reveal how the experience of walking varies widely across the city. In some neighborhoods, a connected street grid allows for short, convenient walks. In other cases, disconnected street networks and cul-de-sacs force students to take longer, less direct routes—often along busy roads. Even where sidewalks exist, the absence of shade can make these short trips difficult, especially in the summer heat. Improving walkability near schools through better connections, shaded paths, and traffic-calming measures can support healthier, more active lifestyles for students and families.



Figure 28. *Walkshed Zoom 1 - Wedgewood Elementary School*



Figure 29. *Walkshed Zoom 2 - Friendswood Junior High*

Walkshed Analysis

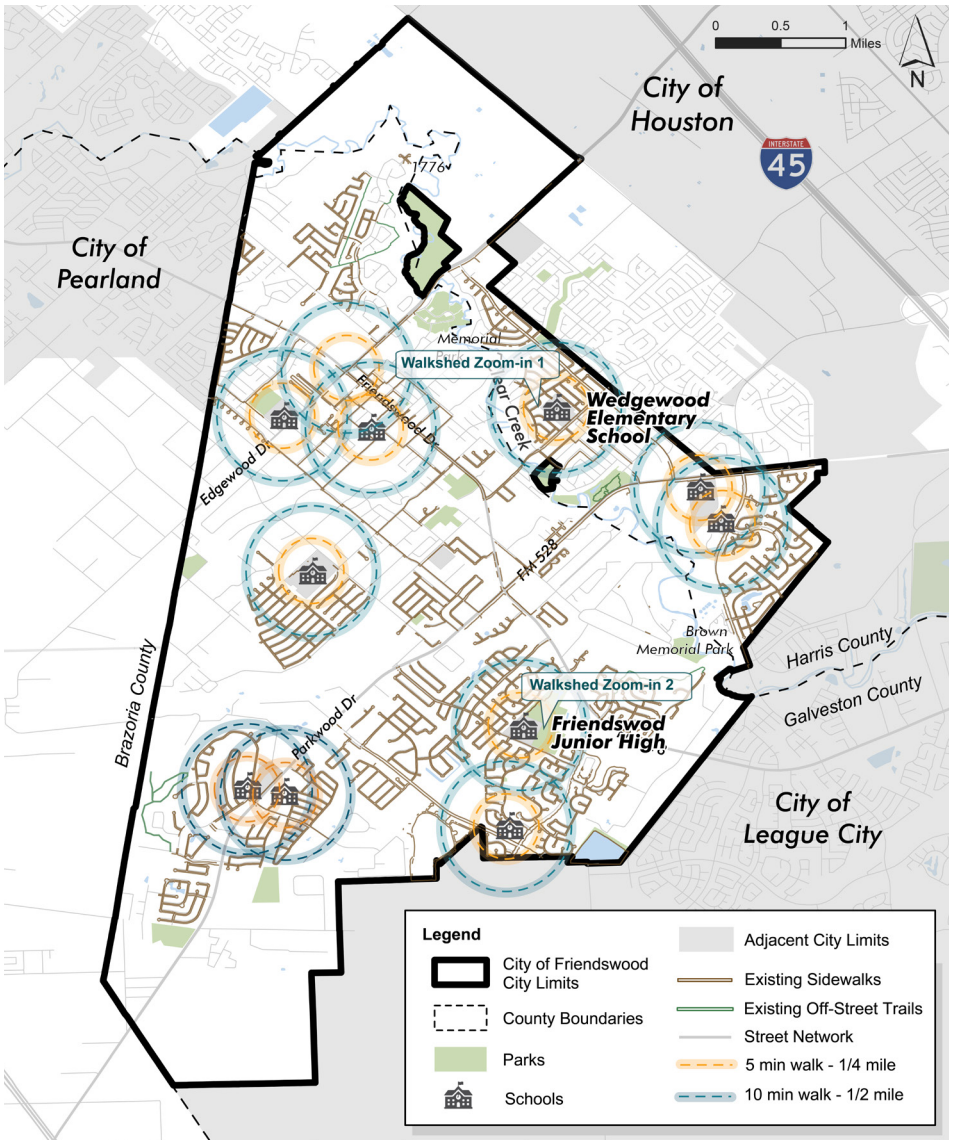


Figure 30. *Walkshed Analysis*



Chapter 2

Public and Stakeholder Engagement

Public and Stakeholder Engagement Summary

This chapter contains an overview of the public and stakeholder engagement. For more details, refer to **Appendix 2**.

A multifaceted engagement strategy was implemented for the Friendswood Active Transportation Plan, consisting of a project website, two online surveys, three steering committee meetings, two stakeholder committee meetings, a walk audit, and public outreach. The project team engaged stakeholders and the public at key stages throughout the planning process to gather feedback, refine concepts, and prioritize project recommendations.

The public engagement timeline is illustrated in **Figure 31**. The project kicked off with an initial steering committee meeting, followed by a pop-up event at Friendswood's 4th of July celebration, online survey, stakeholder committee meeting, and walk audit. The second steering committee reviewed project prioritization criteria and refined the draft Primary Active Transportation Network. A public open house was held in December 2025, giving the community the opportunity to review the project's progress, evaluate project prioritization criteria, and refine project concepts and recommendations. An online survey was offered for those unable to attend the meeting. In 2026, a final steering committee and stakeholder committee meeting were held to review the project's recommendations and make any final adjustments to the project's implementation strategy.



Walk Audit



Steering Committee Meeting #2



4th of July Pop Up Event



Steering Committee Meeting #1



Open House

Public and Stakeholder Engagement Timeline

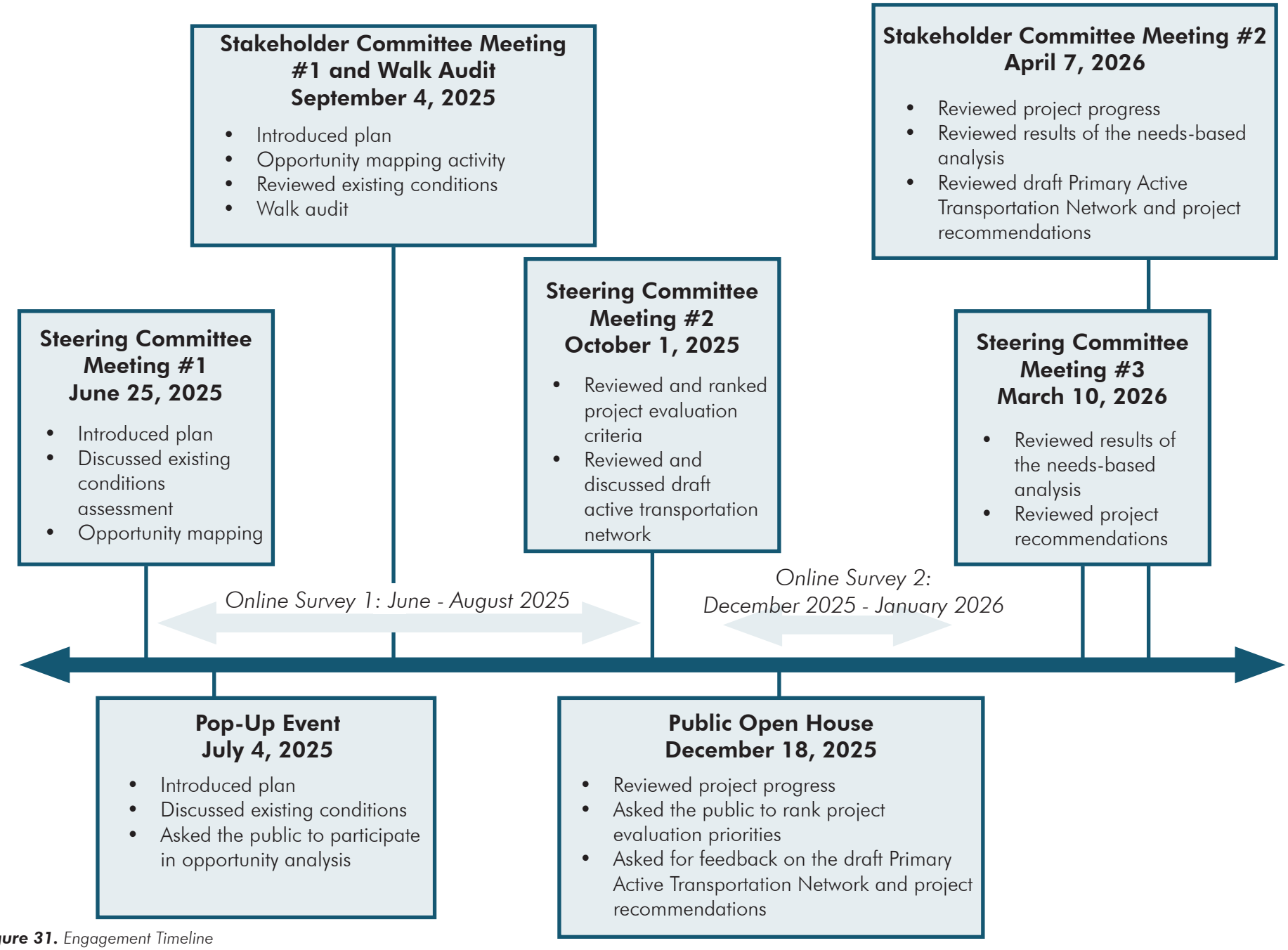


Figure 31. *Engagement Timeline*



Chapter 3

Opportunity Analysis

Opportunity Documentation

This chapter contains an overview of the opportunity analysis. For more details, refer to **Appendix 3**.

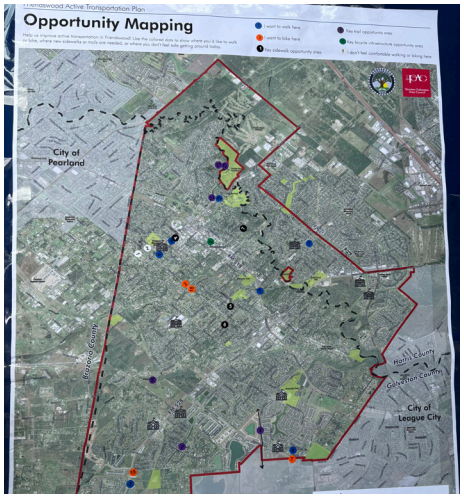
Several occasions to identify opportunities for active transportation – desired locations for walking or biking, locations for sidewalks, trails, and bicycle infrastructure, and locations that are uncomfortable to walk or roll - were provided:

- Steering Committee: June 25, 2025
- Community: City of Friendswood July 4th Celebration (July 4, 2025)
- Stakeholder Committee: September 4, 2025

At each of these occasions, a large map showing the City of Friendswood was displayed on a table and colored dots that correspond with the various categories were provided to participants. All identified opportunities were then mapped and are illustrated in **Figure 32**.

Results of the opportunity activity include:

- 46 opportunities for active transportation (walk, bike, trail).
- 28 locations where participants want to walk.
- 27 locations where participants want to bike.
- 11 locations where participants are uncomfortable using active transportation.



Opportunity Mapping at Pop Up Event



Opportunity Mapping at Steering Committee Meeting 1

Map of Opportunities

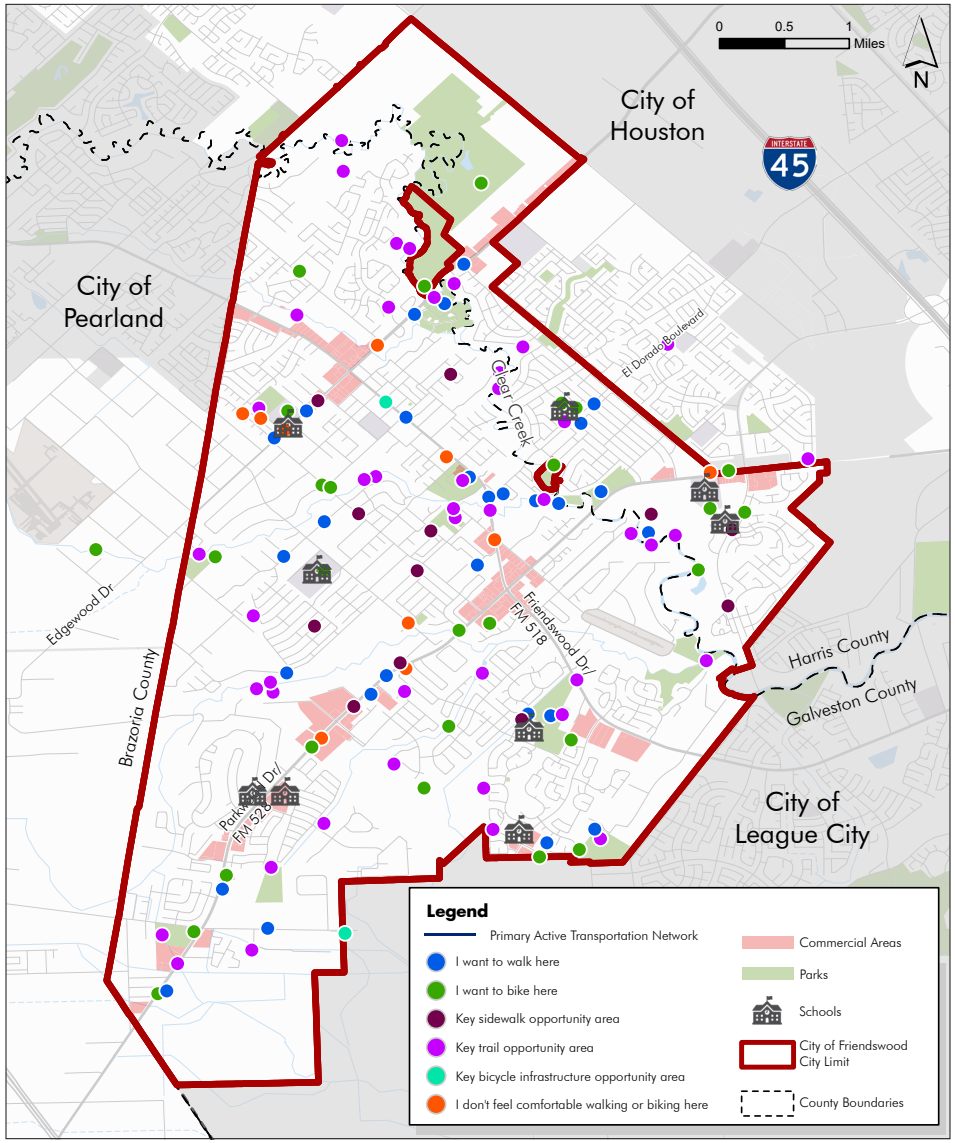


Figure 32. *Map of Opportunities*

Primary Active Transportation Network

Using the identified opportunities as a guide, the project team developed a Primary Active Transportation Network (PATN) to connect these opportunities to schools, parks, neighborhoods, and commercial areas. The PATN takes into consideration connections with adjacent communities. Based on information gathered in preceding efforts, using creeks and flood conveyance channels was not possible given right-of-way constraints and complexities with easements, so the PATN avoided these areas, instead prioritizing main corridors and neighborhood connections.

Several iterations of the PATN were developed, each refined using feedback received from the City of Friendswood, Steering Committee, Stakeholder Committee, and the community. The final PATN is illustrated in **Figure 33**.

