Houston-Galveston Area Council

CEMETERY ROAD CORRIDOR STUDY

JUNE 2025

THE STATE OF TEXAS
COUNTY OF GALVESTON

H-GAC
Houston-Galveston Area Council

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EXECUTIVE SUMMARY

PROJECT OVERVIEW

The Houston-Galveston Area Council (H-GAC), in cooperation with Galveston County, conducted this corridor study of Cemetery Road with the goal to improve multi-modal mobility along the corridor. The Study Area limits for this study includes the full 3.76 mile length of Cemetery Road from State Highway 6 (SH 6) to Farm-to-Market Road 517 (FM 517), as well as a quarter-mile buffer around the corridor, as illustrated in *Map 1: Study Area*. The corridor is maintained by multiple jurisdictions: Galveston County, the City of Dickinson, and the City of Santa Fe.

Galveston County, much like the rest of the Houston region, is currently experiencing robust population growth as rural land is being developed into suburban residential land uses. This corridor study identifies potential impacts to the Cemetery Road corridor associated with this projected growth and provides conceptual alternatives for a future design of Cemetery Road to improve safe multi-modal mobility along the corridor. Ultimately, this study will result in an actionable plan - with planning-level cost estimates and funding sources - to address short-, medium-, and long-term needs.

Open Ditch drainage along Cemetery Road

ENGAGEMENT OVERVIEW

To gather feedback and ensure residents and others with vested interest in Cemetery Road were able to voice their opinions regarding future improvements to the corridor, this study included a robust public engagement element. The engagement process included two open house meetings, one pop-up tabling event at a local festival, and meetings with county and municipal staff to discuss incoming projects and development.

Steering committee members reviewing conceptual alternatives at steering committee meeting #2

Project Schedule

The Cemetery Road Corridor Study included four phases:

Phase 1: Initiation - This phase included data collection and preliminary public engagement.

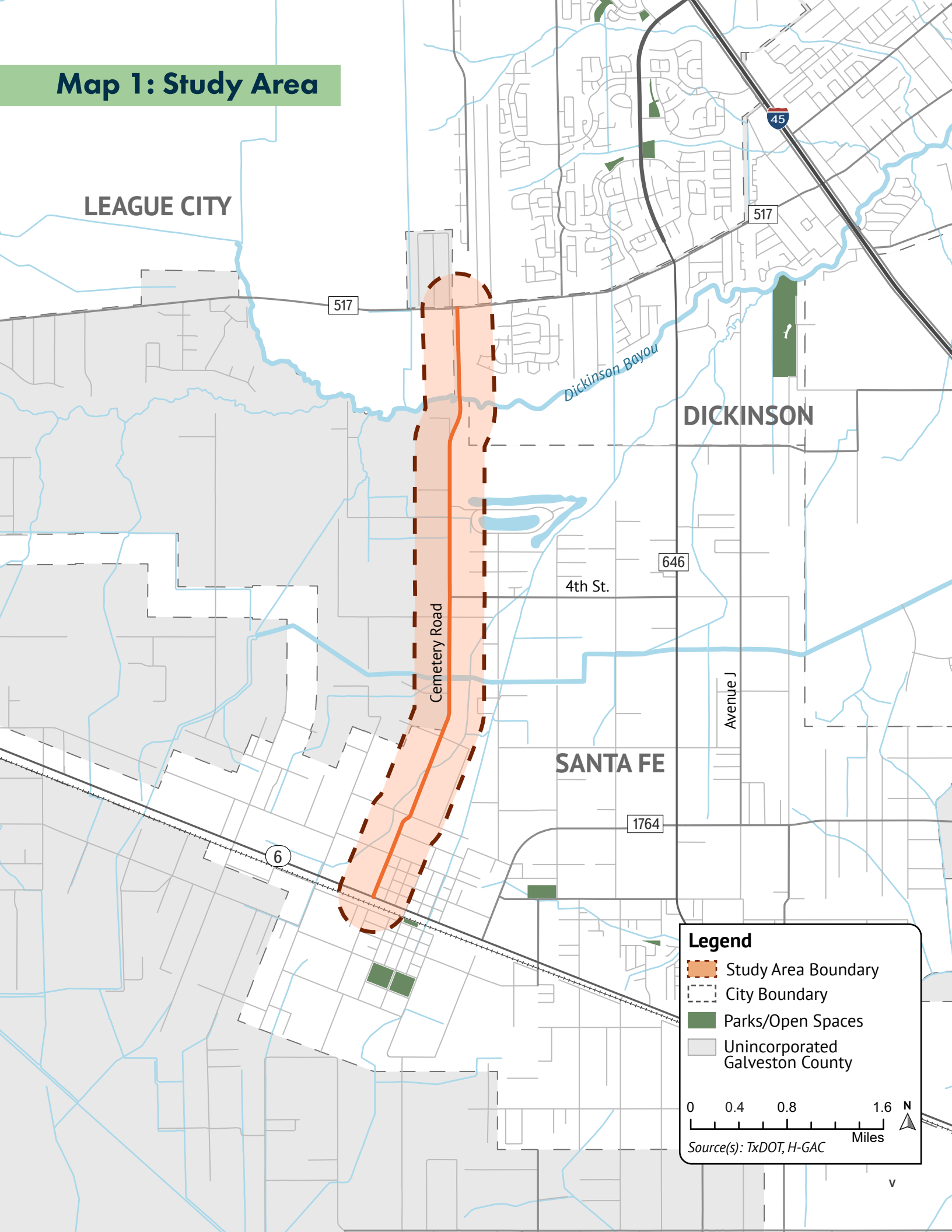
Phase 2: Needs Assessment - This phase included analysis of existing conditions and community needs.

Phase 3: Alternatives - This phase included the evaluation of conceptual roadway alternatives.

Phase 4: Recommendations- This phase included an action plan for implementation of the proposed roadway concepts.

Community members reviewing conceptual alternatives at Open House #2

Map 1: Study Area



CONCEPTUAL ALTERNATIVES

Two conceptual design alternatives for Cemetery Road were initially developed in response to the challenges and opportunities identified in the existing conditions assessment. These alternatives also incorporated the ideas and opinions expressed during the first Steering Committee meeting, ensuring that key stakeholder insights were incorporated in the designs. At Open House #1, these alternatives were presented to the public alongside key findings from the existing conditions assessment.

Following Open House #1, the alternatives underwent further refinement based on feedback received during the second Steering Committee meeting and the focus group meetings. Finally, three refined alternatives - A, B, and C - were presented at Open House #2. Figures 6, 7, and 8 depict the proposed cross-sections for each alternative. The presentation of these alternatives at Open House #2 marked a significant milestone in the study, showcasing the evolution of the designs and ongoing commitment to the community's needs.

To determine which of the three conceptual alternatives would best serve the needs of the community, performance measures were selected to analyze and compare them. How each alternative performed in terms of these measures is summarized in *Table 4: Alternatives Evaluation*. Because this is a high-level planning study and the alternative designs for Cemetery Road are in the conceptual phase, these performance measures are evaluated qualitatively, in terms of most to least favorable. In *Table 4*, most favorable performance is indicated in green, least favorable in red, and neither most or least favorable in orange. A No Build option is show to indicate keeping the road as it is today.

All three alternatives would improve the roadway surface; provide safe and separate paths for pedestrians and bicyclists, which includes crosswalks at the intersections with SH 6, Countryside Street, and FM 517; improve drainage facilities by replacing the existing open ditch drainage with curb and gutter; provide more landscaping and shade; and improve operations of the intersection of Cemetery Road at SH 6 through the installation of a new signal.

However, there are trade-offs for each alternative in terms of the performance measures.

- **Alternative A**, which is a two lane road with a center turn lane, does not improve traffic conditions and has the shortest service life but is the most cost effective of the conceptual alternatives and minimizes impacts to drainage and private property; however, it is not an improvement from the No Build configuration and would have more negative impacts than leaving the corridor as-is.
- **Alternative B,** which is a four lane road with a center median, significantly improves traffic conditions both in the short- and long-term but has the greatest negative impact on drainage and private property; it is also the least favored within the community.
- **Alternative C,** which is like Alternative A north of Carolyn Street and like Alternative B south of Carolyn Street, strikes a balance between Alternatives A and B for every performance measure; it provides the benefit of improving traffic conditions with less impact to drainage and private property.

The results of this analysis are intended to serve as a road map for decision makers to prioritize future improvements to Cemetery Road. Ultimately, it is the responsibility of these decision makers to weigh the trade-offs, select a design they wish to implement, and coordinate on the implementation process.

Table 4: Alternatives Evaluation

	ALTERNATIVE SCENARIOS			
Performance Measure	**No Build**	**A**	**B**	**C**
ROW Needed	0 acres	1.13 acres	2.55 acres	1.83 acres
Parcels Impacted	0 parcels	62 parcels	81 parcels	69 parcels
Drainage Impacts	0 ac-ft	6.09 ac-ft	21.94 ac-ft	13.79 ac-ft
Level-Of-Service	0 percent	+0.3 percent	-34 percent	-18 percent
Construction Cost	$0	$21 M	$30 M	$25 M
Estimated Service Life	18-32 years	13-32 years	23-47 years	23-40 years
Public Preference	20 votes	11 votes	5 votes	6 votes

Figure 6: Alternative A Cross-Section (2 lane road with center turn lane)

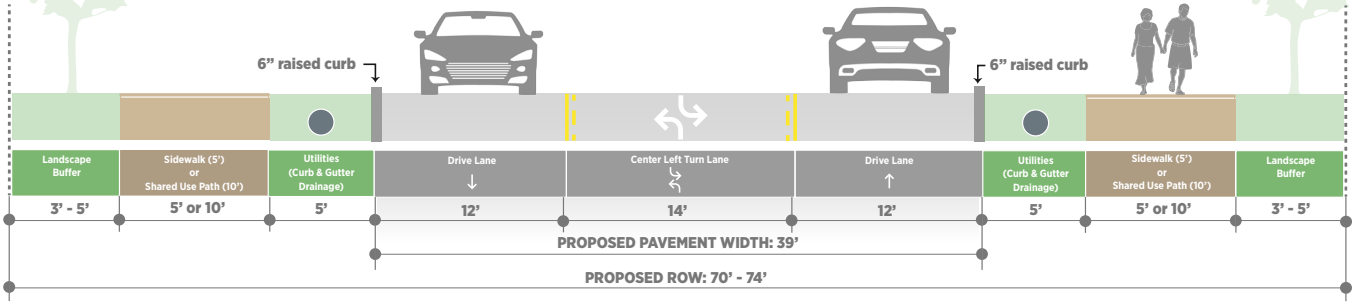


Figure 7: Alternative B Cross-Section (4 lane road with raised median and left-turn bays)

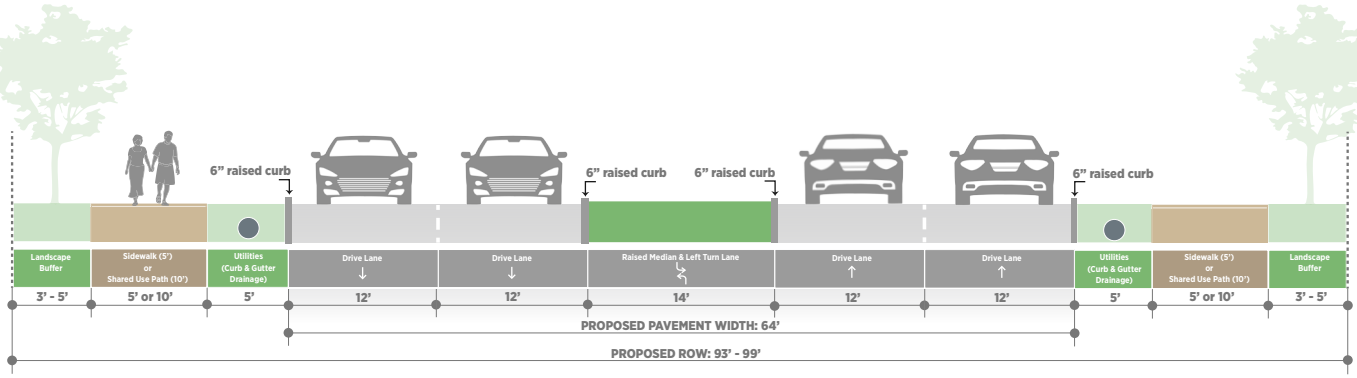
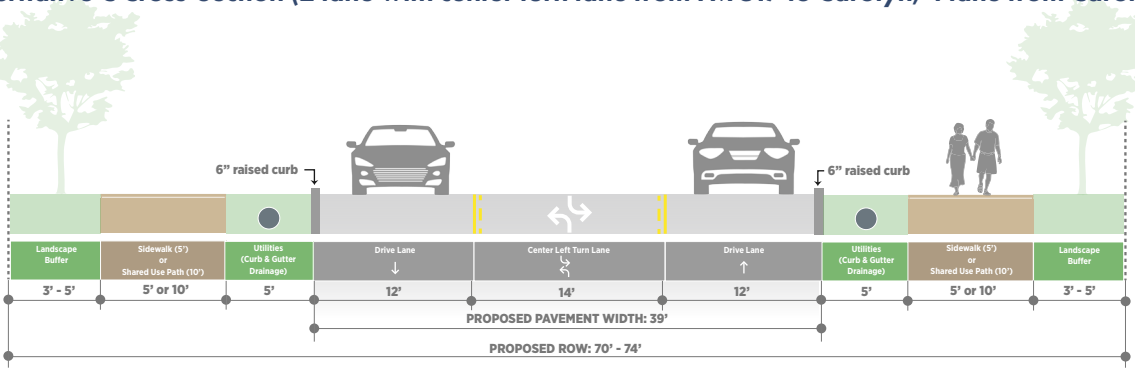
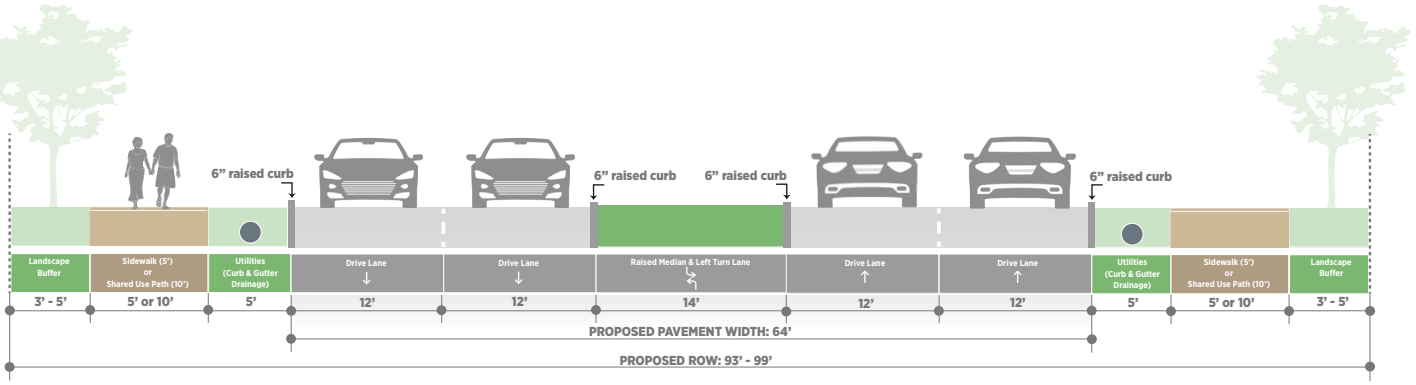


Figure 8: Alternative C Cross-Section (2 lane with center turn lane from FM 517 to Carolyn, 4 lane from Carolyn to SH 6)





CHAPTER 1 | Introduction

Chapter 1, *Introduction*, provides an overview of the Cemetery Road Corridor Study, the purpose of the planning process, potential impacts to the regional roadway network, and alignment with local, regional, and statewide goals.

WHAT IS A CORRIDOR STUDY?

A corridor study is a planning project that analyzes existing and future roadway conditions and land use along a major roadway. Corridor studies often consider multiple modes of transportation, including vehicles, pedestrians, bicycles, and public transit. Corridor studies incorporate multiple forms of data including land use, traffic counts, speeds, and crash history to evaluate existing conditions and forecast future travel demand along the corridor.

For the purpose of the Cemetery Road Corridor Study (the Study), the Study Area includes the full 3.76 mile length of Cemetery Road from State Highway 6 (SH 6) to Farm-to-Market Road 517 (FM 517), as well as a quarter-mile buffer around the corridor, as illustrated in *Map 1: Study Area*. Cemetery Road is currently classified as a Major Collector and is maintained by multiple jurisdictions: Galveston County, the City of Dickinson, and the City of Santa Fe.

WHY PLAN NOW?

The Houston-Galveston Area Council (H-GAC), in cooperation with Galveston County, conducted this corridor study of Cemetery Road with the goal to improve multi-modal mobility along the corridor. Galveston County, much like the rest of the Houston region, is currently experiencing robust population growth as rural land is being developed into suburban residential land uses. As this development continues and more residents move to the area, the roadway network will struggle to support increased vehicle traffic. This corridor study identifies potential impacts to the Cemetery Road corridor associated with this projected growth and provides conceptual alternatives for a future design of Cemetery Road to improve safe multi-modal mobility along the corridor.

This study reflects local and regional priorities for multi-modal mobility. Ultimately, this study is an actionable plan - with planning-level cost estimates and funding sources - to address short-, medium-, and long-term needs.

PROJECT TIMELINE

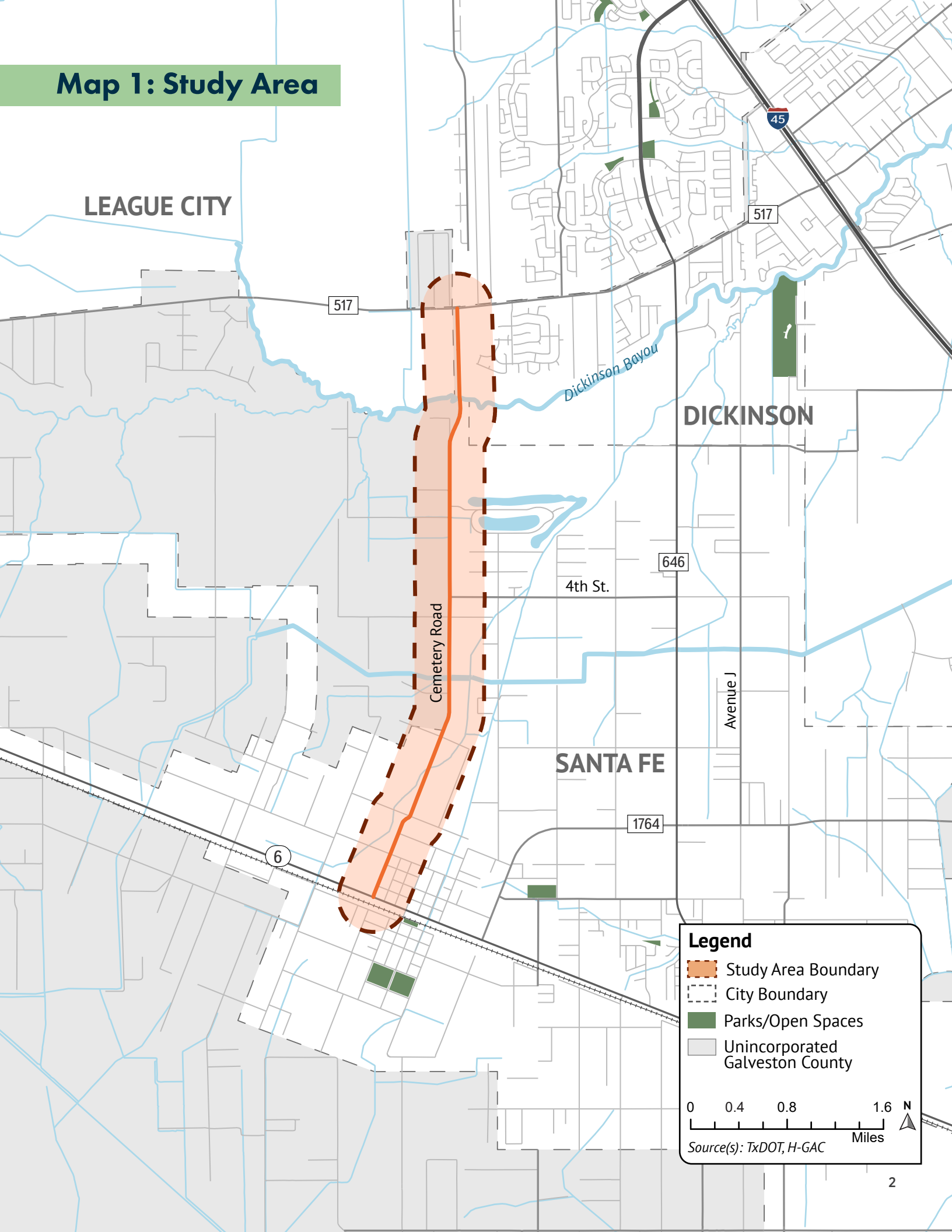
1 Project Initiation
- Initial Data Collection
- Public Engagement
- Stakeholder Outreach

2 Needs Assessment
- Existing Conditions
- Safety Analysis
- Identify Community Needs and Preferences

3 Alternatives Analysis
- Evaluation Matrix
- Conceptual Renderings
- Network Modeling

4 Recommendations & Implementation
- Action Plan
- Cost Estimates
- Study Completion

Map 1: Study Area



PREVIOUS PLANNING EFFORTS

As part of the initial data collection effort, previously completed and ongoing concept plans, studies, assessments, policies, programs, and processes relevant to Cemetery Road were reviewed. Reviewing these documents established an understanding of the current challenges and opportunities to build a strong foundation for the rest of the corridor study.

TxDOT

Project Tracker

The Texas Department of Transportation (TxDOT) publishes information on planned, funded, and ongoing improvement projects on state-maintained roadways in its online Project Tracker. The projects in the vicinity of Cemetery Road are illustrated in *Map 2: Planned Roadway Projects*.

H-GAC

2045 Regional Transportation Plan (2019)

The H-GAC 2045 Regional Transportation Plan (RTP) is a coordinated effort to address existing regional transportation concerns and prepare for future mobility needs. The RTP addresses five key goals for the region: improve safety; achieve/maintain state of good repair; move people and goods efficiently; strengthen regional economic competitiveness; and conserve and protect natural and cultural resources. The goals seek to address roadway congestion and safety issues in the region. The plan also addresses needed improvements to regional transit, freight movement, bikeways and sidewalks, and air quality.
The Plan identifies over 1.4 billion dollars in investments to upgrade the Interstate Highway 45 South (IH 45 S) corridor and 3.9 billion dollars for the Grand Parkway/State Highway 99 (SH 99) over the next 25 years.