Additional coordination is needed in several locations along the PATN, specifically where proposed connections extend beyond the City of Friendswood's jurisdiction. Implementation of these connections will require coordination with adjacent municipalities.



Primary Active Transportation Network Review - Steering Committee Meeting 2

Primary Active Transportation Network

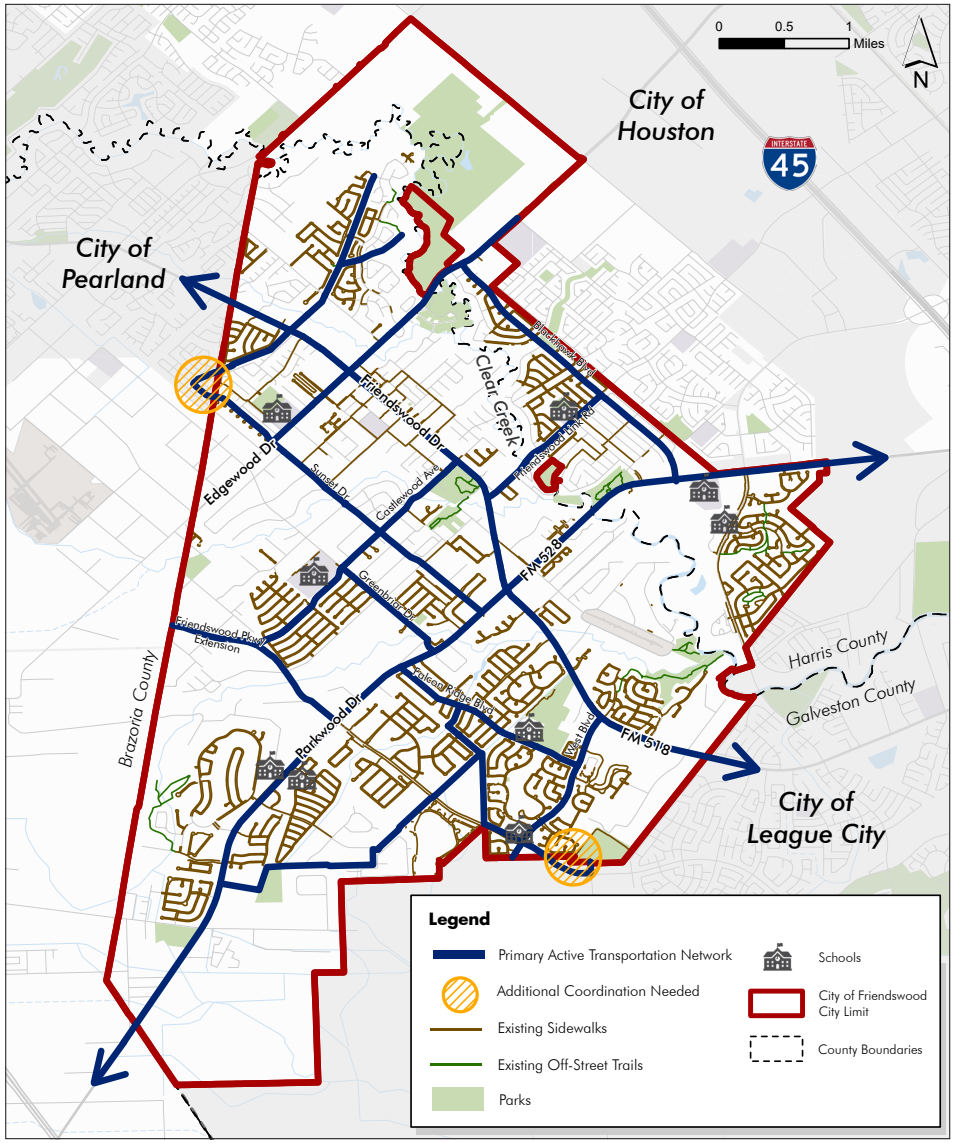
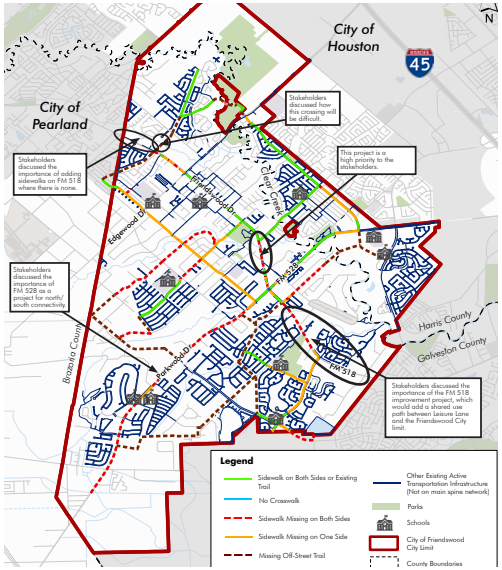


Figure 33. *Friendswood Primary Active Transportation Network (PATN)*

Using the PATN as a guide to inform project recommendations, gaps in active transportation infrastructure along the PATN were identified using a combination of aerial imagery and field verification. Infrastructure gaps, such as missing sidewalks on one or both sides of the street, missing off-street trails, and missing crosswalks are illustrated in **Figure 34**.

The gaps were used to develop the proposed projects to be evaluated as part of the needs-based analysis, described in the next section.



Feedback on Gap Analysis from Steering Committee Meeting 2



Gap Analysis Review - Steering Committee Meeting 2

PATN Gap Analysis

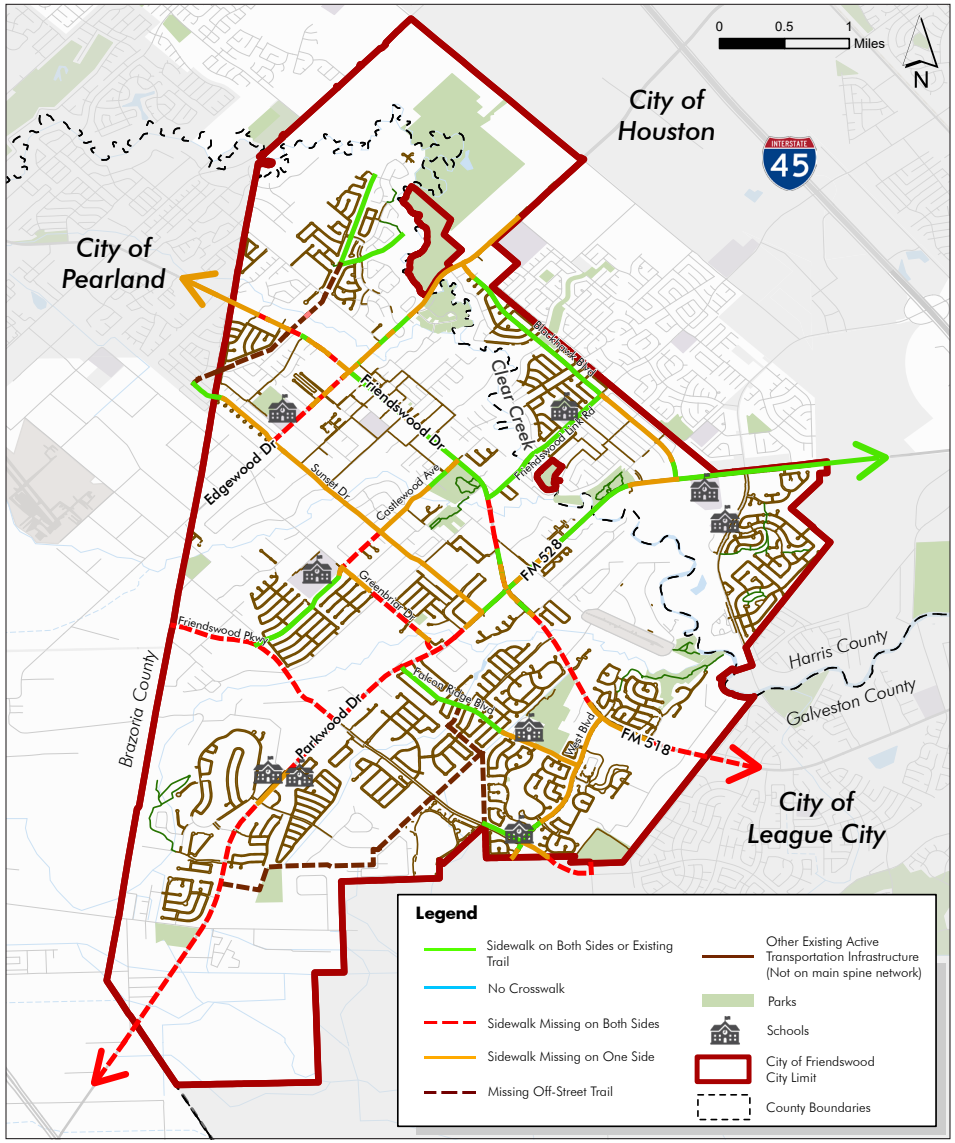


Figure 34. *Primary Active Transportation Network Gap Analysis*

PATN Project Recommendations

Fourteen projects were identified as recommendations along the PATN (**Figure 35**). While the needs-based analysis served as a key foundation for establishing these priorities, it was only one component of the overall evaluation process.

The final prioritized project selection incorporated input from public engagement efforts, as well as feedback from H-GAC and the City of Friendswood, to ensure the recommended projects reflect both technical need and community priorities. Five projects were selected for detailed development, discussed in Chapter 4.

Project Recommendations

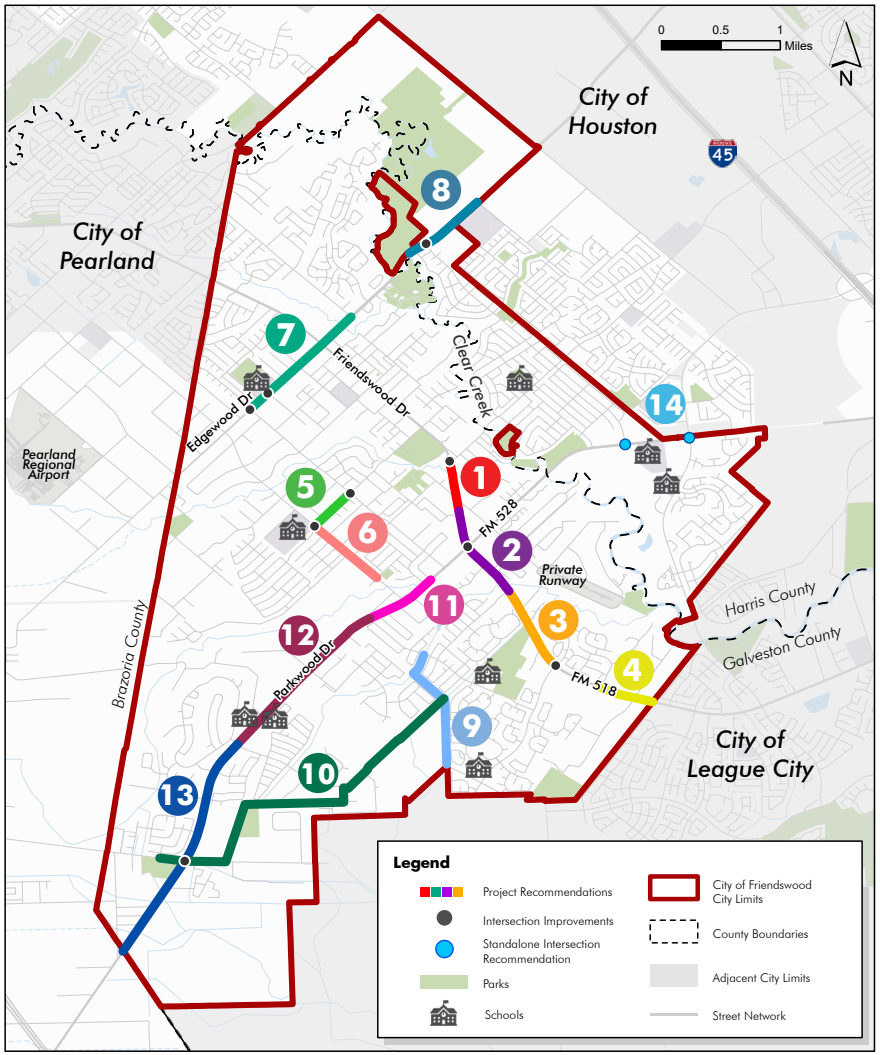


Figure 35. *PATN Project Recommendations*

1 FM 518 from Whispering Pines Avenue to Silverstone Drive

- Install pedestrian bridge on one side of the existing bridge
- Install sidewalk on the south side of the street on either side of the proposed pedestrian bridge
- Improve the intersection of FM 518 and Winding Way Ave

2 FM 518 from Silverstone Drive to Eagle Lakes Drive

- Install new sidewalks on both sides of the street
- Fill gaps in existing sidewalk network
- Install pedestrian bridge over Chigger Creek

3 FM 518 from Eagle Lakes Drive to West Boulevard

- Install new sidewalk on both sides of street
- Upgrade pedestrian crossing infrastructure at the intersection of FM 518 and West Boulevard

4 FM 518 from Ranch Drive to City Limits

- Install new sidewalk on both sides of street

5 Castlewood Avenue from just south of Greenbriar Avenue to Sunset Drive

- Install new sidewalk on north side of the street
- Improve pedestrian crossing infrastructure at the intersection of Castlewood Avenue and Sunset Drive

6 Greenbriar Avenue from Castlewood Avenue to Buckingham Drive

- Install sidewalk on both sides of street
- Improve pedestrian crossing infrastructure at the intersection of Castlewood Avenue and Greenbriar Drive

7 Edgewood Drive (FM 2351) from Sunset Drive to Melody Lane

- Install new sidewalks on at least one side of the street (north side), but preferably both sides
- Fill gaps in the existing sidewalk network
- Upgrade existing striped crosswalk at Garden Drive to a signalized HAWK midblock crosswalk signal
- Restripe pedestrian crosswalk at the intersection of Sunset Drive and Edgewood Drive

8 Edgewood Drive (FM 2351) from Hope Village Road to the entrance of Frankie Carter Randolph Park

- Install sidewalk on the north side of the street
- Improve pedestrian crossing infrastructure at the intersection of Edgewood Avenue and Blackhawk Boulevard

9 Off Street Trail 1: Easements from Falcon Ridge Drive to city limits (south of Friendswood Parkway)

- Install new shared use path (off street trail) through power line corridor

10 Off Street Trail 2: Easements from Eagle Lake Drive to FM 528

- Install new shared use path (off street trail)

11 FM 528 from Regency Court to Falcon Ridge Boulevard

- Install new sidewalk / shared use path on both sides on street
- Consider extending bike lane

12 FM 528 from Falcon Ridge Boulevard to San Joaquin Parkway

- Install new sidewalk / shared use path on both sides on street
- Consider extending bike lane

13 FM 528 from San Joaquin Parkway/ Cypress Point Drive to southern City Limit

- Install new sidewalk / shared use path on both sides on street
- Consider extending bike lane

14 Additional Intersection Improvements

- Intersection of FM 528 at Bay Area Boulevard
  - Restripe pedestrian crosswalks
  - Upgrade pedestrian crossing infrastructure
- Intersection of FM 528 at Blackhawk Boulevard
  - Restripe pedestrian crosswalks
  - Upgrade pedestrian crossing infrastructure
  - Add ADA accessible curb ramps

Needs-Based Analysis

This section provides an overview of the needs-based analysis. For more details, refer to **Appendix 3**.

This analysis evaluates and prioritizes the proposed active transportation projects by measuring conditions within defined criteria to identify the relative need for project implementation within the group of proposed projects. Conditions are captured as value metrics — such as crash frequency, destination density, or network connectivity — measured across all projects. Because each metric uses different units of measurement (e.g., counts, percentages, linear feet), raw values are normalized using a Z-score method so they can be compared and combined on a common scale. Each criterion is scored on a relative basis, meaning a project's score reflects how it compares to the other projects within this specific group of recommendations. Each category is weighted to reflect the goals and objectives of the community, with all weights summing to 100% on a 1,000-point scale.

Six evaluation metrics, or categories, were selected for this analysis – safety, mobility, connectivity, access, environment, and public input. Each category is evaluated by measurable criteria listed here:

Needs-Based Analysis Evaluation Criteria

Criteria 1: Safety

- 5-Year Average of Vehicle Crashes
- 5-Year Average of Pedestrian Crashes
- 5-Year Average of Bike Crashes
- 5-Year Average Monetized Values of Injuries (In Millions)
- 5-Year Crash Rate

Criteria 2: Mobility

- Highest Functional Classification
- Existing Pedestrian and Bicycle Commuters (H-GAC ACE Tool)

Criteria 3: Connectivity

- Existing Bike Network Connection
- Barrier Elimination
- Existing Trail Connections

Criteria 4: Access

- Schools, parks, community centers, grocery stores, healthcare facilities and care facilities (e.g., childcare, senior care, mental health), government buildings, and places of worship
- Commercial areas, multifamily housing

Criteria 5: Environment

- Floodplains
- Wetlands

Criteria 6: Public Input

- Community feedback

Score Weighting

Raw data values are first normalized to enable fair comparison across different units. A two-tier weighting structure then controls scoring influence. Point values assigned to individual criteria determine their weight within a category, while percentage weights assigned to categories determine each category's share of the total score. These settings enabled the City of Friendswood to align the ranking with its policy priorities. The final weights used for each category are illustrated in **Figure 36**.

The five highest ranking projects overall are listed in **Table 3** and mapped in **Figure 37**.

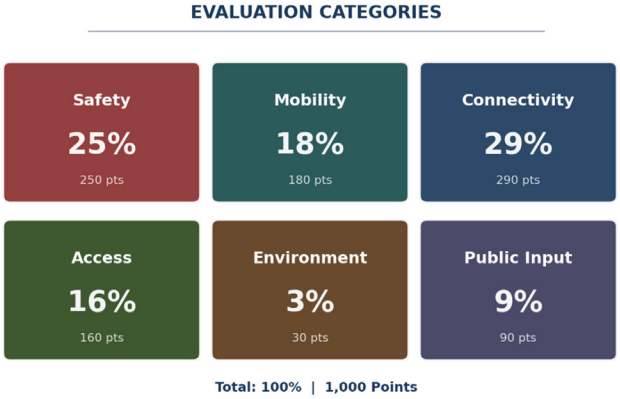


Figure 36. *Evaluation Categories and Weighting*

Table 3. *Five Highest Ranked Projects from NBA*

Rank	Project Name	Score
1	FM 518 from Whispering Pines Avenue to Silverstone Drive	682.4
2	FM 518 from Silverstone Drive to Eagle Lakes Drive	601.0
3	Edgewood Drive (FM 2351) from Sunset Drive to Melody Lane	560.8
4	FM 528 from San Joaquin Pkwy/Cypress Point Drive to City Limit	491.6
5	FM 528 from Falcon Ridge Boulevard to San Joaquin Parkway	490.8

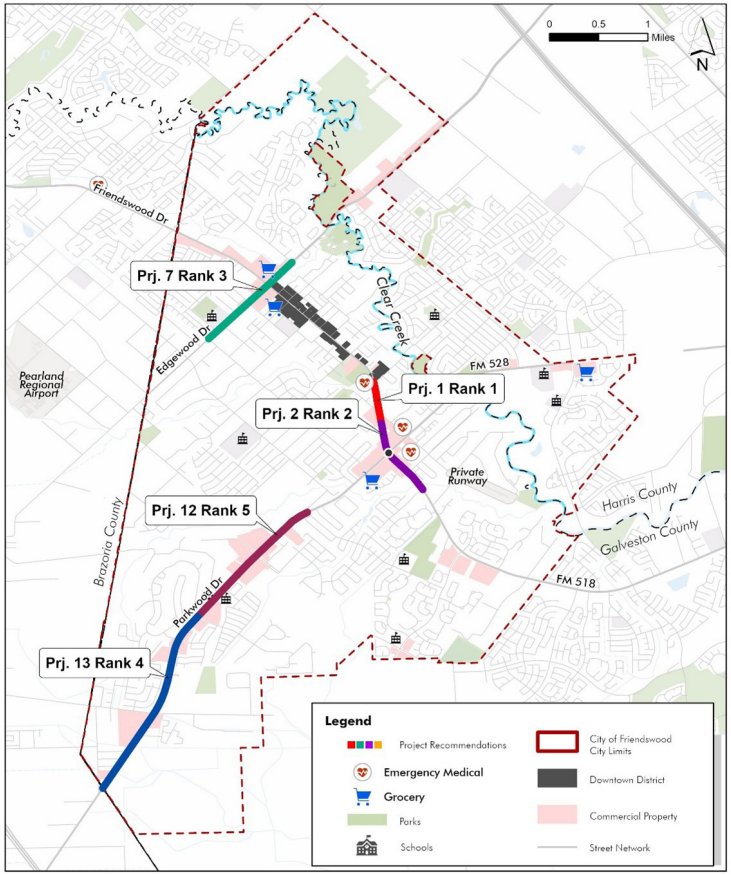


Figure 37. *Five Highest Ranked Projects from the Needs-Based Analysis*



Chapter 4

Recommendations and Implementation

Friendswood Active Transportation Plan Project Profiles

Out of the fourteen projects identified on the Primary Active Transportation Network, the team selected five projects for detailed development, listed in **Table 4** and mapped in **Figure 38**, based on the needs-based analysis, input from the City and H-GAC, and the public. The following sections describe these projects and provide a detailed profile for each.

For more information on recommendations and implementation, refer to **Appendix 4**.

Table 4. *Prioritized Projects*

Project Rank	Project Name	Project Limits
1	FM 518	From Whispering Pines Avenue to Silverstone Drive
2	FM 518	From Silverstone Drive to Eagle Lakes Drive
3	Castlewood Avenue Sidewalk	From just south of Greenbriar Drive at the existing sidewalk terminus to Sunset Drive
4	Greenbriar Drive Sidewalk	From Castlewood Avenue to just east of Buckingham Drive
5	Intersection of FM 528 and Bay Area Boulevard	Intersection of FM 528 and Bay Area Boulevard

Prioritized Infrastructure Projects

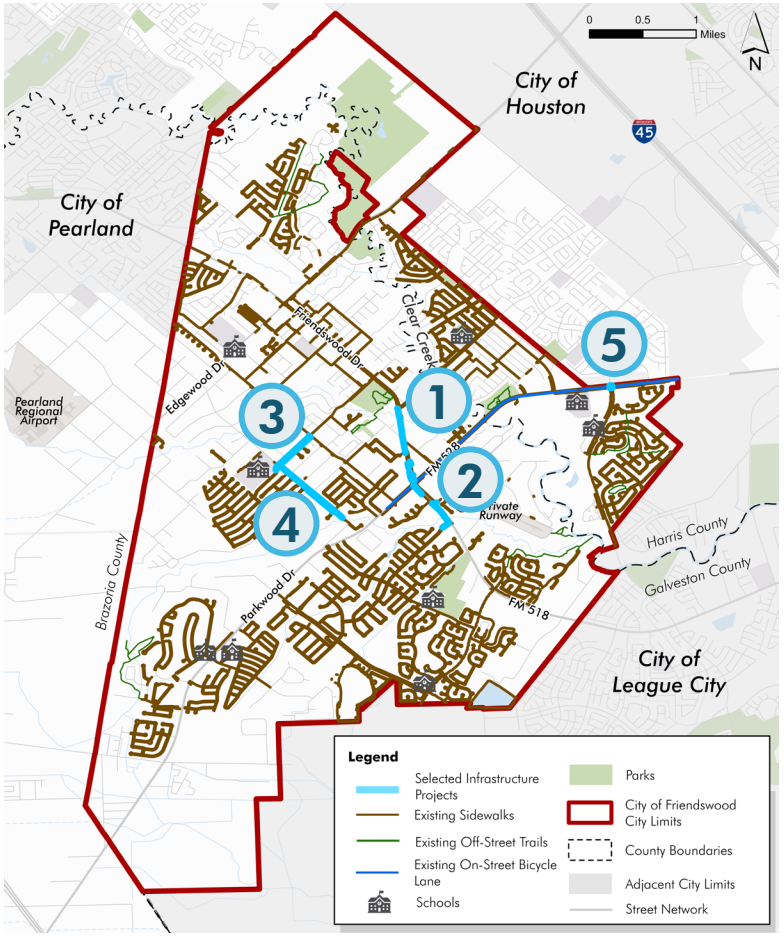


Figure 38. *Prioritized Projects on the PATN*

PROJECT 1: FM 518 from Whispering Pines Avenue to Silverstone Drive

Project Description

The project will fill in gaps in the existing sidewalk network along FM 518 between Whispering Pines and Silverstone Drive by constructing approximately 1,200 feet of new sidewalk and a 900-foot separated pedestrian bridge over Cowart Creek. The sidewalk and pedestrian bridge will be constructed on the west side of the street. This project will also improve safety at the intersection of FM 518 and Winding Way Drive by upgrading the signal equipment and adding high-visibility crosswalk markings on the west and south legs.

This project is a critical connection and has been a repeated priority heard from the community during the public engagement process. Pedestrians frequently attempt to cross Cowart Creek via the median along FM 518, resulting in unsafe conditions. The project will provide a direct connection to Downtown Friendswood, including several key facilities such as Stevenson Park, City Hall, and Friendswood's main commercial district.

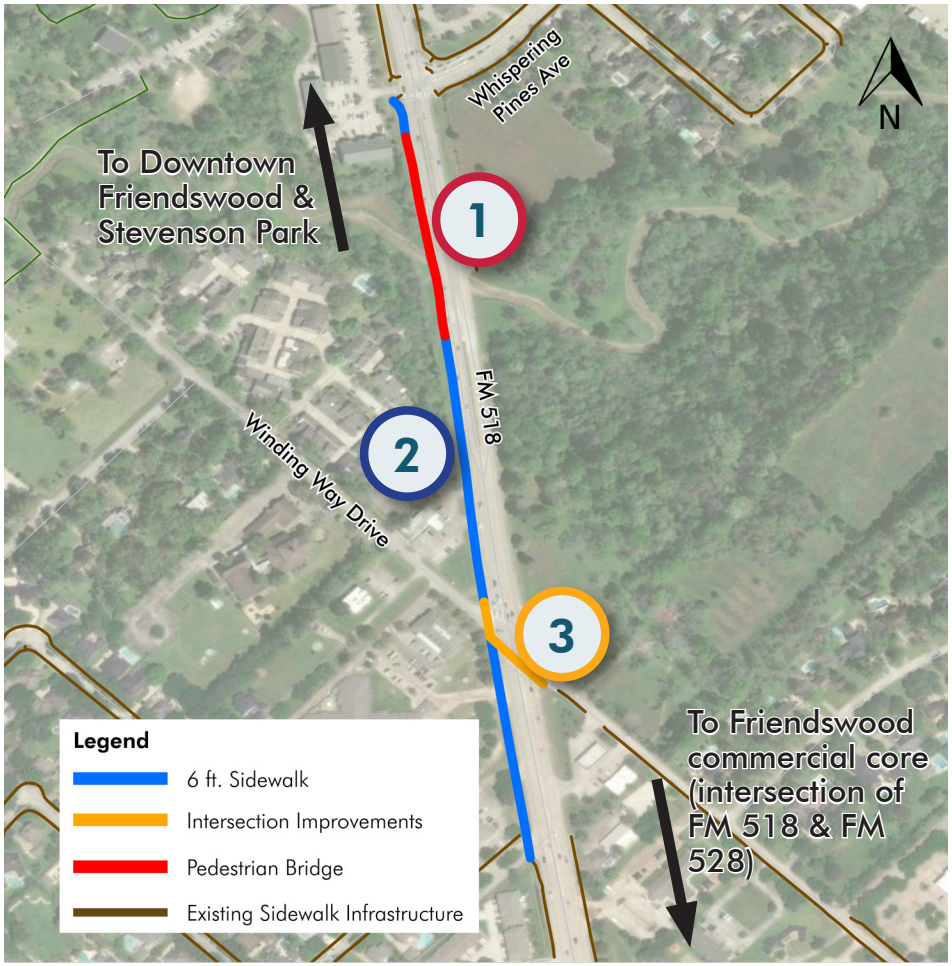


Figure 39. *Project 1: FM 518 Location*

Nearmap, March 2026

Project Length

2,546 feet (0.5 miles)

Facility Type

- Sidewalk
- Pedestrian Bridge
- Intersection Improvements

Estimated Cost

$2.3 Million

Estimated Duration

2 - 3 years (Not including ROW or easement acquisition, if required)

Potential Implementation Partners

- City of Friendswood
- H-GAC
- TxDOT

Coordination & Maintenance

- Coordination with TxDOT, utility companies, and property owners (driveways)
- TxDOT project in development at FM 518 & Winding Way Drive
- Establish maintenance agreement with TxDOT

Potential Funding Opportunities

- H-GAC Active Transportation
- TxDOT Transportation Alternatives

Engineering Considerations and Project Specifications

Numbers below are associated with the numbers on the previous page.

1 Pedestrian Bridge

- Separated pedestrian bridge
- Rail-to-rail clearance of 8 feet per TxDOT Roadway Design Manual
- No ROW acquisition or easements anticipated

2 Sidewalk

- Minimum 6-foot-wide sidewalk with 10-foot clearance from edge of travel way (the shoulder may count toward the required clearance width) per TxDOT Roadway Design Manual
- Slotted curb buffer
- Ditch reshaping needed north of Winding Way Drive and piping ditch needed south of Winding Way Drive
- No ROW acquisition or easements anticipated

3 FM 518 and Winding Way Drive

- High-visibility crosswalks on west and south legs per TxDOT Pavement Marking Standards & Texas Manual on Uniform Traffic Control Devices (TMUTCD)
- Upgrade signal equipment from span wire to mast arm

Existing Conditions Photos



Bridge over Cowart Creek on FM 518 looking northbound



Looking southbound on FM 518 at Whispering Pines Ave.



FM 518 at Whispering Pines Ave. looking east

PROJECT 2: FM 518 from Silverstone Drive to Eagle Lakes Drive

Project Description

The project will fill existing sidewalk gaps along FM 518 to complete the sidewalk network between Silverstone Drive and Eagle Lakes Drive. Approximately 2,750 linear feet of sidewalk will be constructed with this project, in addition to a 200-foot separated pedestrian bridge over Chigger Creek on the west side of the street. The intersection of FM 518 and FM 528 will also be improved as part of this project and will add high-visibility crosswalks, and upgraded curb ramps. Upgraded pedestrian signal equipment will also be installed at the intersection of FM 518 and Leisure Lane.