2045 Active Transportation Plan (2019)

This plan supports the larger H-GAC 2045 RTP and reviews the region's existing sidewalk and bikeway networks and outlines strategies to guide public investment in these networks throughout the region. The Active Transportation Plan highlights the benefits of mobility choice, active people, and clean air for the communities in the region.

The Active Transportation Plan proposes constructing 399 miles of new bikeways in Galveston County with an estimated cost of 200 million dollars. This includes 32 miles of bike lanes, 185 miles of shared-use paths, 12 miles of signed shared roadways, and an additional 170 miles of bikeways with an undesignated facility type. While there are currently no bike or pedestrian facilities along Cemetery Road, there is a proposed undesignated facility included in the Active Transportation Plan along the corridor.

2025-2028 Transportation Improvement Program

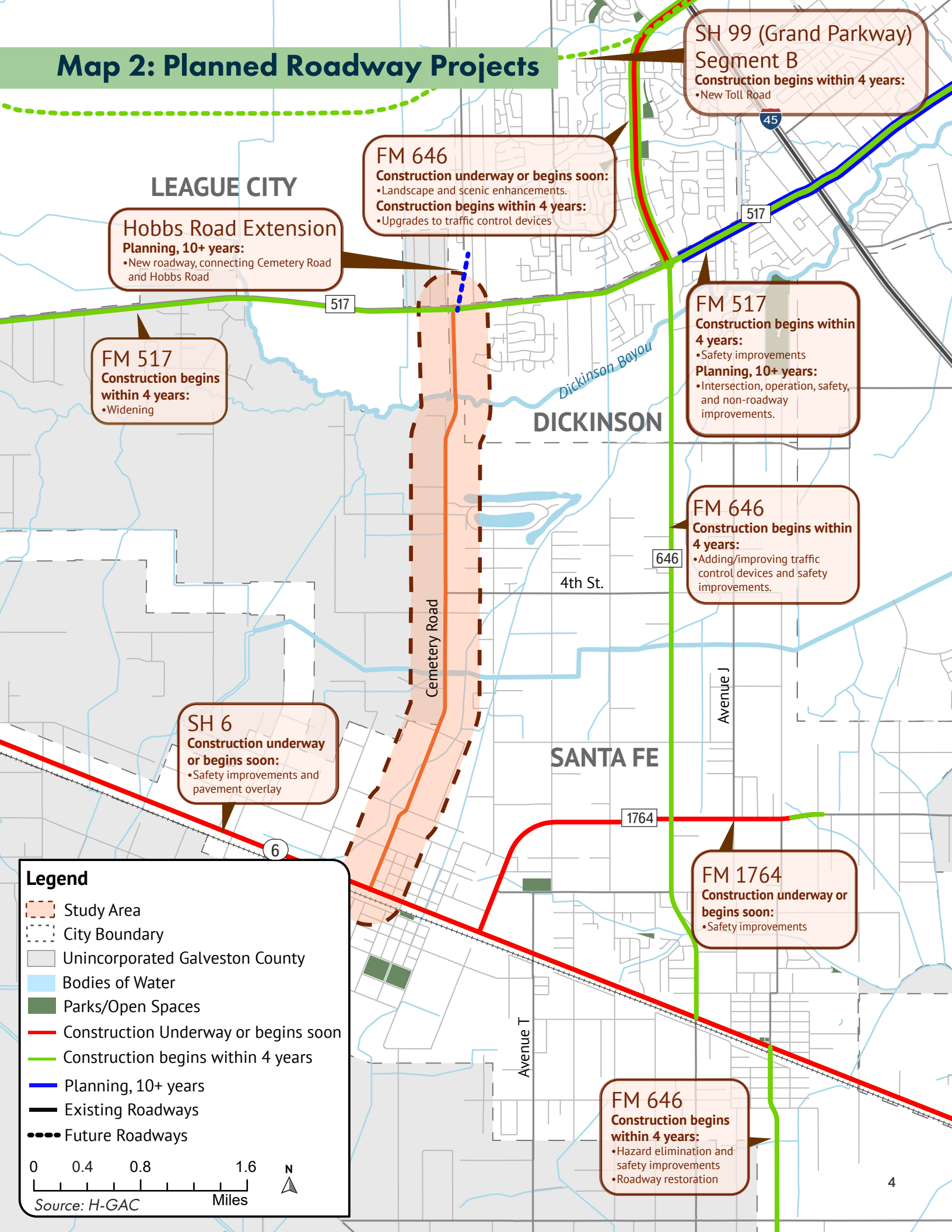
The H-GAC 2025-2028 Transportation Improvement Program (TIP) is a multimodal program of transportation infrastructure and service improvements planned for implementation in the Houston-Galveston region over the next four years. It includes projects of regional significance for which federal, state, and local funding is available or committed. This program includes transit planning efforts and operations improvements for the Galveston County Gulf Coast Transit District as well as funding for the projects identified in the TxDOT Project Tracker.

GALVESTON COUNTY

Parks Master Plan Update (2017)

This Parks Master Plan is an update from the 2011 master plan. Runge Park is within the corridor Study Area, being approximately 2,100 feet southeast of the southern terminus of Cemetery Road. Located in the City of Santa Fe, Runge Park is a 20-acre Community Park in the County's park system. During the public engagement process for the Parks Master Plan Update, participants expressed a preference for safety improvements over sustainability, resiliency, and low-impact improvements. When asked what elements would make them feel safer, participants expressed preference for additional lighting, increased maintenance, and safety officer presence.

Map 2: Planned Roadway Projects



CITY OF SANTA FE

SFTX Vision 2050 Comprehensive Plan (2023)

This comprehensive plan is the first of its kind for the City of Santa Fe. According to the adopted Future Land Use Plan (FLUP), Cemetery Road is not anticipated to become a major commercial corridor; instead, development on either side of Cemetery Road is projected to be mostly single-family residential.

This plan includes a conceptual thoroughfare plan for the City of Santa Fe and its ETJ. This plan takes into account Segment B of the Grand Parkway (SH 99). The conceptual thoroughfare plan classifies Cemetery Road as a Principal Arterial and proposes an extension of the roadway beyond its current limits, including a connection to the Grand Parkway to the north and a new railroad crossing south of SH 6 connecting to Scott Avenue. This classification reinforces the vision of Cemetery Road as a mobility corridor rather than a commercial corridor, prioritizing free flowing traffic.

In addition to thoroughfare classifications, the comprehensive plan includes a conceptual trails plan. There are nine potential trails that fall within the Cemetery Road corridor study area, indicating high potential for pedestrian and bicyclist mobility along the corridor. See *Map 3: Santa Fe Conceptual Thoroughfare and Trails Plan* for an illustration of these ideas.

CITY OF DICKINSON

Comprehensive Plan 2015-2030

In the City of Dickinson's Comprehensive Plan, Cemetery Road is not considered a major roadway for Dickinson; however, FM 517, connecting to the northern end of Cemetery Road, is a Major Arterial and is the only east-west roadway that runs the length of the city. The plan notes that TxDOT proposed widening FM 517 west of FM 646 to accommodate traffic needs generated by "significant development" on the far west end of Dickinson and the portion of League City that abuts the north side of FM 517. Traffic volumes are expected to continue rising as development increases in this area. This proposed widening project is included in TxDOT's Project Tracker and H-GAC's TIP.

The Future Land Use Plan (FLUP) indicates that there is planned development in the vacant parcel that abuts Cemetery Road, within the city limits of Dickinson, on the south side of FM 517. In the years following the completion of this comprehensive plan, this parcel has been used to expand Bayou Lakes, a single-family residential development that had already been partially constructed. The FLUP proposes some commercial development along the south side of FM 517; this has yet to be developed.

Additionally, as cited in the Comprehensive Plan, the City of Dickinson has had several transit, pedestrian, and bike planning efforts in recent years. The City has partnered with H-GAC, TxDOT, Galveston County, Connect Transit, the Gulf Coast Center, and League City, signaling a demand for more of these services and facilities in the vicinity of Cemetery Road.

Parks, Trails, and Recreation Master Plan (2023)

This plan identifies an existing neighborhood park, an existing public-school park (which includes playground equipment and a baseball field), and a potential future park within the Cemetery Road Corridor Study Area. Additionally, this plan highlights the "Paddle Trail" that exists along Dickinson Bayou, which intersects Cemetery Road. This is a unique mode of active transportation. There may be an opportunity to connect to these amenities as part of this study's implementation.

CITY OF LEAGUE CITY

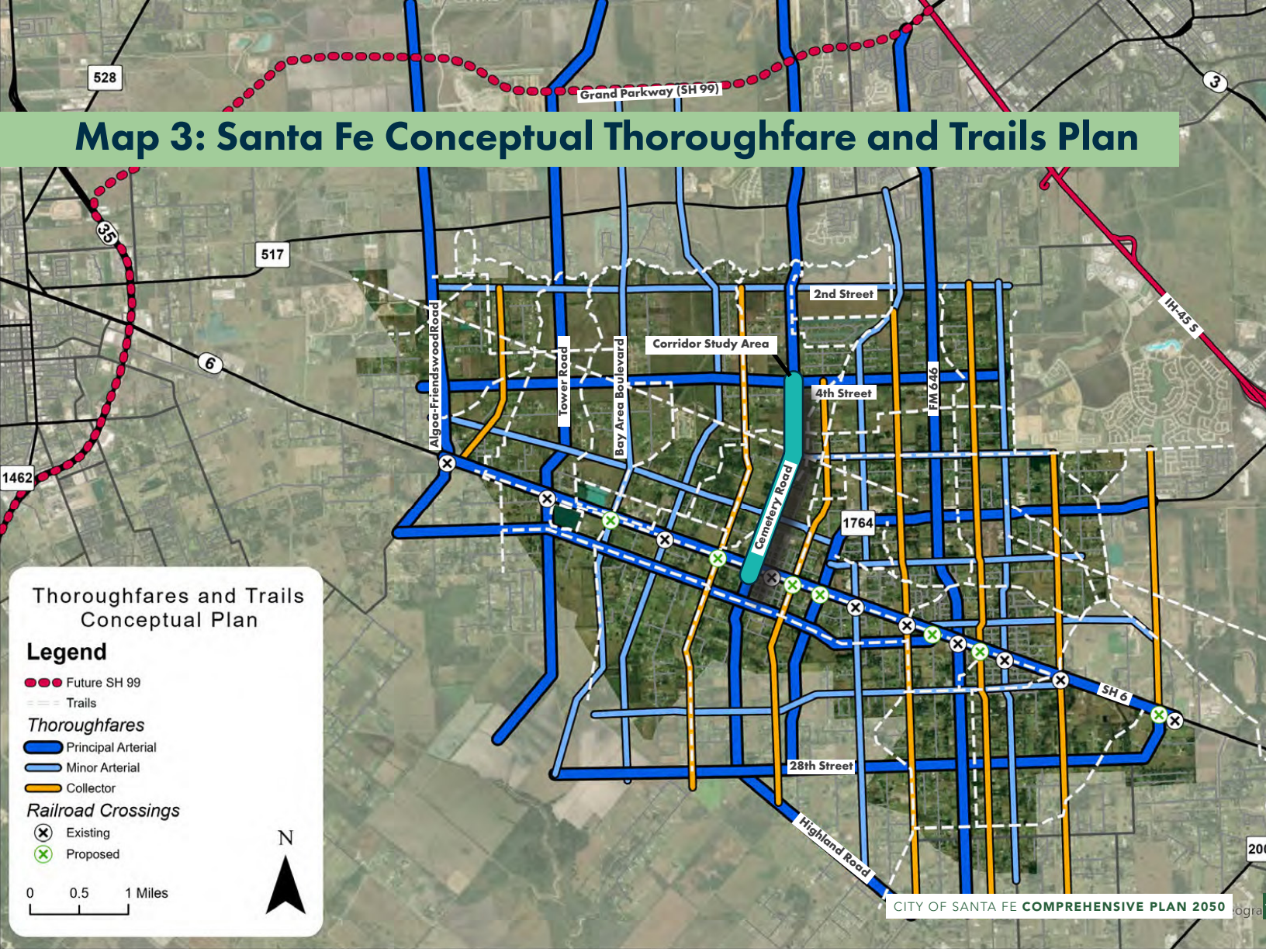
League City 2035 Comprehensive Plan

The Future Land Use Plan (FLUP) included in this comprehensive plan illustrates a similar land use pattern adjacent to the west side of Cemetery Road as the Santa Fe FLUP on the east side of Cemetery Road. Most of the land adjacent to Cemetery Road and its potential future extension along Hobbs Road is classified as Suburban Residential or Suburban Commercial.

Capital Improvement Program

All of League City's active Capital Improvement Program (CIP) projects are illustrated in an online map, similar to the TxDOT Project Tracker. The extension of Hobbs Road south from its current terminus to FM 517, connecting to Cemetery Road, is included in the CIP. This project will provide better access, drainage improvements, and intersection improvements at the Hobbs Road and FM 517 intersection. The ultimate scope of the project is to construct approximately 1,880 feet of 4-lane divided urban roadway from the existing terminus approximately 266 feet south of the intersection of Oracle Drive and Hobbs Road to FM 517. Though the design will include all 4-lanes, the City will only construct the two southbound lanes (western portion) at this time, with the remaining two northbound lanes (eastern portion) to be constructed at a later date.

Map 3: Santa Fe Conceptual Thoroughfare and Trails Plan



Master Mobility Plan Update (2018)

This plan identifies the extension of Cemetery Road to Hobbs Road as a recommended project to be executed between 5-15 years from the plan's completion. A Shared Use Path or Trail is proposed along Hobbs Road, including the proposed connecting link between Hobbs and Cemetery Road. Also, this plan identifies a need for "bike and pedestrian connection" along Cemetery Road south of FM 517.

Parks, Trails, and Open Spaces Plan (2017)

This plan recommends a neighborhood park just north of the terminus of Cemetery Road at FM 517, as well as a 6-foot wide "neighborhood" trail along one side of the extension of Cemetery Road/Hobbs Road and along the north side of FM 517. These trails are part of a comprehensive, well-connected trail network proposed in this plan. There is also a recommended trail wayfinding sign at the intersection of Cemetery Road and FM 517.

CHAPTER 2 | Existing Conditions

Chapter 2, Existing Conditions, provides a high-level analysis of the existing characteristics along the Cemetery Road corridor, including demographic and socio-economic information, existing land use, environmental constraints, mobility characteristics, and safety analysis. Information gathered for this chapter informed decisions regarding the future development of the Cemetery Road corridor.

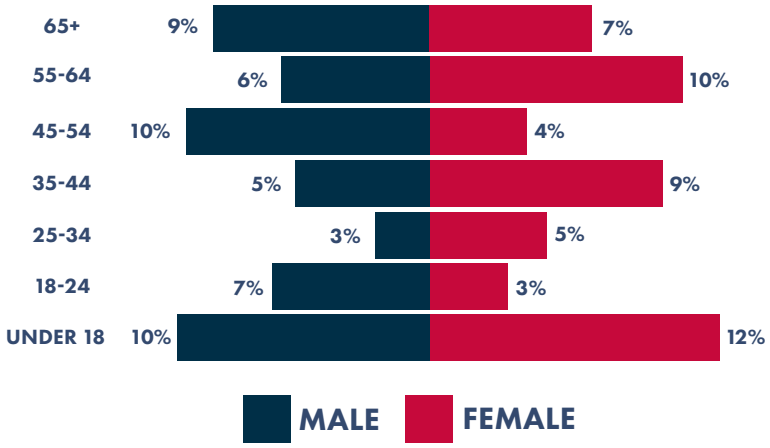
DEMOGRAPHICS

This report utilizes demographic and socio-economic data from the U.S. Census Bureau's 2018-2022 American Community Survey (ACS) 5-Year Estimates. The demographic analysis focuses on Census Block Groups that intersect the quarter-mile buffer area along the corridor. According to the ACS data, the estimated population of this study area is 6,827. Given the corridor study's emphasis, the demographic data will primarily relate to mobility patterns such as modes of transportation used for commuting. However, various factors influencing travel behavior and destination choices will also be explored. This information will be compared to the demographics of Galveston County to identify similarities, differences, and unique characteristics of the Study Area within the broader regional context.

AGE AND SEX

A population's age plays a critical role in the design and prioritization of multi-modal mobility infrastructure. As shown in *Figure 1: Study Area Population by Age and Sex*, the Study Area's age and sex composition is similar to that of Galveston County. Approximately 22 percent of residents in the Study Area are children and 32 percent of the population are older than 55, signaling a need for safe, accessible, and equitable transportation infrastructure which would connect residents to local destinations, schools, parks, and community centers.

Figure 1: Study Area Population by Age and Sex



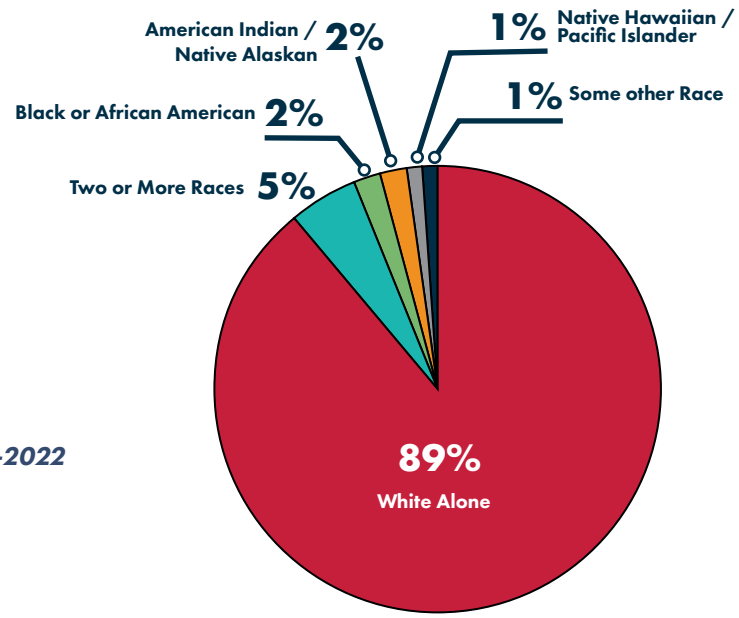
Source(s): U.S. Census Bureau ACS 2018-2022

RACE AND ETHNICITY / LANGUAGE

Figure 2: Study Area Race, represents the racial and ethnic breakdown of the Study Area. The Study Area is 89 percent white alone, and 11 percent of the Study Area is Hispanic or Latino of any race, much lower than the 26 percent present in Galveston County.

The Study Area has higher rates of English proficiency than Galveston County, with three percent (3%) of the Study Area's population reporting that they do not speak English well. Approximately 12 percent of Galveston County's population reported that they do not speak English well and four percent (4%) reported that they speak no English.

Figure 2: Study Area Race



Source(s): U.S. Census Bureau ACS 2018-2022

Map 4: Study Area Commuting Destinations

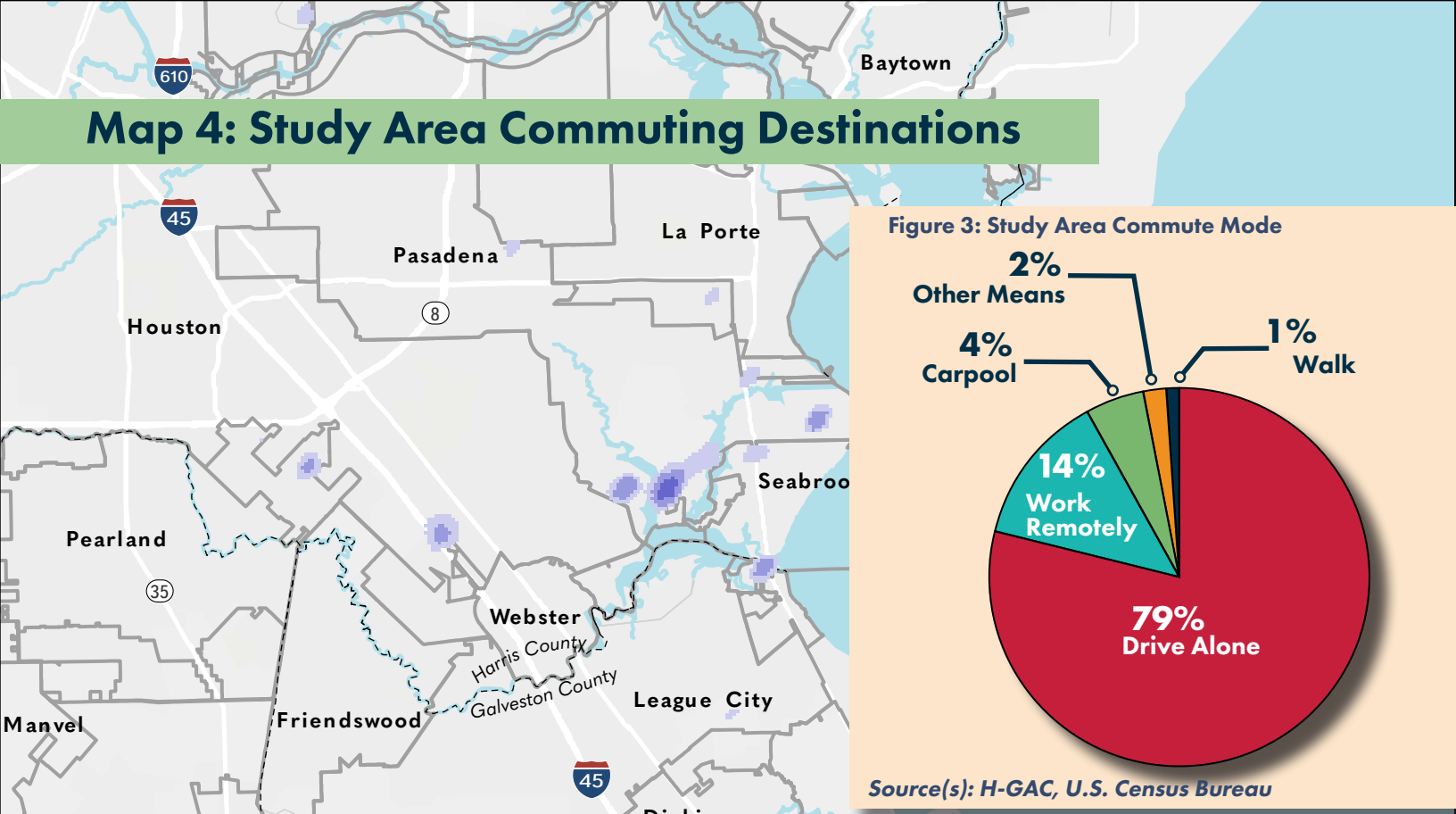


Figure 3: Study Area Commute Mode

Source(s): H-GAC, U.S. Census Bureau

COMMUTING CHARACTERISTICS

As shown in *Figure 3: Study Area Commute Mode*, over three-quarters (79%) of Study Area workers aged 16 and older travel to work via single occupancy vehicle (SOV). SOV commute characteristics are comparable to Galveston County (also 79%).