This project was identified as a high priority during the public engagement process, and is a critical connection over Chigger Creek, which is a major barrier to multimodal transportation.

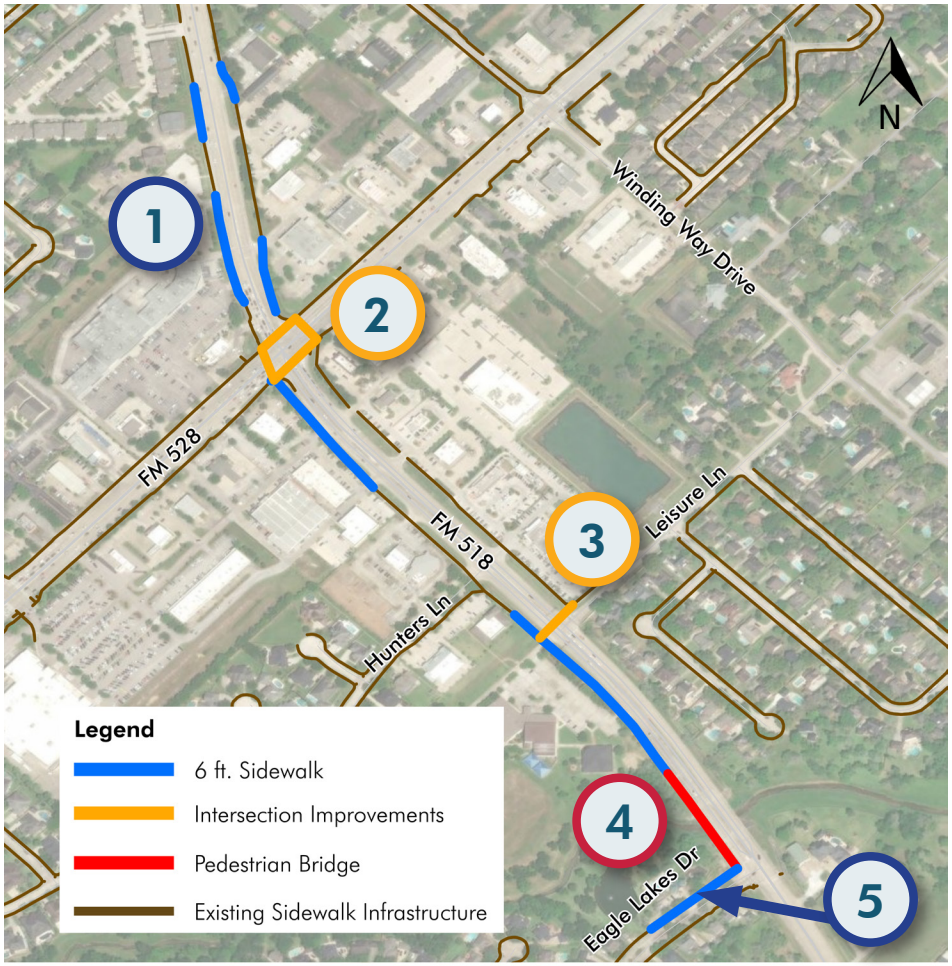


Figure 40. *Project 2: FM 518 Location*

Nearmap, March 2026

Project Length

2,950 feet

Facility Type

- Sidewalk Gaps
- Pedestrian Bridge
- Intersection Improvements

Estimated Cost

$2.2 Million

Estimated Duration

2 - 3 years (Not including ROW or easement acquisition, if required)

Potential Implementation Partners

- City of Friendswood
- H-GAC
- TxDOT

Coordination & Maintenance

- Coordination with TxDOT, utility companies, Eagle Lakes neighborhood, and property owners (driveways)
- Establish maintenance agreement with TxDOT

Potential Funding Opportunities

- H-GAC Active Transportation
- TxDOT Transportation Alternatives

Engineering Considerations and Project Specifications

Numbers below are associated with the numbers on the previous page.

1 Sidewalk on FM 518

- Minimum 6- foot-wide sidewalk with 10-foot clearance from edge of travel way (can include shoulder in clearance width) per TxDOT Roadway Design Manual
- Slotted curb buffer
- Ditch reshaping
- ROW acquisition or easements are anticipated for the sidewalk south of FM 528 on west side of FM 518, near Leisure Lane on west side of FM 518, and west of FM 518 on north side of Eagles Lakes Drive

2 FM 518 & FM 528

- Upgrade curb ramps per ADA & PROWAG
- Upgrade signal equipment from span wire to mast arm

3 FM 518 & Leisure Lane

- High-visibility crosswalk on north and west legs per TxDOT Pavement Marking Standards & TMUTCD
- Add curb ramps and sidewalk connection in northeast corner per ADA & PROWAG (will need to extend pipe and move SET in northeast corner)
- Add pedestrian signal equipment

4 Pedestrian Bridge

- Separated pedestrian bridge
- Rail-to-rail clearance of 8 feet per TxDOT Roadway Design Manual
- Potential ROW acquisition or easement anticipated on north end of pedestrian bridge

5 Sidewalk on Eagle Lakes Drive

- 6-foot-wide sidewalk (minimum 4-foot-wide sidewalk per the City of Friendswood Design Criteria Manual)
- Slotted curb
- Frame & grate over concrete channel in northwest corner of FM 518 & Eagle Lakes Drive intersection
- Eagle Lakes sign and community pool landscaping may need modifying to accommodate sidewalk

Existing Conditions Photos



Existing sidewalk conditions on FM 518



Existing conditions at the intersection of FM 518 and FM 528



Bike lane on FM 528

PROJECT 3: Castlewood Avenue Sidewalk

Project Description

The project will add approximately 2,300 linear feet of a new, 5-foot sidewalk along Castlewood Avenue, from 300 feet west of Greenbriar Drive to Sunset Drive. The project will begin at an existing sidewalk terminus just before the intersection of Greenbriar Drive. The intersection of Castlewood Avenue and Greenbriar Drive will also be improved as part of this project with high-visibility crosswalks and upgraded curb ramp features.

The sidewalk is desired by the community and will connect students to Friendswood High School.

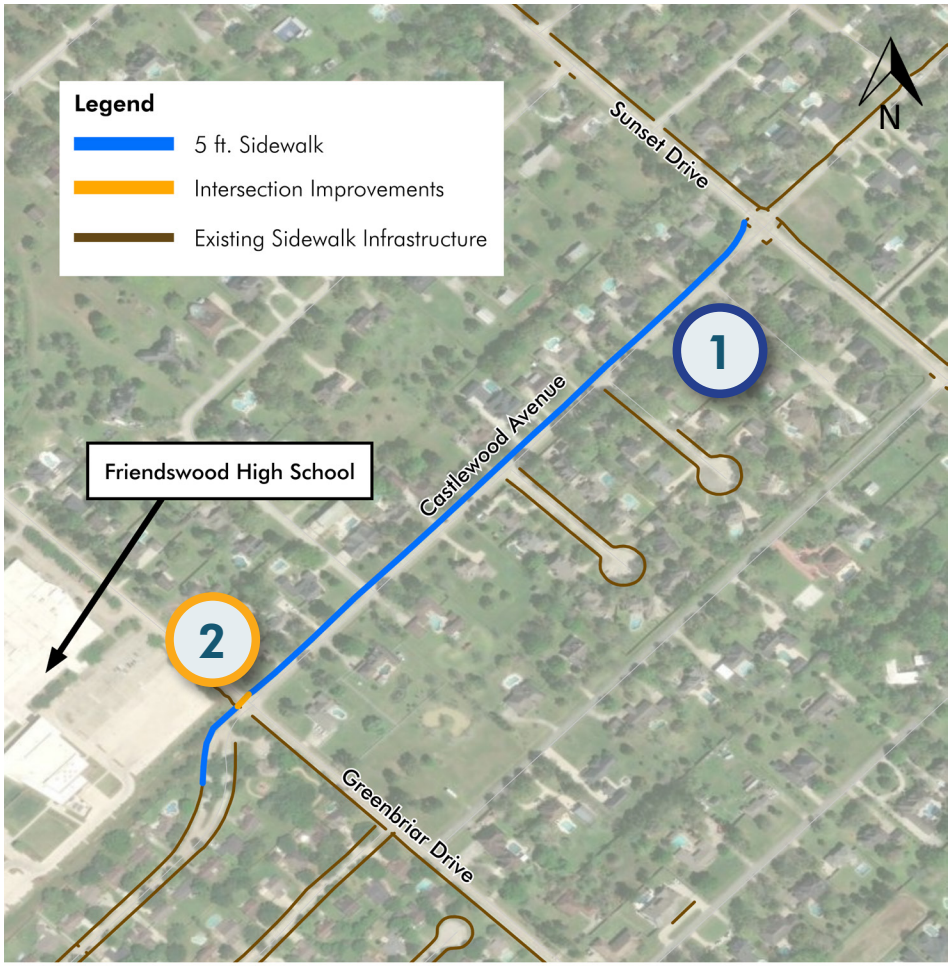


Figure 41. *Project 3: Castlewood Avenue Sidewalk Location*

Nearmap, March 2026

Project Length

2,300 feet of sidewalk on the north side of Castlewood Avenue

Facility Type

- Sidewalk
- Intersection Improvements

Estimated Cost

$500,000

Estimated Duration

1 - 2 years (Not including ROW or easement acquisition, if required)

Potential Implementation Partners

- City of Friendswood
- H-GAC

Coordination & Maintenance

- Coordination with utility companies, Friendswood High School, and property owners (driveways)

Potential Funding Opportunities

- H-GAC Active Transportation
- TxDOT Transportation Alternatives

Engineering Considerations and Project Specifications

Numbers below are associated with the numbers on the previous page.

1

Sidewalk on Castlewood Avenue

- 5-foot-wide sidewalk (minimum 4-foot-wide sidewalk per the City of Friendswood Design Criteria Manual)
- Slotted curb buffer
- Ditch reshaping
- Potential for ROW acquisition or easements west of Greenbriar Drive

2

Greenbriar Drive & Castlewood Avenue

- High-visibility crosswalk on north leg per TMUTCD
- Add advance warning signage for pedestrian crossings on Greenbriar Drive per TMUTCD
- Upgrade/add curb ramps per ADA & PROWAG

Existing Conditions Photos



Castlewood Avenue





Castlewood Avenue at Greenbriar Drive (top) Castlewood Avenue (bottom)



Castlewood Avenue

Before and After Renderings of Castlewood Avenue Sidewalk Project



Castlewood Avenue - Existing Conditions



Castlewood Avenue - After Sidewalk Treatment

PROJECT 4: Greenbriar Drive Sidewalk

Project Description

The project will construct a new, 6-foot sidewalk along Greenbriar Drive from Castlewood Avenue to 500 feet south of Buckingham Court. The project will consist of approximately 1,500 feet of sidewalk on the west side of Greenbriar Drive, and will connect to the existing sidewalk. Additionally, approximately 3,800 feet of sidewalk will be constructed on the east side of Greenbriar Drive. The intersection of Castlewood Avenue and Greenbriar Drive will also be improved by adding high-visibility crosswalks, advanced warning signage, and upgraded curb ramps.

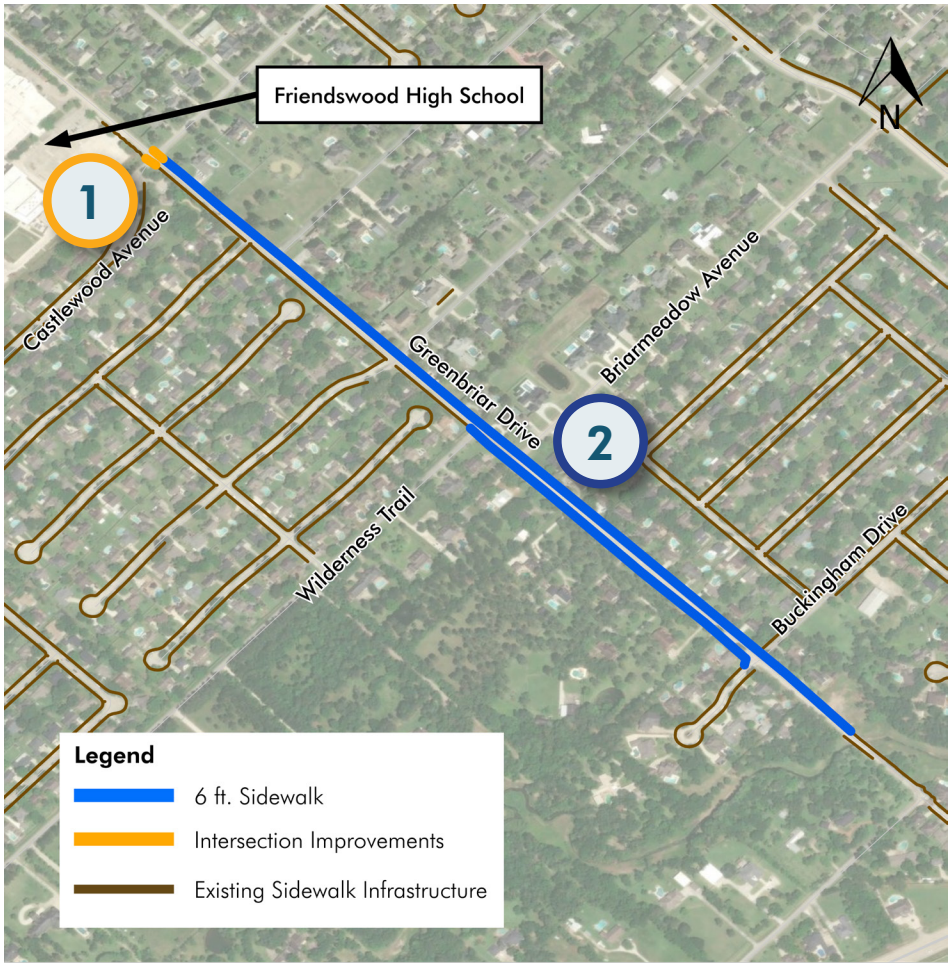


Figure 42. *Project 4: Greenbriar Drive Sidewalk Project Location*

Nearmap, March 2026

Project Length

5,300 feet

Facility Type

- Sidewalk
- Intersection Improvements

Estimated Cost

$1.3 Million

Estimated Duration

1 - 2 years

Potential Implementation Partners

- City of Friendswood
- H-GAC
- TxDOT

Coordination & Maintenance

- Coordination with utility companies, Friendswood High School, and property owners (driveways)

Potential Funding Opportunities

- H-GAC Active Transportation
- TxDOT Transportation Alternatives

Engineering Considerations and Project Specifications

Numbers below are associated with the numbers on the previous page.

1 Greenbriar Drive & Castlewood Avenue

- High-visibility crosswalks on east and west legs per TMUTCD
- Upgrade/add curb ramps per ADA & PROWAG

2 Sidewalk on Greenbriar Drive

- 6-foot-wide sidewalk adjacent to travel lane with slotted curb (minimum 4-foot-wide sidewalk per the City of Friendswood Design Criteria Manual)
- Slotted curb buffer
- Ditch reshaping
- Potential for ROW acquisition or easements on west side of Greenbriar Avenue from Briarmeadow Avenue to Buckingham Court

Existing Conditions Photos



Greenbriar Drive







Missing sidewalk connections to and along Greenbriar Drive

PROJECT 5: Intersection of FM 528 & Bay Area Boulevard

Project Description

The project will upgrade the intersection of FM 528 and Bay Area Boulevard. This intersection has a history of negative impacts on vulnerable roadway users, including serious injuries and fatalities. With the planned Friendswood City Center and Midline Master Planned Development nearby, additional traffic stress will be placed on this intersection. Recommendations include upgrading the traffic and pedestrian signals, as well as curb ramps to be compliant with ADA requirements. A pedestrian refuge island should be constructed at this intersection to further protect vulnerable roadway users.