According to the Longitudinal Employer-Household Dynamics (LEHD) program from the U.S. Census Bureau, nearly 30 percent (30%) of Study Area residents commute less than 10 miles for work. Approximately 62 percent (62%) of workers living within the Study Area commute between 10 and 50 miles for work. *Map 4: Study Area Commuting Destinations*, shows where these residents are traveling for work.

Legend

- Study Area Boundary
- City Boundary
- 5 - 6 Jobs / Sq.Mi.
- 7 - 22 Jobs / Sq.Mi.
- 23 - 33 Jobs / Sq.Mi.

0 10 Miles N

Source(s): H-GAC, U.S. Census Bureau

EXISTING LAND USE

Using data retrieved from H-GAC, an analysis of existing land use was performed on parcels within the Study Area. This high-level review of the land use characteristics of the Study Area will help identify potential constraints and opportunities for future projects or development along the Cemetery Road corridor.

STUDY AREA LAND USE

As shown in *Table 1: Study Area Land Use*, there are 608 parcels totaling over 1,500 acres of land within the Study Area. As illustrated in *Map 5: Study Area Land Use*, the Study Area is mostly comprised of residential or vacant land uses. There are two educational facilities near the Study Area, Lobit Elementary and Lobit Middle School, signaling a potential need for improved pedestrian and bicyclist connectivity along Cemetery Road and FM 517.

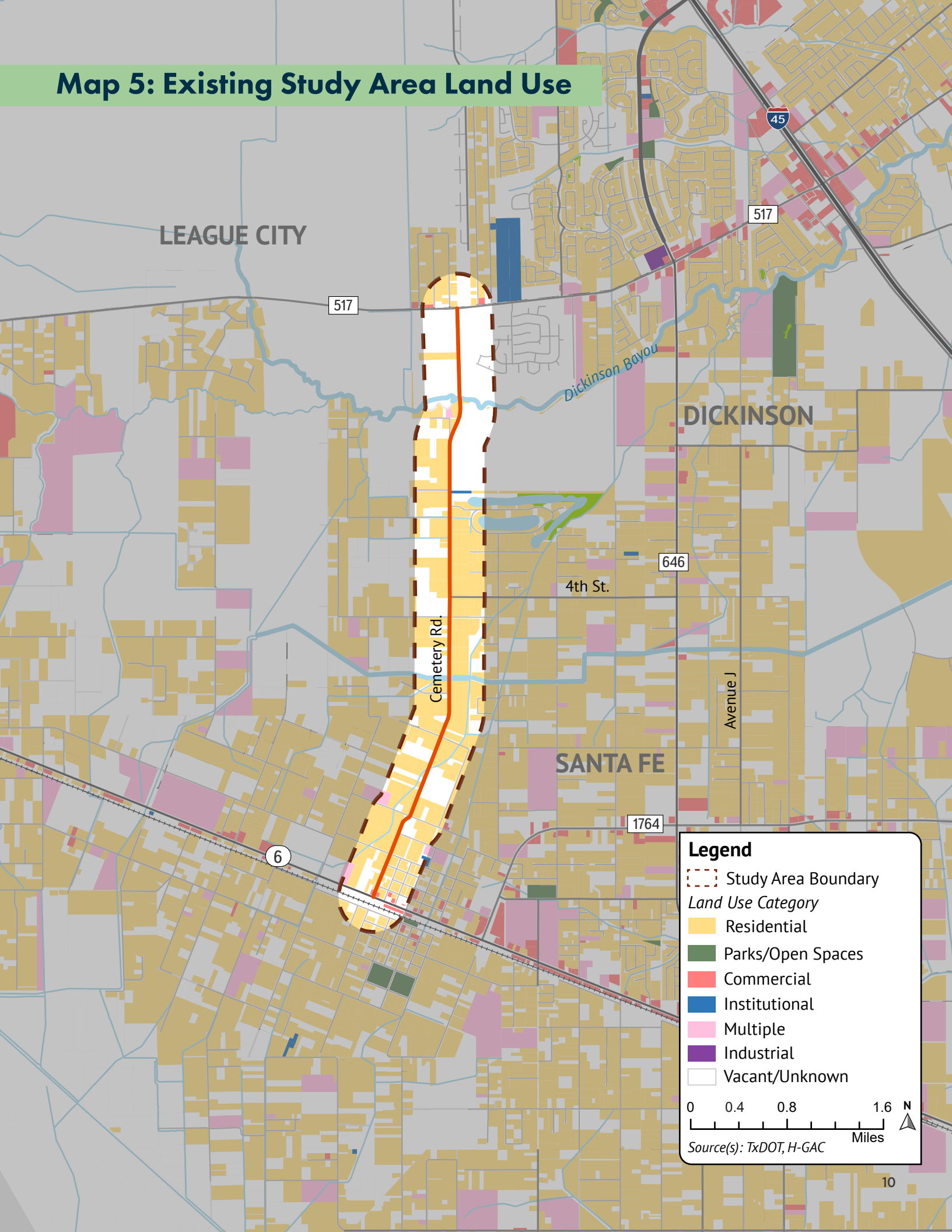
Residential land uses along the Cemetery Road corridor can be described as large lot single family homes. Vacant land uses within the Study Area are mostly used for agriculture. The presence of residential land uses along the corridor may present potential constraints for future roadway development due to coordination between private land owners and Galveston County.

Table 1: Study Area Land Use

Source(s):TxDOT and H-GAC

Land Use Type	Acreage	%
Parks / Open Space	0	0%
Commercial	5.34	0.35%
Government / Medical / Education	16.52	1.07%
Multiple	17.50	1.13%
Other	0.21	0.01%
Residential	963.78	62.31%
Undevelopable	42.37	2.74%
Unknown	37.53	2.42%
Vacant	463.58	29.97%
Total	1546.82	100.00%

Map 5: Existing Study Area Land Use



ENVIRONMENTAL REVIEW

Publicly available date was used to identify and analyze environmental constraints, including existing natural resources and potential environmental concerns, that could influence project design. The analysis performed included a high-level review of natural resource data including but not limited to aerial photography, floodplain mapping, U.S. Fish and Wildlife (USFWS) National Wetland Inventory (NWI), pipeline data, and other environmental quality resources.

WATER RESOURCES & DRAINAGE

Existing Drainage System

The current drainage system along Cemetery Road is open ditch drainage, which is typical for roadways in rural contexts or near flooding bodies of water like Dickinson Bayou.

Open ditch drainage is simply a hollowed out grassy area adjacent to the paved roadway, which allows stormwater to rise to the open-air top of the ditch and spill over onto the adjacent roadway and property. Gravity flowing the water away to other retention bodies, evaporation into the air, and absorption into the soil help these ditches fully drain. Excessive vegetative growth or trash build-up in open ditches can diminish the efficacy of their drainage, therefore requiring routine maintenance. If the right-of-way and cross-section design allows, open ditch drainage can provide a wide buffer between the roadway and walkways or bikeways, allowing multiple modes to safely use the corridor simultaneously.

Flooding Impacts

According to the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL), approximately one percent (1%) of the Study Area is located within the floodway, two percent (2%) is within the 100-year floodplain, and 12 percent is within the 500-year floodplain. Future project designs should consider the impacts associated with the floodplains so that all infrastructure within the floodplain can withstand occasional floods. Should federal funding or federal permitting be required for future designs, additional public review may be required for construction within the floodplain.

Dickinson Bayou, located in the Study Area, is a crucial waterway that stretches over 20 miles from its origin near Alvin to its confluence with Galveston Bay near San Leon. Several major tributaries feed into Dickinson Bayou throughout its 20 miles which include Gum Bayou, Benson Bayou, Magnolia (Geisler) Bayou, Bordens Gully, Cedar Creek, and LaFlore's Bayou, many of which pass through residential areas, providing backyard access to the bayou. The flooding of Dickinson Bayou along Cemetery Road is a recurring issue and is a major concern of the community.

Open Ditch drainage along Cemetery Road

Property Damage

- In 2017, Hurricane Harvey flooded nearly 80 percent of Dickinson, impacting around 7,000 structures. Homes were severely damaged, with many residents having to rebuild or elevate their properties to mitigate future flooding risk.
- In October 2018, several families in Santa Fe experienced flooding inside their homes, leading to damage to carpets, flooring, and personal belongings.
- Hurricane Beryl in July 2024 caused the bayou to overflow, flooding homes and submerging vehicles.

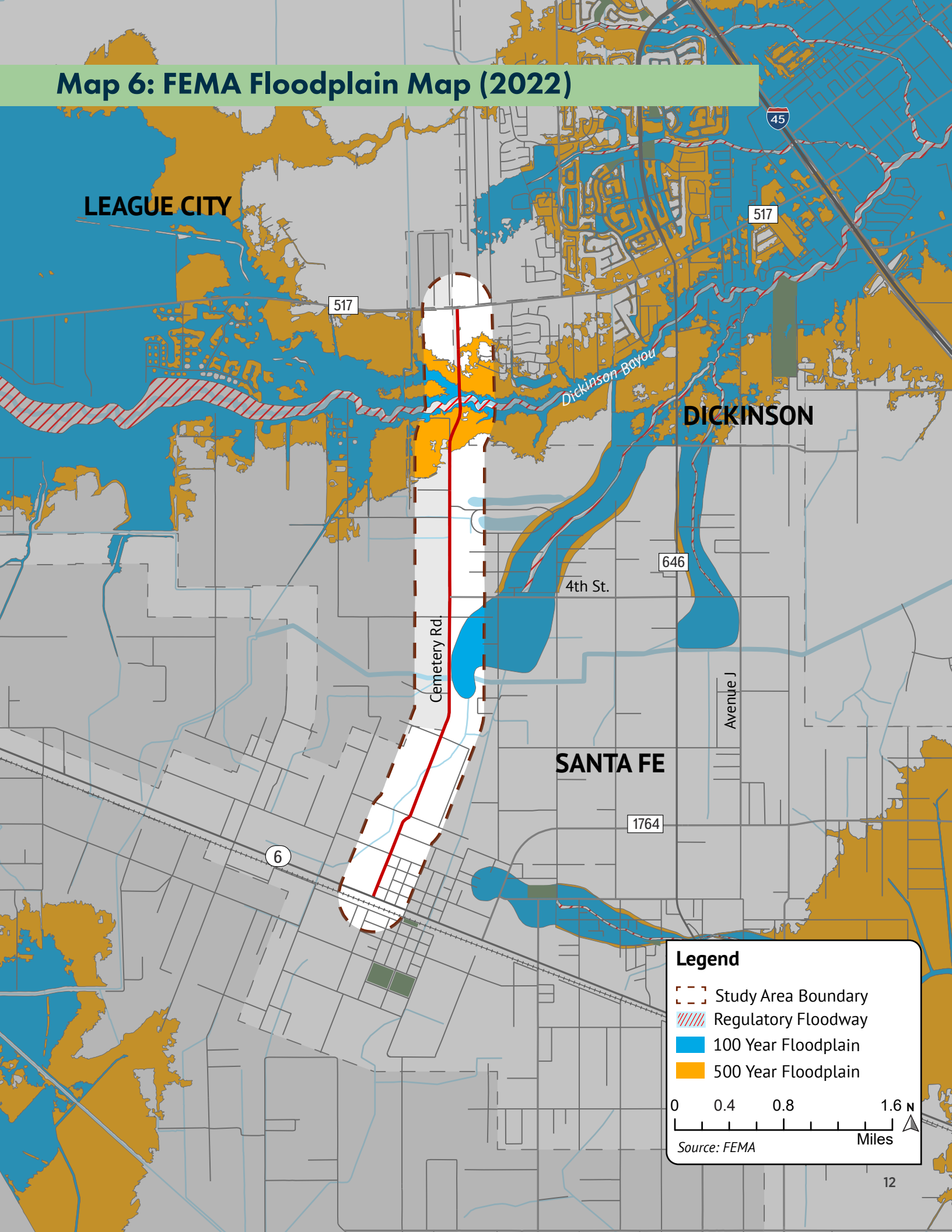
Traffic Interruptions

- Flooding often leads to road closures, making it difficult for residents to commute, stranding drivers, and causing significant traffic disruptions.
- FM 517 frequently experiences high water levels during heavy rains, leading to closures and traffic delays.