Figure 43. *Project 5: Intersection of FM 528 and Bay Area Blvd. Project Location*

Project Length

~420 feet

Facility Type

- Intersection Improvements

Estimated Cost

$1 Million

Estimated Duration

12 - 18 Months

Potential Implementation Partners

- City of Friendswood
- TxDOT
- City of Houston
- Harris County

Coordination & Maintenance

- Coordination with TxDOT (project in development)

Potential Funding Opportunities

- H-GAC Active Transportation
- TxDOT Transportation Alternatives

Engineering Highlights

Numbers below are associated with the numbers on the previous page.

1

FM 528 & Bay Area Boulevard

- Upgrade signal equipment from span wire to mast arm
- Upgrade curb ramps per ADA & PROWAG
- Extend Bay Area Boulevard medians to include pedestrian refuge island
- Additional right-of-way needed

Existing Conditions Photos







Bay Area Boulevard looking south across FM 528

Safety Impacts

All of the proposed PATN infrastructure project recommendations have a goal of improving safety for bicyclists and pedestrians. Specific safety benefits of all projects can be documented and quantified through TxDOT's Highway Safety Improvement Program (HSIP). HSIP is a federally funded program that supports data-driven investments in roadway safety improvements, and have quantifiable, standardized crash reduction factors associated with active transportation improvements.

Table 6 summarizes the quantifiable benefits associated with the proposed improvements. Some projects will see a greater crash reduction factor based on the project type, specifically the projects that are constructing new sidewalks where none exist today.

Project Benefits

The five projects selected for detailed development were evaluated against H-GAC's Activity-Connectivity (ACE) Tool to determine the estimated impacts each project will have in terms of mode shift patterns and vehicle miles traveled (VMT) reduction. A 0.25-mile buffer was placed around each of the top five priority projects, and mode shift and VMT reduction data was collected and is displayed in **Table 5**. The analysis shows that these projects provide meaningful community benefits by shifting trips from automobile travel to walking or biking.

Table 5. *Project Benefits (H-GAC ACE Tool)*

Project Rank	Project Name	Mode-Shift New Walking Trips	Mode-Shift New Bicycling Trips	Daily VMT Reduction by New Walking Commuters (Miles)	Daily VMT Reduction by New Bicycling Commuters (Miles)	Total Daily VMT Reduction
1	FM 518 from Whispering Pines Avenue to Silverstone Drive	12	34	5.5	53.7	59.2
2	FM 518 from Silverstone Drive to Eagle Lakes Drive	20	54	12.5	92	104.5
3	Castlewood Avenue Sidewalk	18	38	11.3	62.6	73.8
4	Greenbriar Drive Sidewalk	8	52	4.4	84.6	89.9
5	Intersection of FM 528 and Bay Area Boulevard	14	118	16.3	294.1	310.4

Table 6. *TxDOT HSIP Crash Reduction Factors for Proposed Capital Improvements*

Improvement Name	Definition	HSIP Code (TxDOT)	Crash Reduction Factor
Install Sidewalks	Install new sidewalks where none currently exist including the extension of existing sidewalks. Widening existing sidewalks is not eligible.	407	50%
Install Pedestrian Crosswalk	Place pedestrian crosswalk markings where none existed previously. Refer to Work Code (WC) 114 for school zones, and WC 110 for pedestrian signal.	403	10%
Improve Traffic Signals (Hardware)	Improve existing intersection signals to current design standards. Can include replacement of signal heads with retroreflective backplates, as well as upgrading wire signals with mast arms. May also include adding and realigning curb ramps, as well as enhancements to pavement markings.	108	10%
Install Pedestrian Signal	Provide a pedestrian signal at an existing signalized location where no pedestrian phase exists, but pedestrian crosswalks are existing.	110	34%
Safety Lighting (Non-Intersection)	Provide roadway lighting, either partial or continuous, where either none existed previously or major improvements are being made	304	30%
Safety Lighting (Intersection)	Install lighting at an intersection where either none existed previously or major improvements are proposed. Refer to WC 304 for general lighting.	305	13%
Install Raised Median	Install a roadway divider using barrier curb. If local access is impacted, approval from the Chief Engineer is required prior to advertisement and publishing the job for letting.	203	25%

Source: TxDOT Crash Reduction Factors

Sidewalk Gap Filling Program

In addition to the project recommendations located on the Primary Active Transportation Network, several additional, smaller sidewalk gap filling projects have been identified that will benefit multimodal connectivity in Friendswood. These improvements are designed to connect residents to schools, parks, and daily destinations, and reduce unsafe walking conditions.

The sidewalk gap filling projects are in three categories:

- Sidewalk gaps on local streets under 350 feet
- Sidewalk gaps that are on or adjacent to a TxDOT facility
- Sidewalk gaps that are over 350 feet









All pictures on this page show sidewalk gaps in various locations throughout Friendswood

Sidewalk Gaps on Local Streets Under 350 Feet

Nine sidewalk gap projects were identified in this category. These projects are located on city-controlled, local streets and are under 350 feet in length, meaning they would typically not require extensive engineering. The projects focus on identifying the smallest gaps with the largest network connectivity improvements across the pedestrian network. The gaps in this category either connect to the PATN or to another sidewalk that would then connect to the PATN. These projects are displayed in yellow in **Figure 44**.

Sidewalk Gaps that are on or Adjacent to a TxDOT Facility

This category includes nine sidewalk gap projects that are on or adjacent to a TxDOT facility, mapped in **Figure 45**. These segments complete pedestrian connections along or that touch major TxDOT maintained roadways, including FM 518, FM 528, and Edgewood Drive/FM 2351. Many of the projects in this category connect neighborhood sidewalks to FM 528, which should be filled when the proposed improvements along FM 528 are implemented. However, since there are not any sidewalk facilities that exist today on FM 528, it is not feasible to construct these sidewalk connections at this time.

Sidewalk Gaps that are Over 350 Feet

This category includes two projects that are over 350 feet. These projects are key connections that will help complete the sidewalk network and will require detailed engineering design. The two projects are displayed in green in **Figure 46**.

Sidewalk Gap Fills on Local Streets Under 350 Feet

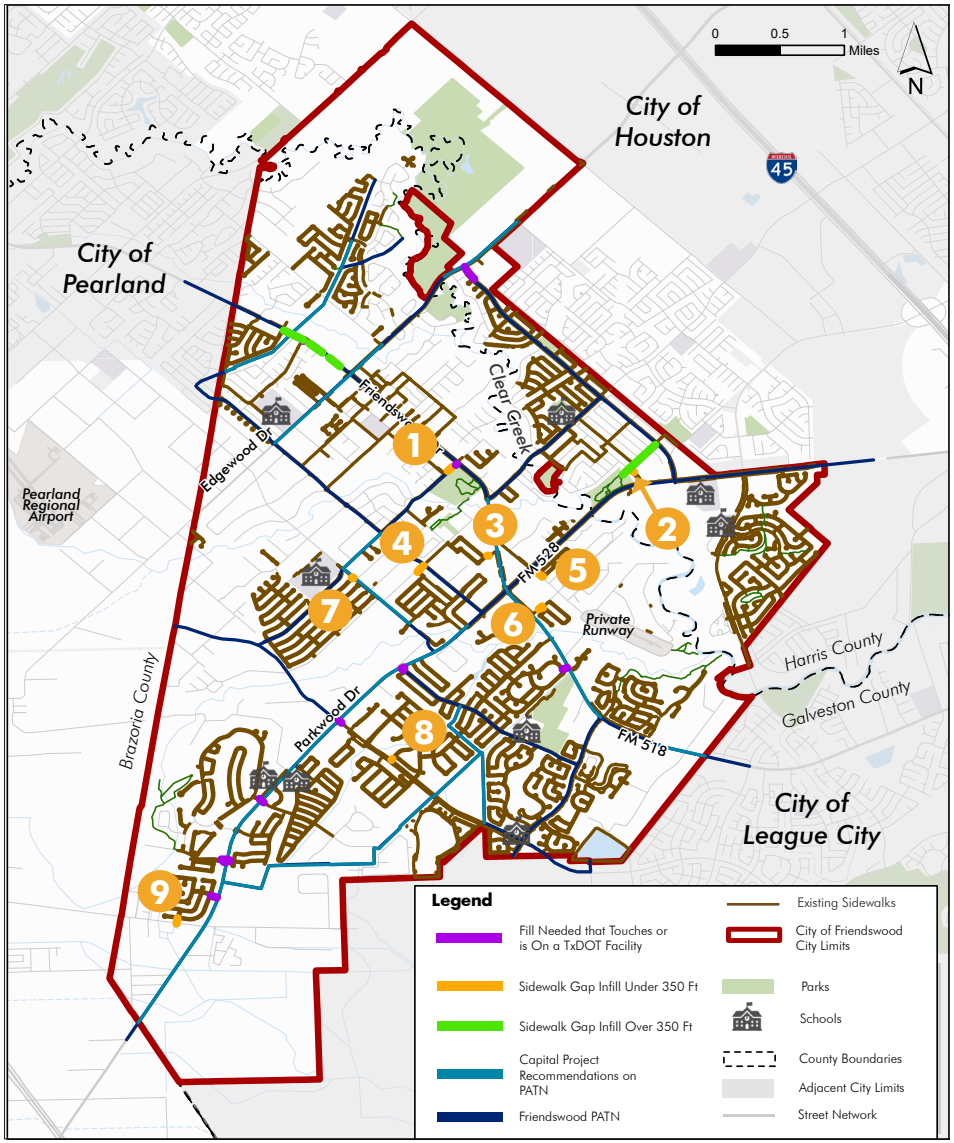
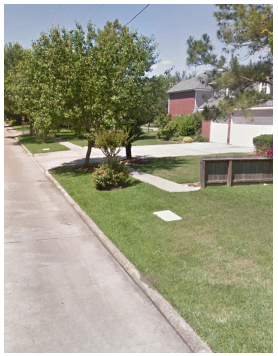


Figure 44. *Sidewalk Gap Fills on Local Streets Under 350 Feet*

1 Castlewood Avenue

Length: 200 feet
North/west side of the street

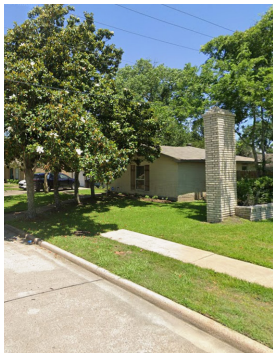
- From existing sidewalk terminus near Cedarwood Avenue to existing sidewalk terminus near FM 518
- Right-of-way (ROW)/easement needed; utilities coordination; property owner coordination; potential tree relocation/removal



2 Townes Road

Length: 300 feet
North side of the street

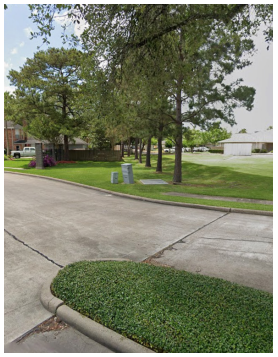
- From existing sidewalk terminus (at multifamily internal street) to Laura Leigh Drive
- New curb ramp
- Property owner coordination (relocate/remove trees with ROW/easement OR push curb out and remove on-street parking)



3 Silverstone Drive

Length: 60 feet
North side of the street

- From existing sidewalk terminus to existing sidewalk terminus
- ROW/easement needed; utilities coordination; neighborhood coordination (stone column at end of fence)

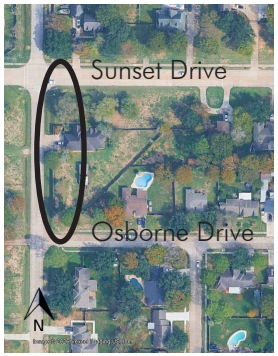


Sidewalk Gap Fills on Local Streets Under 350 Feet

4 Briarmeadow Avenue

Length: 330 feet
West side of the street

- From Osborne Drive to Sunset Drive
- New curb ramp
- Ditch reshaping or piping needed



5 Winding Way Drive

Length: 200 feet
North/west side of the street

- From existing sidewalk terminus to Parkwood Village Drive
- ROW/easement needed; utilities coordination; property owner coordination
- Potential tree relocation/removal



6 Leisure Lane

Length: 130 feet
East side of the street

- From existing sidewalk terminus to Talon Drive
- New curb ramp; high-visibility crosswalk
- ROW/easement needed (sidewalk behind ditch)



7 Killarney Avenue

Length: 50 feet
North/west side of the street

- From existing sidewalk terminus to Greenbriar Drive
- Culvert crossing of ditch required

Length: 25 feet
South/east side of the street

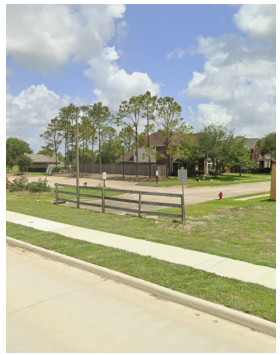
- From existing sidewalk terminus to Greenbriar Drive
- Culvert crossing of ditch required



8 Mossy Stone Drive

Length: 60 feet
East side of the street

- From existing sidewalk terminus to Friendswood Parkway
- Potential ROW/easement needed



9 Crescent Drive

Length: 180 feet
West side of the street

- From existing sidewalk terminus to County Road 133
- Neighborhood coordination (landscaping)