Other Impacts

- Flooding can lead to power outages as water levels rise and affect electrical systems. During Hurricane Beryl, firefighters had to cut power in some neighborhoods because electric boxes were underwater.
- Emergency services often have to intervene to assist stranded residents. Road closures can delay emergency services, further compromising the health and safety of residents.

Map 6: FEMA Floodplain Map (2022)



Incoming Development Impacts

New development involves the construction of roads, buildings, and parking lots, which are impervious surfaces. These surfaces prevent rainwater from naturally soaking into the ground, leading to increased surface runoff. This additional runoff can overwhelm existing drainage systems, causing them to fail and leading to localized flooding. Drainage systems that are older, in rural areas, or are open ditches are less likely to be regularly maintained, and therefore easily accumulate debris that exacerbates their lack of capacity. New development should account for stormwater impacts, however, long-term downstream impacts will need to be continuously monitored.

Addressing the impact of incoming development in the vicinity of Cemetery Road requires thoughtful regulation, investment in sustainable drainage systems, and the preservation of natural flood mitigation features. Galveston County, Drainage District #1, and the Cities of Dickinson and Santa Fe have developed Drainage Criteria Manuals and Stormwater Master Plans that provide a starting point for drainage improvements and long-term flooding mitigation.

Drainage outfall along Cemetery Road

FUTURE DEVELOPMENT

Increased development is likely to impact flooding and increase vehicular traffic along adjacent roadways. Additional Environmental Impact Analyses and Traffic Impact Analyses may be required to determine exact impacts as a result of new development.

Three Planned Unit Developments (PUDs) and several other developments are projected to be constructed around Cemetery Road within the next five to ten years, as illustrated in *Map 7: Incoming Developments*. The exact make-up of these developments is not known; however, since some of these are directly adjacent to Cemetery Road, they will likely have the greatest impact on the corridor in terms of drainage and traffic. The following briefly describes what is known about the PUDs at the time of this study.

Duncan Tract

The Duncan PUD is located in the western portion of League City and is bounded on the south by FM 517 and the north by the American Canal. It will have 3,621 lots. It is currently under construction, with approximately 55 percent built out at the time of this study.

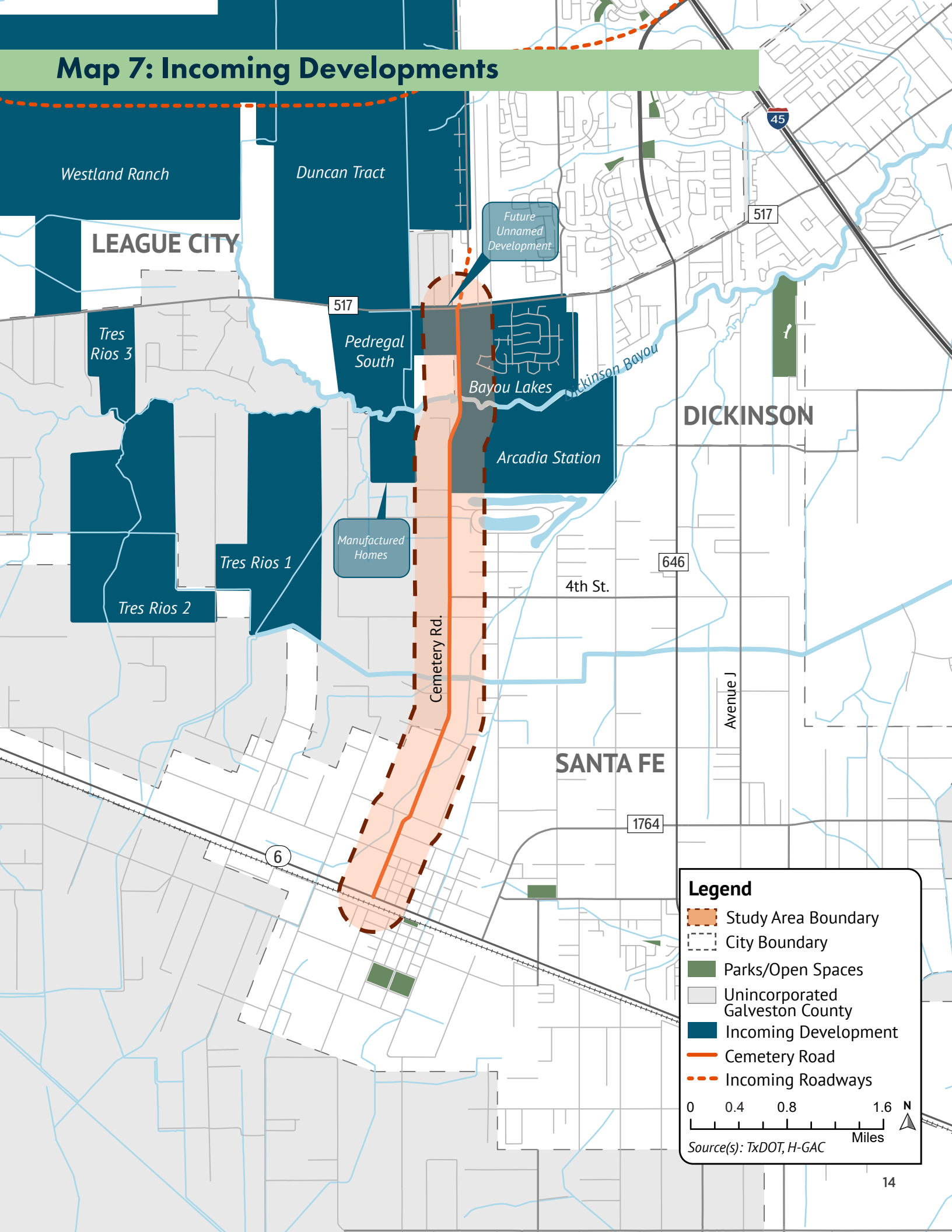
Westland Ranch

The Westland Ranch PUD is in the western portion of League City and is bounded on the north by the future Grand Parkway, the south by FM 517, the east by the Lloyd Tract PUD and the west by undeveloped acreage. It is currently under construction and approximately 40 percent built out. It will have 1,595 residential lots with a projected population of approximately 4,785 people at 2.9 individuals per household.

Tres Rios

The Tres Rios PUD is proposed on the south side of FM 517 in Galveston County. Full build of the proposed development will include a total of 2,800 single-family homes and 950 multi-family units and is expected to be completed in 2033. Access to the proposed site for Phase 1 and Phase 2 is provided via existing FM 517, and access to the proposed site for full build is provided via existing Jack Beaver Road, Tower Road, and proposed Bay Area Boulevard.

Map 7: Incoming Developments



NATURAL HABITATS

This desktop analysis identified 63 U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) features totaling approximately 39 acres. The NWI features consist of 13 acres of riverine features, 11 acres of freshwater forested/shrub wetlands, nine acres of ponds, five acres of lakes, and one acre of freshwater emergent wetlands. While these features should be verified by in-person observation to determine if they are present, many of these features may be considered Waters of the United States (WOTUS). Permit(s) from the United States Army Corps of Engineers (USACE) would be required for impacts to WOTUS.

CULTURAL RESOURCES

Based on a review of the Texas Historical Commission (THC) database, one historical marker and one cemetery are identified within the Study Area. Potential impacts to or near the historical marker or the cemetery may require coordination with the THC.

HAZARDOUS MATERIALS

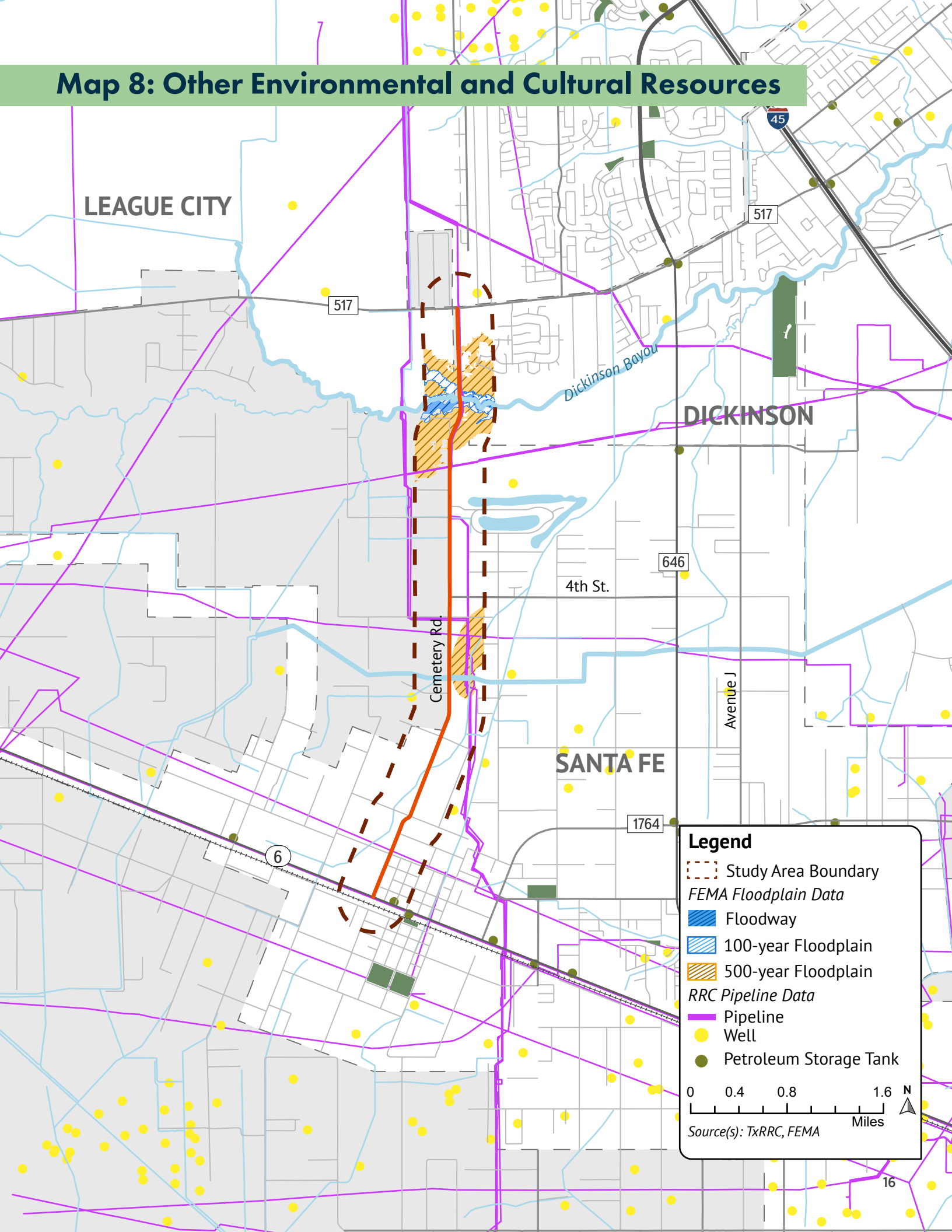
According to the Texas Commission on Environmental Quality (TCEQ) publicly available data, there are potential hazardous materials present in the Study Area. One Petroleum Storage Tank (PST) was identified in the Study Area and two Leaking Petroleum Storage Tanks (LPSTs) were identified within a half-mile. A Phase I Environmental Site Assessment (ESA) is recommended to determine if the PST, LPST, or other hazards in or around the Study Area may be considered a Recognized Environmental Condition (REC) that may then require a Phase II ESA for any potential roadway developments.