Sidewalk Gaps that are Adjacent to or on a TxDOT Facility

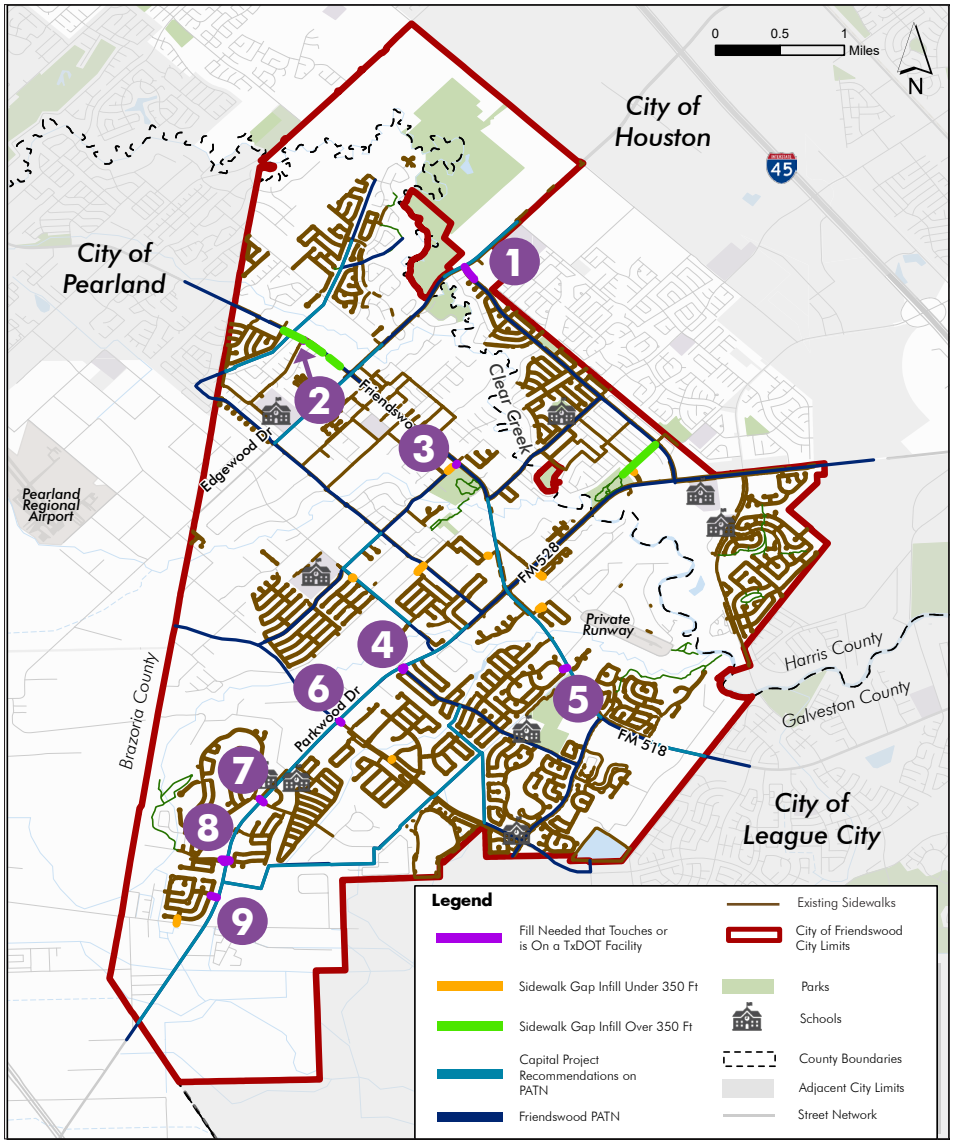


Figure 45. *Sidewalk Gap that are on or Adjacent to a TxDOT Facility*

1 Blackhawk Boulevard

Length: 500 feet
East side of the street

- From Edgewood Drive to existing sidewalk terminus
- New curb ramps
- Signal equipment relocation; streetlight relocation; City of Friendswood sign relocation



2 Mary Ann Drive

Length: 50 feet
East side of the street

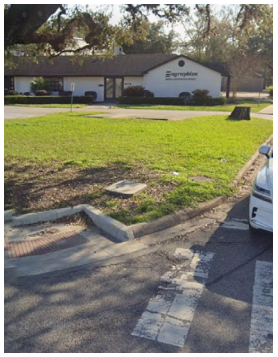
- From existing sidewalk terminus to FM 518
- New curb ramp



3 Castlewood Avenue

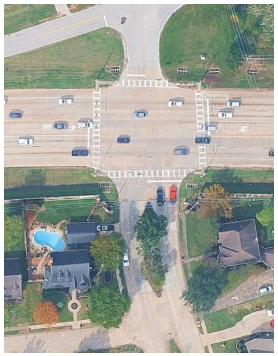
Length: 80 feet
East/south side of the street

- From existing sidewalk terminus to FM 518
- New curb ramps; signal equipment relocation; tree stump removal



Sidewalk Gaps that are Adjacent to or on a TxDOT Facility

4 Falcon Ridge Boulevard



1. **Length: 40 feet**
   North side of the street
   - From existing sidewalk terminus to FM 528
   - New curb ramps; culverts to cross ditches; utilities coordination
2. **Length: 80 feet**
   South side of the street
   - From existing sidewalk terminus to FM 528
   - New curb ramps; culverts to cross ditches; utilities coordination; ROW/easement needed

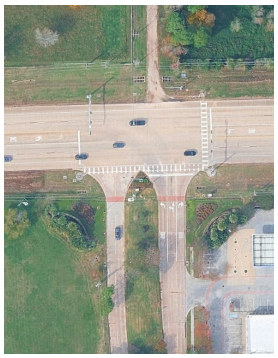
5 W Oak Drive



Length: 180 feet
East side of the street

- From existing sidewalk terminus to FM 518
- New curb ramps; streetlight relocation; coordination with neighborhood (landscaping)

6 Friendswood Parkway



Length: 100 feet
North side of the street

- From existing sidewalk terminus to FM 528
- New curb ramps; streetlight relocation; utilities coordination

7 1. Cypress Point Drive

Length: 50 feet
North side of the street

- From existing sidewalk terminus to FM 528
- Culvert to cross ditch on Cypress Point Drive; modify existing slotted curb
- Coordination with neighborhood (Sunmeadow sign); utilities coordination

2. San Joaquin Parkway

Length: 50 feet
North side of the street

- From existing sidewalk terminus to FM 528
- Culvert to cross ditch on Cypress Point Drive; modify existing slotted curb
- Coordination with neighborhood (Sunmeadow sign); utilities coordination

8 Friendswood Trail

1. **Length: 160 feet**
   North side of the street
   - From existing sidewalk terminus to FM 528
   - High-visibility crosswalks; culverts to cross ditches
   - ROW/easement needed; utilities coordination
2. **Length: 60 feet**
   South side of the street
   - From existing sidewalk terminus to FM 528
   - High-visibility crosswalks; culverts to cross ditches
   - ROW/easement needed; utilities coordination

9 Championship Drive



Length: 220 feet
South side of the street

- From existing sidewalk terminus to FM 528
- ROW/easement needed; coordination with neighborhood (landscaping)

Sidewalk Gaps that are Over 350 Feet

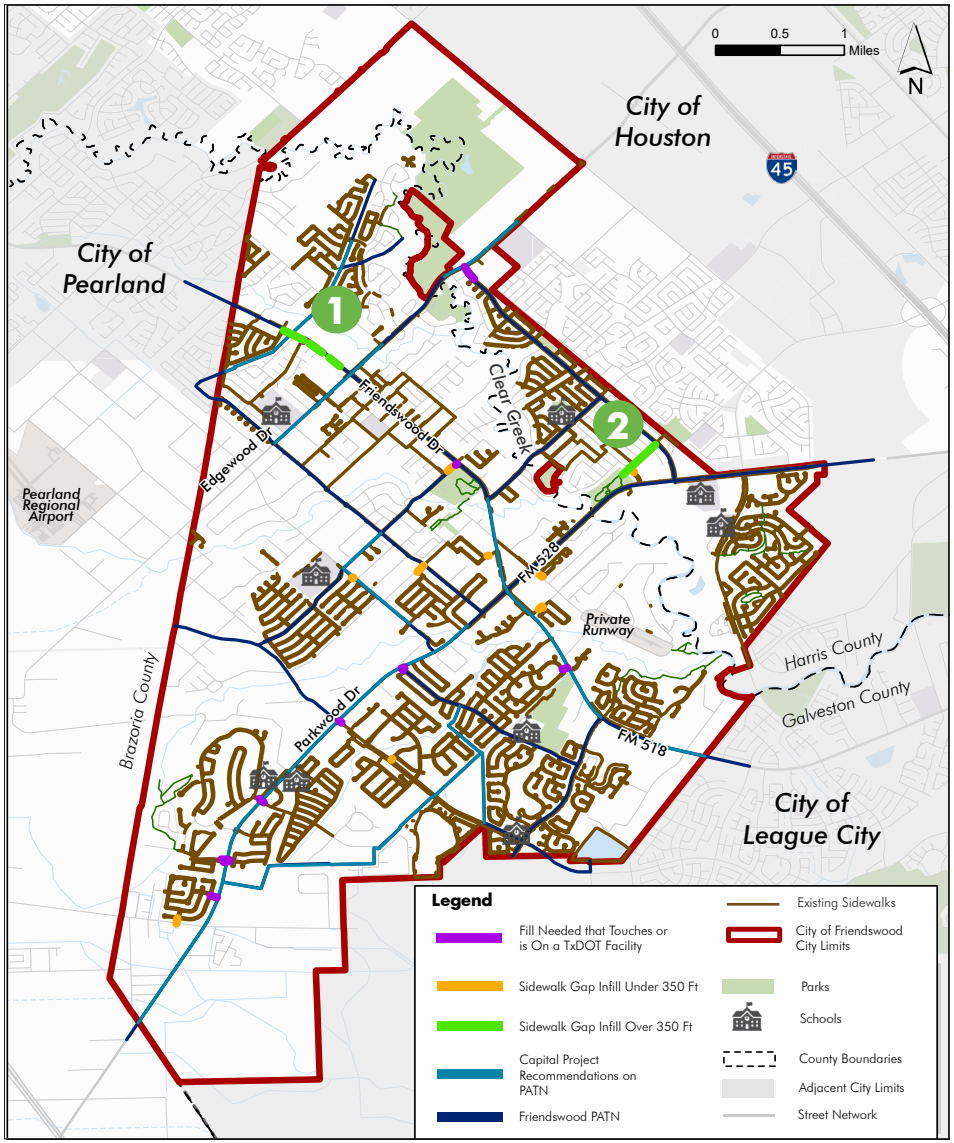
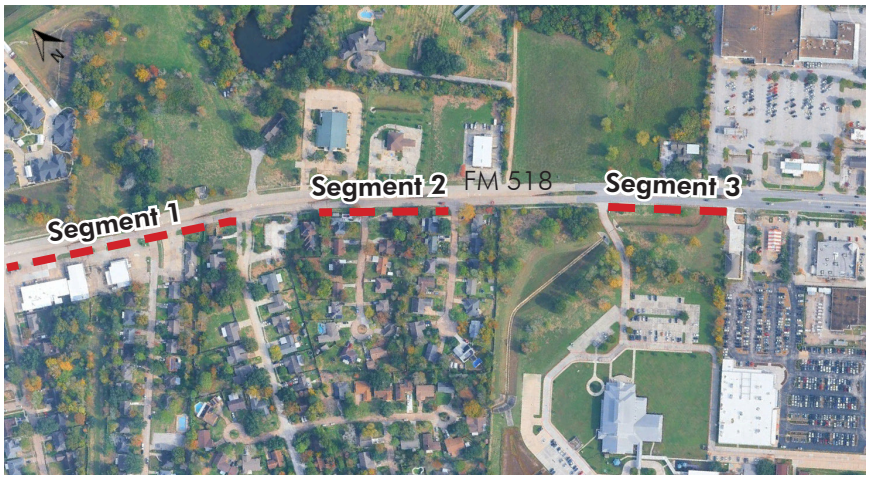


Figure 46. *Sidewalk Gap Fills Over 350 Feet*

1 FM 518/ N Friendswood Drive

South side of the street

- New curb ramps
- ROW/easement needed (south of Annette Lane); utility coordination
- **Segment 1 (Length 800 feet):** Brandywyne Drive to Mary Ann Drive
- **Segment 2 (Length 240 feet):** Existing sidewalk terminus near Annette Lane to existing sidewalk terminus near Lottie Lane
- **Segment 3 (Length 400 feet):** Existing sidewalk terminus near Friendswood Methodist Church to existing sidewalk terminus near Gulf Shore Orthodontics

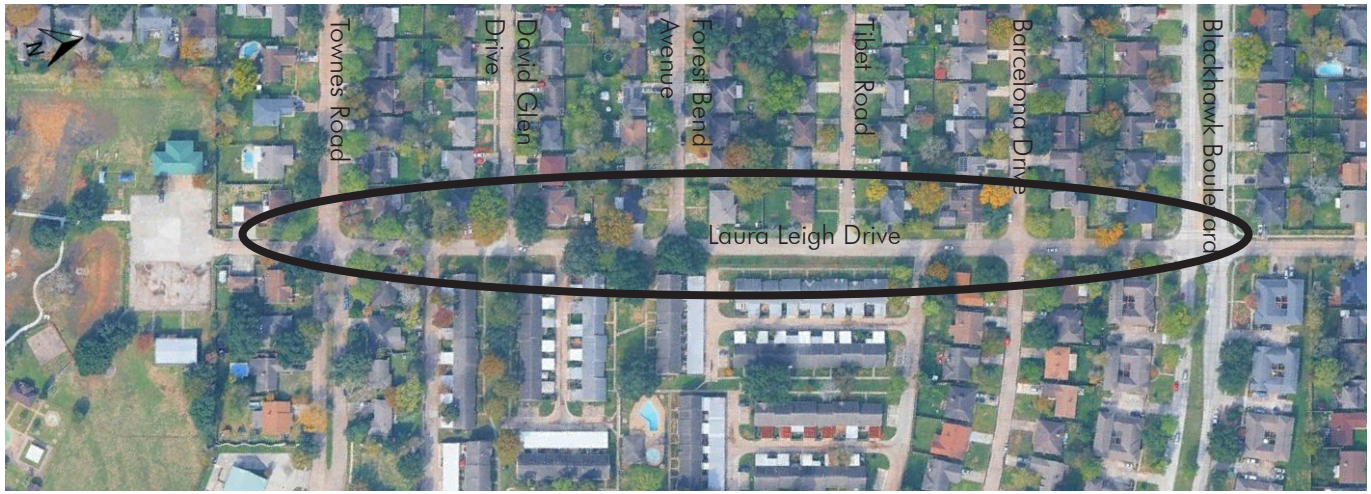


Sidewalk Gaps that are Over 350 Feet

2 Laura Leigh Drive

Length: 1,500 feet
East side of the street

- From Forest Bend Park to Blackhawk Boulevard
- New curb ramps; streetlight relocation; utilities coordination; property owner coordination



Implementation Matrix

Several projects discussed throughout this Plan have been grouped together by implementation timeline or phasing that is most appropriate for funding pursuit or funding packaging.

Tables 7 - 13 provide a matrix outlining the project group or package, timeframe, potential steps for implementation, considerations, and potential funding sources needed to implement the fourteen project recommendations and sidewalk gap filling program.

Table 7. *Safe Routes to School Projects Implementation Matrix*

Safe Routes to School Projects

Individual Project Name	Project Limits	Project Type	Cost	Implementation Timeframe	Implementation Plan	Implementation Considerations	Funding Sources
Castlewood Avenue	Existing sidewalk terminus just south of Greenbriar Drive to Sunset Drive	Priority Project	$$$	Short-Term	1. Add project to City of Friendswood capital improvement planning documentation. 2. Identify, pursue, and secure funding to further develop the project, preferably through a City of Friendswood public financing option. 3. Create 30%, 60%, 90%, and construction documentation for proposed improvements. This includes ROW acquisitions and utility relocation coordination. (~1 year) 4. Construct project (~1 year)	These projects are smaller, local sidewalk projects. The Edgewood Drive projects are located along a TxDOT facility and may need further coordination. Projects can be funded with local funds, either utilizing capital planning funds, bonds, or annual budget allocations. Recommended to group several projects together in order to package a substantial project improvement request if external funding is pursued.	Local Funding Sources: City of Friendswood, Harris County Precinct 2 Regional Funding Sources: H-GAC State Funding Sources: TxDOT
Greenbriar Drive	Castlewood Avenue to Buckingham Drive	Priority Project					
Laura Leigh Drive	Forest Bend Park to Blackhawk Boulevard	Sidewalk Gap Infill Projects Over 350 Feet					
Edgewood Drive (FM 2351)	Sunset Drive to Melody Lane	PATN Project					
Edgewood Drive (FM 2351)	Hope Village Road to the Entrance of Frankie Carter Randolph Park	PATN Project					

Table 8. *Sidewalk Gaps on Local Streets Under 350 Feet Implementation Matrix*

Sidewalk Gaps on Local Streets Under 350 Feet

Individual Project Name	Project Limits	Project Type	Cost	Implementation Timeframe	Implementation Plan	Implementation Considerations	Funding Sources
Castlewood Avenue	Existing Sidewalk Terminus near Cedarwood Avenue to Existing Sidewalk Terminus near FM 518	Sidewalk Gap Fills on Local Streets Under 350 Feet	$$$-$$$$	Mid-term	1. Add project to City of Friendswood capital improvement planning documentation. 2. Identify, pursue, and secure funding to further develop the project, preferably through a City of Friendswood public financing option. 3. Create necessary construction documentation for proposed improvements (if needed). This includes ROW acquisitions and utility relocation coordination. (~1 year) 4. Construct projects (~1 year)	Coordination is needed for various property owners and HOAs	Local Funding Sources are recommended for these projects. Grouped sidewalk projects may also be eligible for regional, state, and/or federal discretionary grant funding. Local Funding Sources: City of Friendswood, Harris County Precinct 2 Regional Funding Sources: H-GAC State Funding Sources: TxDOT Highway Safety Improvement Program (HSIP); TxDOT Transportation Alternatives (TA) Federal Funding Sources: Community Project Funding (Congressional Earmarks), Safe Streets and Roads for All (SS4A)
Townes Road	Existing Sidewalk Terminus (at Multifamily Internal Street) to Laura Leigh Drive						
Silverstone Drive	From Existing Sidewalk Terminus to Existing Sidewalk Terminus						
Briarmeadow Avenue	Osborne Drive to Sunset Drive						
Winding Way Drive	Existing Sidewalk Terminus near Cedarwood Avenue to Existing Sidewalk Terminus near FM 518						
Leisure Lane	Existing Sidewalk Terminus to Talon Drive						
Killarney Avenue	Existing Sidewalk Terminus to Greenbriar Drive						
Mossy Stone Drive	Existing Sidewalk Terminus to Friendswood Parkway						
Crescent Drive	Existing Sidewalk Terminus to County Road 133						

Table 9. *Sidewalk Gap Infill Projects Adjacent to or on a TxDOT Facility Implementation Matrix*

Sidewalk Gaps Infill Projects Adjacent to or on a TxDOT Facility

Individual Project Name	Project Limits	Project Type	Cost	Implementation Timeframe	Implementation Plan	Implementation Considerations	Funding Sources
Blackhawk Boulevard	Edgewood Avenue to Existing Sidewalk Terminus	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility	$$$-$$$$	Long-Term	1. Establish coordination meetings between the City of Friendswood and TxDOT to discuss proposed improvements. 2. Add project to City of Friendswood capital improvement planning documentation. 3. Identify, pursue, and secure funding to further develop the project, including preliminary design plans, detailed cost estimates, and grant readiness reports for design and construction. 4. Create 30%, 60%, 90%, and construction documentation for proposed improvements. This includes ROW acquisitions and utility relocation coordination. (~1 year) 5. Construct project (~1 year)	Coordination with TxDOT and property owners is necessary for successful project implementation. Potentially can coordinate with TxDOT to secure additional sidewalk funding for some of these project segments.	State funding support is recommended because these projects touch a TxDOT facility. Local funding may be needed to implement these projects. Local Funding Sources: City of Friendswood Regional Funding Sources: H-GAC State Funding Sources: TxDOT HSIP; TxDOT TA Federal Funding Sources: Community Project Funding (Congressional Earmarks)
Mary Ann Drive	Existing Sidewalk Terminus to FM 518	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility					
Castlewood Avenue	Existing Sidewalk Terminus to FM 518	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility					
FM 518	Multiple Segments	Sidewalk Gap Infill Projects Over 350 Feet					
W Oak Drive	Existing Sidewalk Terminus to FM 518	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility					

Table 10. *FM 518 Sidewalk Gaps and Pedestrian Bridge Implementation Matrix*

FM 518 Sidewalk Gaps and Pedestrian Bridge

Individual Project Name	Project Limits	Project Type	Cost	Implementation Timeframe	Implementation Plan	Implementation Considerations	Funding Sources
FM 518	Whispering Pines Avenue to Silverstone Drive	Priority Project	$$$$	Long-Term	1. Establish coordination meetings between the City of Friendswood and TxDOT to discuss proposed improvements. 2. Add project to City of Friendswood capital improvement planning documentation. 3. Identify, pursue, and secure funding to further develop the project, including preliminary design plans, detailed cost estimates, and grant readiness reports for design and construction. 4. Create 30%, 60%, 90%, and construction documentation for proposed improvements. This includes ROW acquisitions and utility relocation coordination. (~1 year) 5. Construct project (~1 year)	Extensive coordination with TxDOT is needed. This project will likely need external support to be implemented. Project can be paired with the Whispering Pines segment of FM 518 proposed improvements. Project has strong nexus for the community	Local Funding Sources: City of Friendswood Regional Funding Sources: H-GAC State Funding Sources: TxDOT HSIP; TxDOT TA Federal Funding Sources: Community Project Funding (Congressional Earmarks); SS4A
FM 518	Silverstone Drive to Eagle Lakes Drive	Priority Project					
FM 518	Eagle Lakes Drive to West Boulevard	PATN Project					
FM 518	Ranch Drive to City Limits	PATN Project					

Table 11. *Off-Street Trail Projects Implementation Matrix*

Off-Street Trail Projects

Individual Project Name	Project Limits	Project Type	Cost	Implementation Timeframe	Implementation Plan	Implementation Considerations	Funding Sources
Off Street Trail 1	Easements from Falcon Ridge Drive to City Limits (South of Friendswood Parkway)	PATN Project	$$$$	Long-Term	1. Add project to City of Friendswood capital improvement planning documentation. 2. Coordinate with utility companies who occupy easements to ensure trail construction is feasible. 3. Engage adjacent property owners to vet design plans and implementation processes 4. Identify, pursue, and secure funding to further develop the project, preferably through a regional or state grant program. 5. Create 30%, 60%, 90%, and construction documentation for proposed improvements. This includes ROW acquisitions and utility relocation coordination. (~1 year) 6. Construct project (~1 year)	Project can be pursued through regional, state, or federal funding support. Coordination with the utility companies for easement access should be conducted early in the planning process.	Local Funding Sources: City of Friendswood Regional Funding Sources: H-GAC State Funding Sources: TxDOT TA Federal Funding Sources: Community Project Funding (Congressional Earmarks)
Off Street Trail 2	Easements from Eagle Lake Drive to FM 528	PATN Project					

Table 12. *FM 528 Shared Use Path and Sidewalk Project Implementation Matrix*

FM 528 Shared Use Path and Sidewalk Project

Individual Project Name	Project Limits	Project Type	Cost	Implementation Timeframe	Implementation Plan	Implementation Considerations	Funding Sources
FM 528	Regency Court to Falcon Ridge Boulevard	PATN Project	$$$$	Long-Term	1. Add project to City of Friendswood capital improvement planning documentation. 3. Identify, pursue, and secure funding to further develop the project, preferably through an external funding source. 4. Create necessary construction documentation for proposed improvements (if needed). This includes ROW acquisitions and utility relocation coordination. (~1 year) 5. Construct projects (~2 years)	Sidewalk gaps along FM 528 should wait to be filled until the shared use path along FM 528 is constructed. Extensive coordination with TxDOT is needed to properly implement this project. Drainage and utility coordination will be necessary and can impact project cost.	State funding support is recommended because these projects are located on a TxDOT facility. Local funding may be needed for implementation. Local Funding Sources: City of Friendswood Regional Funding Sources: H-GAC State Funding Sources: TxDOT HSIP; TxDOT TA Federal Funding Sources: Community Project Funding (Congressional Earmarks), SS4A
FM 528	Falcon Ridge Boulevard to San Joaquin Parkway	PATN Project					
FM 528	San Joaquin Parkway to City Limits	PATN Project					
Falcon Ridge Boulevard (Both Sides)	Existing Sidewalk Terminus to FM 528	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility					
Friendswood Parkway	Existing Sidewalk Terminus to FM 528	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility					
Cypress Point Drive/San Joaquin Parkway	Existing Sidewalk Terminus to FM 528	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility					
Friendswood Trail	Existing Sidewalk Terminus to FM 528	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility					
Championship Drive (Both Sides)	Existing Sidewalk Terminus to FM 528	Sidewalk Gap Infill Adjacent to or on a TxDOT Facility					

Table 12. *Intersection Improvements on FM 528 Implementation Matrix*

Intersection Improvements on FM 528

Individual Project Name	Project Limits	Project Type	Cost	Implementation Timeframe	Implementation Plan	Implementation Considerations	Funding Sources
Intersection of FM 528 and Bay Area Boulevard	N/A	Priority Project	$	Mid-Term	1. Establish coordination meetings between the City of Friendswood and TxDOT to discuss proposed improvements. 2. Add project to City of Friendswood capital improvement planning documentation. 3. Identify and secure funding for improvements. Leverage partnerships with TxDOT to potentially subsidize project improvements. 4. Create 30%, 60%, 90%, and construction documentation for proposed improvements. This includes ROW acquisitions and utility relocation coordination. (~1 year) 5. Construct project (~12 to 18 months)	Project is entirely on a TxDOT facility, so coordination is needed to implement this project. This project is being considered for implementation from TxDOT.	State Funding Sources: TxDOT
Intersection of FM 528 at Blackhawk Boulevard	N/A	PATN Project					

Table 13. *Non-Infrastructure Recommendations Implementation Matrix*

Non-Infrastructure Recommendations

Individual Project Name	Project Limits	Project Type	Cost	Implementation Timeframe	Implementation Plan	Implementation Considerations	Funding Sources
City Policy Updates	N/A (Citywide)	Policy Updates	$	Short-Term	Recommended code amendments can be adopted once plan has been approved.	Work with the city legal department to ensure code update language is appropriate.	City of Friendswood
Eco-Friendly and Sustainable Improvements	N/A (Citywide)	Policy Updates	$	Short-Term	Recommended code amendments can be adopted once plan has been approved. City could potentially create a landscape design manual for active transportation improvements.	Work with the city legal department to ensure code update language is appropriate.	City of Friendswood
Active Transportation Wayfinding Project	N/A (Citywide)	N/A	$$	Long-Term	1. Add active transportation wayfinding to the City's capital improvement planning documentation. 2. Conduct public engagement for location and design of active transportation wayfinding signs. 3. Design and construct active transportation wayfinding signs.	Public engagement will be necessary to ensure wayfinding is installed in locations that align with the community's priorities.	City of Friendswood



Chapter 5

Active Transportation Toolbox

How to Use This Toolbox

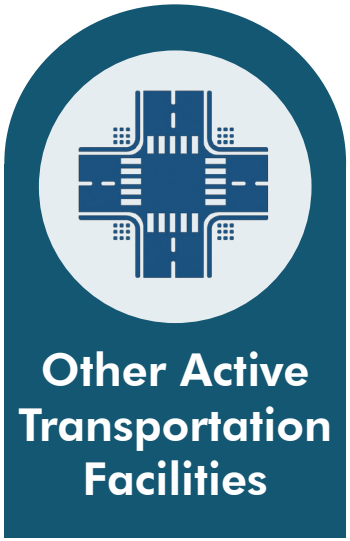
The Friendswood Active Transportation Toolbox is a collection of representative active transportation treatments that can be applied throughout the community of Friendswood. The objective of the Active Transportation Toolbox is to promote a consistent and coordinated application of active transportation infrastructure treatments throughout the city when they are constructed. This way, a cohesive, unified active transportation network will be implemented as it is constructed.

The following sections outline each active transportation treatment recommended in Friendswood and provides specific guidance on how that treatment should be implemented, amenity options for each treatment option, and state or national implementation resources that can guide the city during planning, design, and construction processes.









Multimodal Facilities

Multimodal facilities, including shared use paths and trails are the backbone of the Primary Active Transportation Network (PATN) in Friendswood. Shared use paths should be the default active transportation treatment on the PATN, where possible, this treatment supports both cyclists and pedestrian activity.

The following section describes two multimodal facility types: shared use paths and off-street trails.

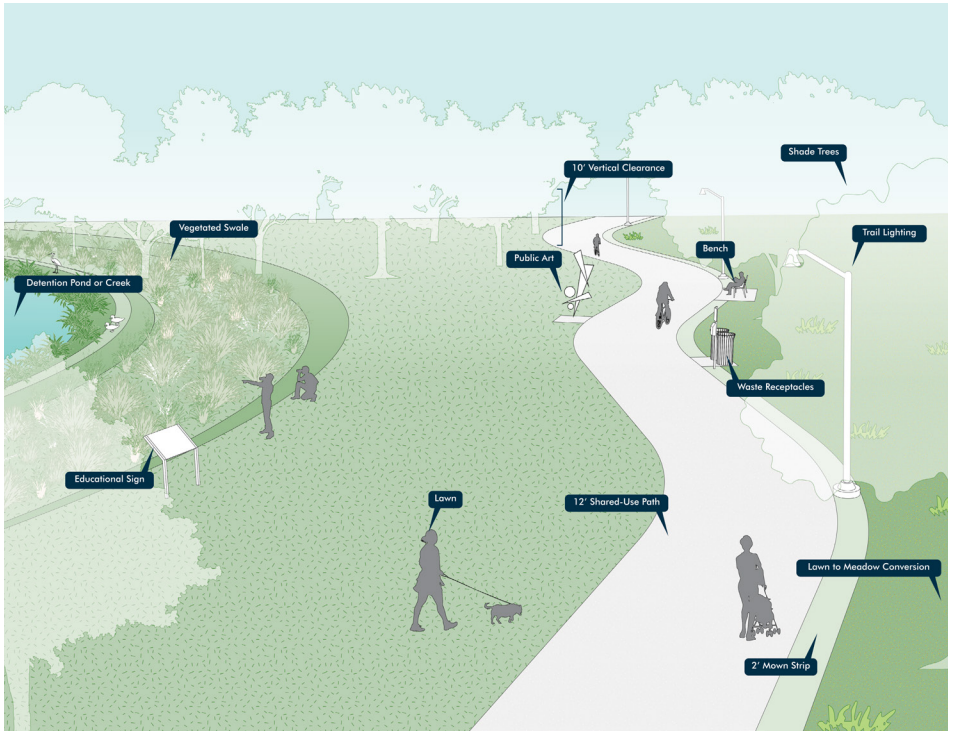


Figure 47. Example of a Trail in Friendswood with Comfort Features

Pedestrian Facilities Amenities & Resources

Amenity Options

Recommended amenity options: pedestrian lighting, wayfinding signage, distance markers, shade trees, pavement markings/centerline striping, ADA-compliant curb ramps, slopes, and access points

Optional comfort amenities: trash receptacles, benches, bicycle parking racks, public art and placemaking elements, water fountains, shade structures or shelters, and interpretive or educational signage

Resources

- National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide
- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities
- Federal Highway Administration (FHWA) Shared Use Path Design Guide
- TxDOT Roadway Design Manual (Bicycle and Pedestrian Facilities)
- Building Better Bikeways: A Planning Guide for the Houston-Galveston Region (H-GAC)

Guidelines for Implementation

Shared Use Path (On-Street Trail)

- A shared use path is a multi-use trail that is physically separated from motor vehicle traffic and designed to accommodate multiple non-motorized users.
- The recommended width for implementation is between 8 to 10 feet, but can be constructed to be up to 20' in width if ROW is available or attainable.
- This treatment is recommended along the two major TxDOT facilities, including FM 518 and FM 528.
- Other segments of the PATN can be a shared use path, where feasible.
- Paths should maintain gradual slopes of less than 5% and comfortable turning radii of 30-70 ft (9-21 m). Steeper slopes and sharper corners require a detailed engineering analysis.
- Paths should be well-lit with pedestrian-level lighting and be available for use at all hours of the day and night.