The Texas Railroad Commission (RRC) pipeline data identified 14 pipelines transecting the Study Area that transport a variety of chemicals including, but not limited to, natural gas, crude oil, and highly volatile liquid. Avoidance of these pipelines should be considered throughout the project design process.

One dry hole well is located within the Study Area. Dry hole wells are supposed to be plugged and abandoned, but may still have the potential to contaminate soils or groundwater.

Existing natural habitats, cultural resources, and hazardous materials are depicted in *Map 8: Other Environmental and Cultural Resources.*

Map 8: Other Environmental and Cultural Resources



MOBILITY

Cemetery Road serves as a integral mobility corridor in Galveston County and will become even more critical as the area rapidly develops. While the corridor is currently predominantly used for personal vehicle travel, there are opportunities for a variety of multi-modal mobility options, which include sidewalks and trails. Understanding how these various modes of travel may interact along Cemetery Road will help identify opportunities to enhance overall accessibility and connectivity within the community. The area is served by the Gulf Coast Transit District, however the corridor is outside of the rider zone and only served by micro-transit and not on fixed routes.

ROADWAY NETWORK

Existing Thoroughfares

Roads are classified according to the function they serve. Broadly speaking, roads of higher classifications – the highest being Interstate Highways – provide more mobility and limited access, serving long-distance travel; whereas those of lower classifications – the lowest being Local Streets – provide more access, less mobility, and serve short-distance travel.

Cemetery Road is functionally classified as a Major Collector and is 3.76 miles long. According to the TxDOT Roadway Inventory, the corridor has an Average Daily Traffic (ADT) volume between 2,359 and 2,859 vehicles per day as of 2022. ADT on Major Collectors ranges from 1,100 to 6,300 vehicles per day, so Cemetery Road currently experiences relatively low daily traffic for a major collector.

Cemetery Road intersects with 13 roadways between FM 517 to the north and SH 6 to the south. Most of these intersecting streets are classified as Local Streets, except for 4th Street, which is also classified as a Major Collector; FM 517, which is a Minor Arterial; and SH 6, which is a Principal Arterial. Additionally, 100 private driveways intersect Cemetery Road.

Cemetery Road is one of four north/south corridors in the area – the others being CR 142, Algoa-Friendswood Road, and FM 646 – between SH 35 and IH 45 that connect FM 517 and SH 6. These corridors provide north-south mobility for Alvin, Santa Fe, League City, and Dickinson. Algoa-Friendswood Road is a Major Collector like Cemetery Road, while CR 142 is a Local Street, and FM 646 is a Principal Arterial. In addition to FM 517 and SH 6, FM 1764 is a Minor Arterial that connects SH 6 to IH 45 and provides east-west connectivity in the area. *Map 9: Thoroughfare Functional Classifications*, illustrates the functional classifications of the existing and future thoroughfares in the vicinity of Cemetery Road. Per the Santa Fe Thoroughfare Plan, Cemetery/Scott Road will become a major arterial in the future.

Future Thoroughfares

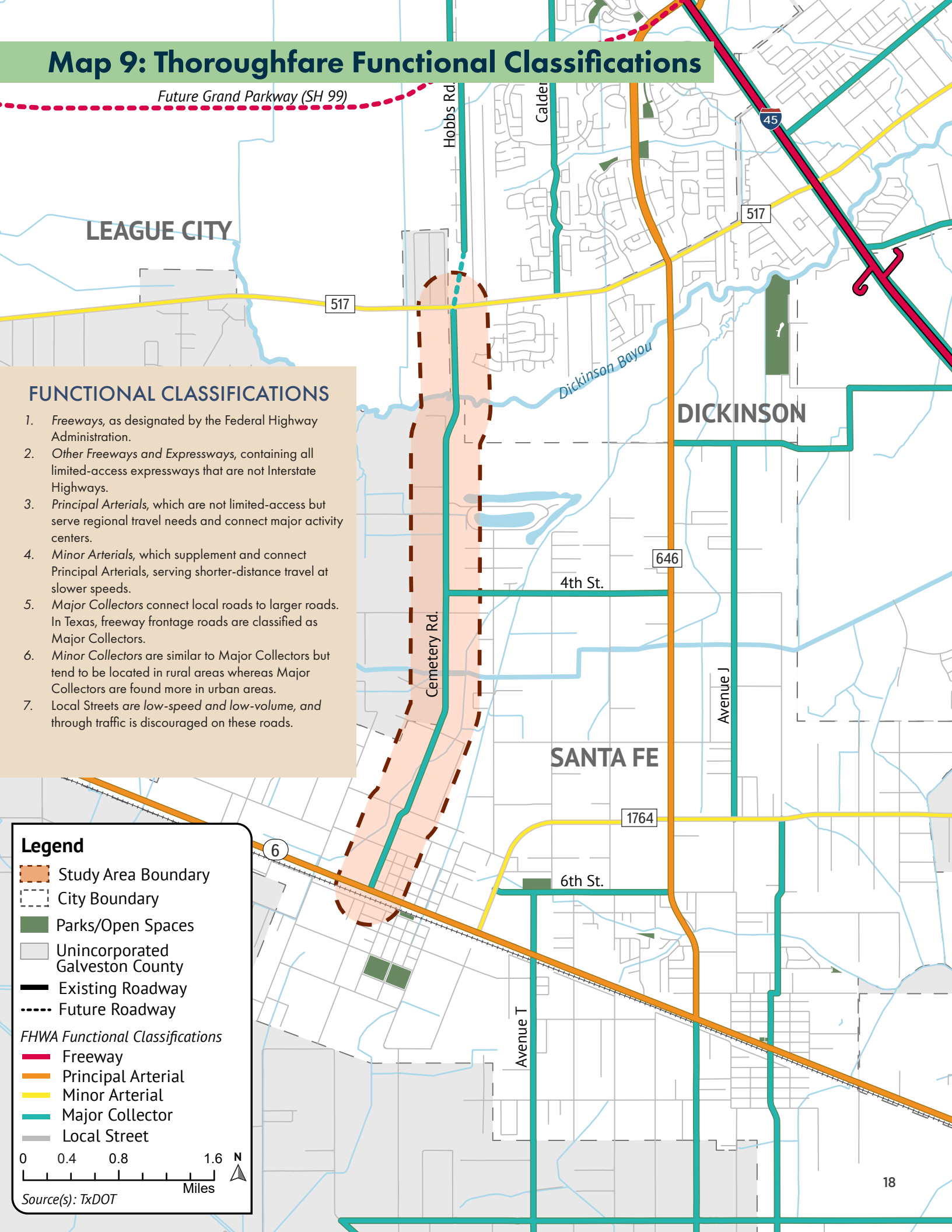
State Highway 99, also known as the Grand Parkway Toll Road, is under construction at the time of this study and will be the largest ring road around the Houston metropolitan area. Segment B of the Grand Parkway will be constructed north of Cemetery Road's current terminus, connecting FM 288 to IH 45S. In January 2024, the Texas Transportation Commission (TTC) assigned the rights to develop, finance, construct, and operate the portion of Segment B between IH 45S and FM 2403 to the Grand Parkway Transportation Corporation.

Current alignment schematics of Segment B shows full access connections (including on and off ramps as well as controlled intersections) to Maple Leaf Drive, Bay Area Boulevard, Landing Street, Calder Road, and FM 646. See Appendix A, Future Thoroughfares, for TxDOT's most current schematic of Segment B that is available at the time of this study.

All of the roads listed above with the exception of Calder Road have planned or proposed extensions from their existing termini in League City that will allow direct access to Grand Parkway. These extensions will improve the north-south connectivity in the area and will allow traffic along the Grand Parkway to easily disseminate into the cities of League City, Dickinson, and Santa Fe. These extensions may also alleviate traffic along the existing roadways which carry the traffic generated from surrounding existing and newly constructed neighborhoods.

In addition to those four extensions, League City is currently planning to extend Cemetery Road north past its current terminus at FM 517 to connect with Hobbs Road. The extension is approximately 2,750 feet long and will have a public right-of-way width of 100 feet. Hobbs Road is a Major Collector and currently extends north beyond the future Grand Parkway to connect with League City Parkway and Main Street. Although Hobbs Road is not currently planned to have direct access to the Grand Parkway, this extension will aid in distributing and alleviating the north-south traffic in the area. See Appendix A for League City's most current schematic of the Cemetery Road – Hobbs Road extension.

Map 9: Thoroughfare Functional Classifications



FUNCTIONAL CLASSIFICATIONS

1. *Freeways*, as designated by the Federal Highway Administration.
2. *Other Freeways and Expressways*, containing all limited-access expressways that are not Interstate Highways.
3. *Principal Arterials*, which are not limited-access but serve regional travel needs and connect major activity centers.
4. *Minor Arterials*, which supplement and connect Principal Arterials, serving shorter-distance travel at slower speeds.
5. *Major Collectors* connect local roads to larger roads. In Texas, freeway frontage roads are classified as Major Collectors.
6. *Minor Collectors* are similar to Major Collectors but tend to be located in rural areas whereas Major Collectors are found more in urban areas.
7. Local Streets *are low-speed and low-volume, and* through traffic is discouraged on these roads.

TRAFFIC

Growth Patterns

ADT volume data from TxDOT was gathered along and in the vicinity of Cemetery Road to gain an understanding of traffic growth patterns between 2016 and 2022. Additionally, 24-hour traffic volume data was collected at 11 intersections in the area on May 8, 2024, to provide the most up to date estimate of this data.