Figure 48. *Shared Use Path Example*
Photo Source: TxDOT

Off-Street Trail

- An off-street trail is very similar to a shared use path. However, off-street trails do not follow the alignment of a vehicular roadway. An off-street trail is a shared-use facility located outside of the roadway right-of-way, providing a dedicated, vehicle-free space for walking, bicycling, and other non-motorized travel.
- There are multiple pavement options for the community. For off-street trails, including crushed aggregate, pavement, and gravel.
- Utilize existing easements or underutilized rights-of-way for trail alignment.
- Prioritize trail alignments that connect key destinations, such as parks, schools, neighborhoods, and commercial areas.
- Consider trail lighting where feasible, especially near trailheads and near destinations.
- Incorporate green infrastructure and stormwater management in trail design where possible.



Figure 49. *Off Street Trail Example*
Photo Source: Sligo Creek Trail

Pedestrian Facilities

Pedestrian facilities are critical to the multimodal network in Friendswood. Sidewalks are how children and families walk to school, access grocery stores, and travel from their homes to nearby parks and other key local destinations.

The following section provides guidance on how different pedestrian facilities could be implemented along the PATN and elsewhere in Friendswood.



Figure 50. *Example of a Sidewalk in Friendswood with Comfort Features*

Pedestrian Facilities Amenities & Resources

Amenity Options

Recommended amenities: Shade structures or shade trees, pedestrian lighting, ADA-compliant curb ramps, slopes, and crossings, high visibility crosswalks, adequate pedestrian crossing infrastructure

Optional comfort amenities: Benches or seating areas, trash receptacles, street furniture, public art or placemaking elements, outdoor dining areas, decorative paving or crossing infrastructure, landscaped buffers

Resources

- NACTO Urban Bikeway Design Guide
- AASHTO Guide for the Development of Bicycle Facilities
- FHWA Shared Use Path Design Guide
- TxDOT Roadway Design Manual (Bicycle and Pedestrian Facilities)
- Building Better Bikeways: A Planning Guide for the Houston-Galveston Region (H-GAC)

Guidelines for Implementation

Sidewalks

- Sidewalks are suggested to be designed with a minimum width of 5 feet for pedestrian comfort.
- Consider completing connections to the existing sidewalk network if a sidewalk project is within 100 feet of an existing sidewalk
- Include adequate lighting for high pedestrian visibility on sidewalks.
- Where feasible, add shade trees to provide additional pedestrian comfort.
- Consider slotted curb, on-street striping or other innovative sidewalk design to accommodate context-sensitive implementation of sidewalks



Figure 51. *Sidewalk Example*

Photo Source: The Goodman Corporation

Slotted Curb Sidewalks

- Incorporate slotted curb sidewalk design where additional drainage flow or capacity is needed, to prevent stagnant water on sidewalks
- Ensure slotted curb sidewalk design is ADA-compliant and does not create hazards for pedestrians, cyclists, or other mobility devices
- Only consider slotted curb design on low- to moderate-speed roadways where the pedestrian activity can be prioritized
- Coordinate this type of sidewalk design with a drainage engineer to ensure adequate drainage flow and to prevent ponding or blocked debris



Figure 52. *Slotted Curb Sidewalk Example*

Photo Source: The Goodman Corporation

Striped On-Street Pedestrian Facility

- A striped on-street pedestrian facility provides a dedicated area for pedestrians to walk directly on the street pavement. This provides the lowest level of comfort for pedestrians; however, it is still better than not providing a dedicated walking path at all.
- Consider this option for pedestrian facilities only on roadways that have constrained right-of-way, and are low speed, low volume residential roadways.
- This is also a low-cost solution for providing dedicated pedestrian paths in Friendswood.
- This pedestrian infrastructure option should not be considered outside of the recommended guidelines provided in this section.



Figure 53. *On-Street Striped Ped Facility Example*

Photo Source: Google Earth

Bicycle Facilities

Bicycle facilities are a component of a well-connected multimodal transportation network. Expanding bicycle infrastructure can improve multimodal access to school, parks, jobs, neighborhoods, and commercial centers - reducing reliance on vehicles and promoting quality of life.

This section provides guidance on different bicycle infrastructure treatments that are recommended in Friendswood, including when and where the specific treatment is appropriate.

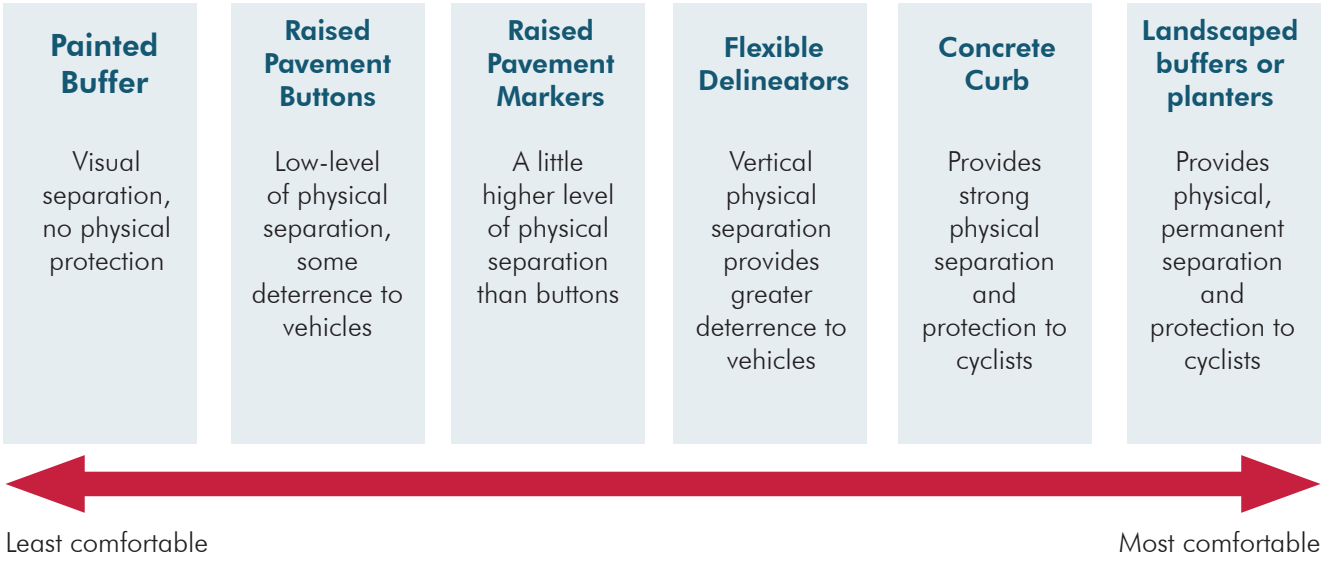


Figure 54. *Levels of Comfort*

Bicycle Facilities Amenities & Resources

Amenity Options

Recommended amenity options: Wayfinding signage for bicycle routes and other active transportation infrastructure, reduced speed limits, high visibility pavement markings

Optional comfort amenity options: Adequate street lighting, bicycle friendly signal timing or intersection design

Resources

- NACTO Urban Bikeway Design Guide
- AASHTO Guide for the Development of Bicycle Facilities
- FHWA Bikeway Selection Guide
- Texas Manual on Uniform Traffic Control Devices (MUTCD) – Traffic Controls for Bicycle Facilities

Guidelines for Implementation

Sharrows

- Sharrows are low-cost, low-comfort solutions for bicycling, and should not be implemented in areas where a large number of the cyclists would consist of vulnerable populations, such as children or the elderly (e.g., near schools).
- Sharrows paint a specific pavement marking on a roadway to alert drivers that the road should be shared with cyclists.
- Implement sharrows on low-volume, low-speed roadways where bicycle lanes or other forms of bicycle infrastructure are not feasible.
- Space sharrows at regular intervals, typically ~250 feet in urban areas.
- Only paint sharrows on streets with a speed limit of 35 mph or less.
- The marking itself should be approximately 112 inches in length. Specific painting implementation guidance can be found in the MUTCD.



Figure 55. *Sharrow Example*
Photo Source: Bike Cleveland

Bicycle Lanes

- A bicycle lane is a dedication portion of roadway pavement that is designated for bicycle use only, typically marked by striping, signage, and pavement markings.
- Appropriate for low to moderate speed and volume roadways where dedicated space is feasible.
- A minimum width 5 feet is recommended to support all ages and abilities.
- Where feasible, additional buffering or protection should be implemented with the construction of bicycle lanes (see next section for further guidance).
- Consider cyclist intersection treatments for additional bicyclist comfort and safety, where feasible.
- Ensure network continuity by extending lanes to key destinations and avoiding abrupt gaps.



Figure 56. *Bicycle Lane Example*
Photo Source: FHWA

Protected Bicycle Lane

- Protected bicycle lanes are on-street facilities with a buffer separating cyclists from motor vehicles.
- Appropriate for moderate speed and volume roadways; use off-street facilities on higher-speed corridors.
- Buffers may include striping, vertical elements, curbs, or landscaping, aligned with City branding.
- Use as the default on-street bicycle facility where feasible.
- Buffer width should be 3 to 5′, up to 7′ for added comfort.
- Incorporate intersection treatments to improve safety.
- Ensure continuity by extending facilities to key destinations and avoiding abrupt gaps.



Figure 57. *Buffered Bicycle Lane Example*
Photo Source: Vision Zero Network

Other Active Transportation Facilities

Other forms of active transportation infrastructure will vary based on context-sensitive implementation of the multimodal transportation network. Three relevant treatments to Friendswood are described in this section: pedestrian bridges, intersection treatments, and green infrastructure.

This section provides implementation guidance for each treatment.

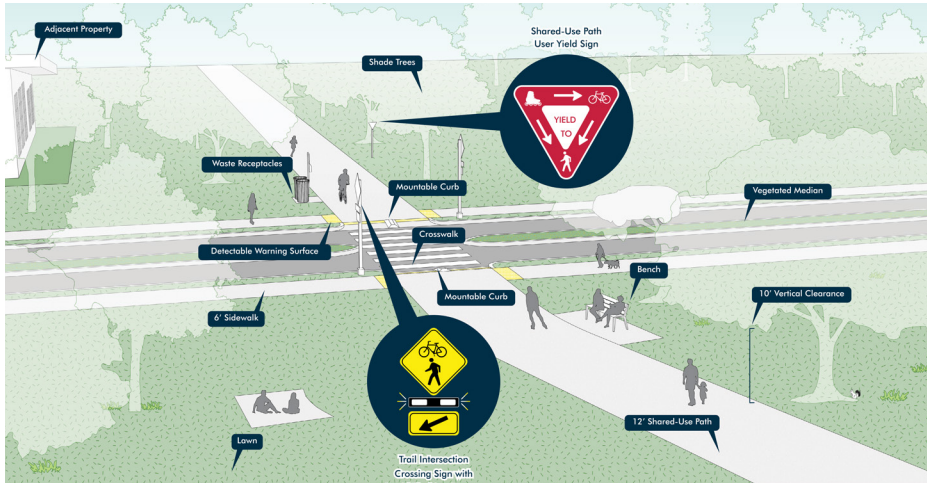


Figure 58. *Example of a Intersection Improvement Illustration*

Other Transportation Facilities Amenities & Resources

Pedestrian Bridges

Amenity Options

- **Recommended amenity options:** Pedestrian railings and barriers, adequate pavement markings, signage, pedestrian lighting
- **Optional amenities:** public art, placemaking elements, wayfinding signage, landscaping

Resources

- TxDOT Roadway Design Manual – 19.7.3 Pedestrian/Bike Bridges and Underpasses

Intersection Treatment

Amenity Options

- **Recommended amenity options:** high-visibility crosswalks, adequate pedestrian lighting, pedestrian signal timing
- **Optional amenities:** Rectangular Rapid Flashing Beacons (RRFBs), Pedestrian Hybrid Beacons (PHBs), leading pedestrian interval signal timing, pedestrian refuge islands, raised crosswalks, curb extensions, bulb-outs

Resources

- NACTO Urban Street Design Guide
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- FHWA Safe Transportation for Every Pedestrian (STEP) Program
- FHWA Proven Safety Countermeasures
- Texas MUTCD
- TxDOT Roadway Design Manual

Green Infrastructure

Amenity Options

- **Recommended amenity options:** green infrastructure that expands stormwater drainage capacity
- **Optional amenities:** Additional planters, landscaping, public art, or placemaking elements

Resources

- Environmental Protection Agency (EPA) Green Infrastructure Resources
- Federal Highway Administration Green Infrastructure and Transportation Guidance
- NACTO Urban Street Design Guide
- Texas Department of Transportation Roadway Design Manual
- Local stormwater or drainage design criteria manuals

Guidelines for Implementation

Pedestrian Bridges

- Construct pedestrian bridges on streets where pedestrians are already crossing the roadway bridges at unsafe or informal locations, such as medians, shoulders, or midblock areas.
- Evaluate the need for pedestrian bridges on roads that connect major commercial areas and activity centers, indicating a need for multimodal connectivity in high activity areas.
- Consider constructing pedestrian bridges where multimodal connectivity is significantly constrained due to major natural or human-made barriers – such as Friendswood's existing creeks.
- Prioritize locations where there is a demonstrated pedestrian demand or consistently heard through community feedback.



Figure 59. *Pedestrian Bridge Example*
Photo Source: The Goodman Corporation

Intersection Treatments

- Intersection safety treatments seek to improve street intersections to make them safer for pedestrians and cyclists. Several safety treatments can be implemented, such as high visibility crosswalks, pedestrian refuge islands, and pedestrian crossing signals.
- Prioritize safety improvements at intersections that have documented safety concerns, such as past non-motorized roadway user serious injuries or fatalities.
- Ensure all treatments comply with the Manual on Uniform Traffic Control Devices (MUTCD) and ADA requirements.
- Implement safety treatments that prioritize vulnerable roadway user safety.
- Implement proven safety countermeasures that have a documented crash reduction factor, per the FHWA.



Figure 60. *Intersection Treatment Example*
Photo Source: City of Seattle

Green Infrastructure

- Green infrastructure, such as bioswales, rain gardens, or planters, are natural systems engineered to use vegetation, soil, and permeable surfaces to manage stormwater, while also enhancing the safety and comfort for active transportation users and facilities.
- Incorporate green infrastructure into active transportation projects wherever feasible.
- Utilize green infrastructure to absorb stormwater runoff in areas with significant drainage needs.
- Design green infrastructure elements to be compatible with and complementary to trails, sidewalks, bikeways, and other active transportation infrastructure.



Figure 61. *Green Infrastructure Example*
Photo Source: US Dept. of Energy & Environment



Houston-Galveston
Area Council