The compiled traffic volume dataset indicates that all major corridors in the area experienced a significant dip in traffic during the 2020 COVID-19 pandemic, so data from that year was removed to prevent it from skewing growth approximations. Daily traffic in 2021 and 2022 was still somewhat depressed; in fact, traffic along the majority of the corridors has not fully recovered to its pre-pandemic levels, but 2020 marked the lowest point.

The average annual traffic growth among the major corridors in the vicinity of Cemetery Road is 3.63 percent per year, while it is 4.05 percent per year along Cemetery Road alone. By 2045, with these baseline growth rates, traffic along Cemetery Road should reach between 4,445 and 7,024 vehicles per day. However, that does not account for potential traffic growth due to incoming developments and other land use changes that may push the performance capacity to unfavorable levels.

Roadway Capacity

Roadway capacity refers to the maximum number of vehicles that can pass through a specific segment of road under ideal conditions within a given period. It is a critical measure of how well a road network can accommodate traffic demands, balancing vehicle flow with safety and efficiency. Factors influencing capacity include functional classification and cross-sectional elements; signalized and unsignalized intersections or driveways; and the types of vehicles using the road.

Roadway performance is commonly evaluated using the ratio of traffic volume to roadway capacity, or the Volume-to-Capacity Ratio (V/C). By understanding the current performance of the roadway, planners can anticipate future demands and identify necessary upgrades to improve traffic flow and reduce congestion.

As a Major Collector with two undivided lanes, Cemetery Road currently has a capacity of 3,800 vehicles per hour. This puts the corridor's V/C at 0.03, which is considered to be safely below capacity. V/C during the PM peak hour is the same.

When the baseline growth rate is applied, Cemetery Road's peak hour V/C increases to 0.05. A V/C ratio above 0.85 is considered adequate, while a V/C ratio above 1.0 indicated excessive delays and queueing. Additional growth due to incoming development will continue to push the performance of the corridor.

ROADWAY VOLUME-TO-CAPACITY

A	**< 0.5** Minimal traffic; free-flowing conditions
B	**0.5 - 0.75** Stable and efficient flow with light traffic
C	**0.75 - 0.9** Increasing congestion, slowing speeds
D	**0.9 - 1.0** Heavily used road; significant congestion
E/F	**> 1.0** Over capacity; restricted flow; stop-and-go

Intersection Performance

There were 11 intersections identified as high-priority by the project team. Traffic data were collected and analyzed using the Synchro 11 traffic analysis software to calculate existing operational performance, reported in terms of Level-of-Service (LOS), which is a letter grade from A to F that describes the delay experienced per vehicle. LOS A-C represent free-flowing conditions, while LOS D-F represent stop-and-go traffic. *Map 10: Intersection Operational Performance,* illustrates the current LOS of the 11 priority intersections.

Detailed descriptions of the analysis methodology and results, as well as recommendations to improve the operational performance of these intersections can be found in Appendix B, Traffic Analysis.

INTERSECTION LEVEL-OF-SERVICE

A	Little to no delays; free-flow conditions
B	Light delays; few vehicles must stop for red light
C	Moderate delays; stable conditions
D	Congested; drivers experience more wait times
E	Heavy delays; long wait times and queues
F	Excessive delays; heavily disrupted traffic flow

Map 10: Intersection Operational Performance

Intersection not visible within map extents

Hobbs Rd & Ervin Street
AM: PM:
EX:

Cemetery Rd & FM 517
AM: PM:
EX:

FM 646 & FM 517
AM: PM:
EX:

Algoa-Friendswood Rd & FM 517
AM: PM:
EX:

Algoa-Friendswood Rd & SH 6
AM: PM:
EX:

Cemetery Rd & 4th Street
AM: PM:
EX:

Scott Ave / Cemetery Rd & 1st Street
AM: PM:
EX:

FM 1764 & FM 646
AM: PM:
EX:

FM 1764 & SH 6
AM: PM:
EX:

Scott Ave / Cemetery Rd & SH 6
AM: PM:
EX:

SH 6 & FM 646
AM: PM:
EX:

LEAGUE CITY
DICKINSON
SANTA FE
Dickinson Bayou
Cemetery Rd.
4th St.
Avenue J
Ave T
517
646
1764
6
45

Legend

- Study Area
- City Boundary
- Unincorporated Galveston County
- Bodies of Water
- Parks/Open Spaces
- Study Intersection

Intersection Level-of-Service Classifications

A B C D E F

Annotations:
AM / PM = Time of Day
EX = Existing Conditions

N

0 0.4 0.8 1.6
Miles

Traffic count data retrieved May 8, 2024

SAFETY ANALYSIS

Using data retrieved from the TxDOT Crash Records Information System (CRIS), vehicular crashes and crash hotspots were identified along Cemetery Road and other roadway segments within the Study Area. Data used in this analysis includes all vehicular crashes that have occurred between the years 2019 and 2023. The following illustrates crash statistics and potential trends in vehicular crashes within the Study Area.

STUDY AREA CRASHES

According to the CRIS data, 115 crashes occurred within the Study Area in 2019-2023. Of the total crashes that have occurred in the Study Area, 29 crashes occurred directly along Cemetery Road. As shown in *Map 11: Study Area Crashes,* the intersections of Cemetery Road at FM 517 and SH 6 are both crash hotspots, with 54 crashes along FM 517 and 29 crashes along SH 6 within the Study Area. Although Cemetery Road does not appear to have the most significant safety needs in the immediate area, this corridor does not exist in a vacuum, and as development continues in the area, the traffic patterns along Cemetery Road may change.

Top Contributing Factors

The top contributing factors for crashes within the Study Area between 2019 and 2023 include:

- Failed to Control Speed (33%)
- Driver Inattention (18%)
- Disregard to Stop Sign or Stop Light (4%)

Corridor & Intersection Crash Rates

Crash rates were calculated at both the corridor and intersection level to provide additional analysis and justification to the crash map. A crash rate is the number of crashes that occur at a given location compared to the traffic volume. *Table 3: 2023 Statewide Average Crash Rates,* identifies the statewide traffic crash rates by highway system and road type, per 100 million vehicle miles traveled (VMT), based on data provided by TxDOT.

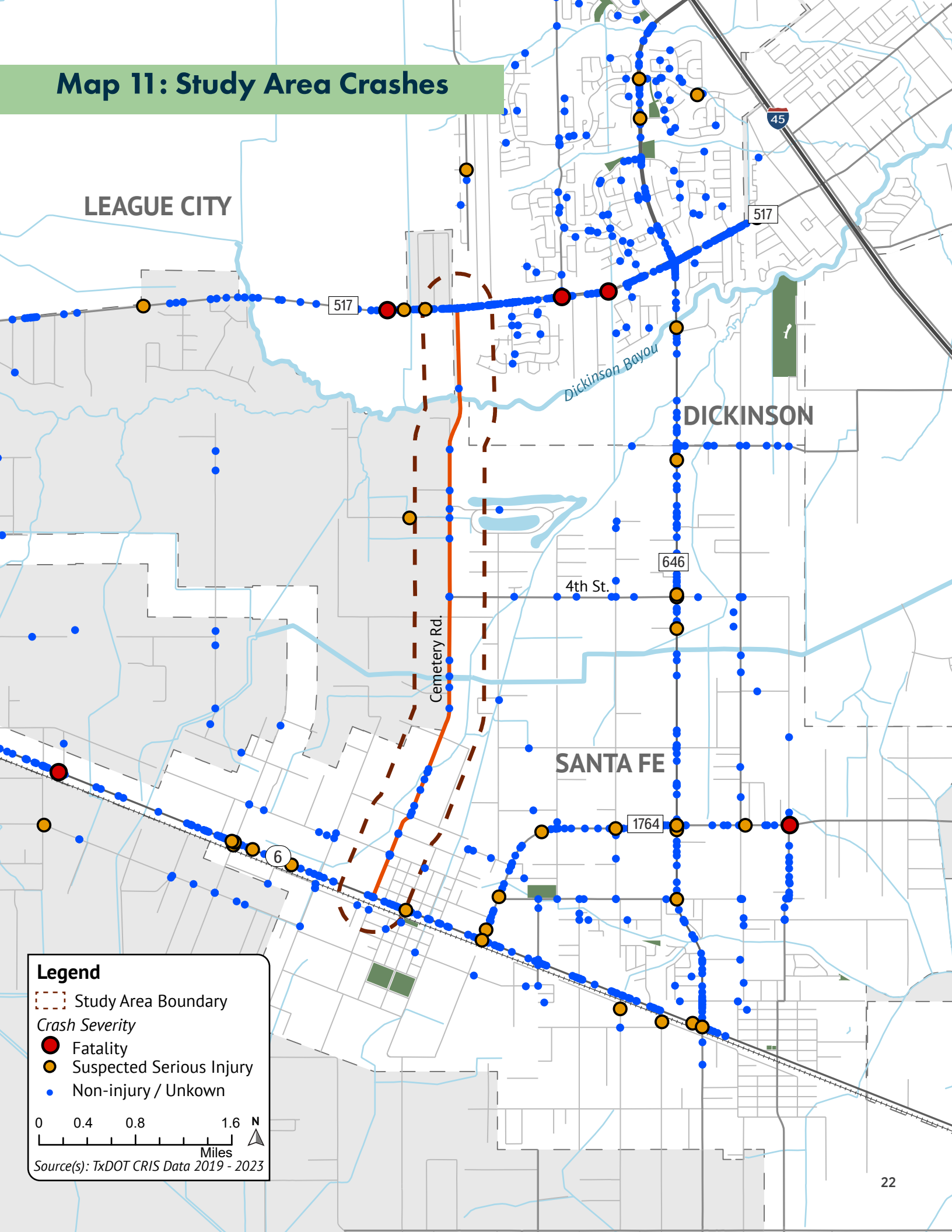
According to the CRIS data, the Cemetery Road corridor crash rate is 6.22 crashes per 100 million VMT. This crash rate is significantly lower than the Statewide Average for urban two-lane, two-way roadways in Texas (218.34).

Table 3: 2023 Statewide Average Crash Rates

Highway System	Traffic Crashes per 100 million Vehicle Miles		
	Rural	Urban	Study Corridors
Interstate	51.01	151.01	-
U.S. Highway	68.57	186.48	-
State Highway	90.82	219.88	91.34 (SH 6)
Farm-to-Market	117.10	258.51	103.82 (FM 517)
Road Type	**Traffic Crashes per 100 million Vehicle Miles**		
	Rural	Urban	Study Corridors
2 lane, 2 way	98.42	218.34	6.22 (Cemetery Rd) 103.82 (FM 517)
4 or more lanes, divided	56.00	163.41	91.34 (SH 6)
4 or more lanes, undivided	100.96	328.74	-

Source(s): TxDOT CRIS Data 2019-2023

Map 11: Study Area Crashes



EXISTING CONDITIONS CONCLUSION

In assessing the existing conditions along the Cemetery Road corridor, a variety of strengths and challenges were identified. While existing roadway capacity and intersection operations allow the corridor to function efficiently today, expected future growth in and around the Study Area due to incoming land use changes and thoroughfare construction will likely cause Cemetery Road's efficiency to decline in the future. The road is in good condition; the pavement is in good repair and it is well striped, however, there is no shoulder and there are open ditches. There is not currently any roadway lighting, which was frequently cited by residents. Currently, the roadway serves vehicular traffic well, but there is a lack of facilities for pedestrians and bicyclists, which reveals an opportunity for multi-modal improvements. Finally, it will be vital to monitor the environmental and right-of way limitations in light of foreseeable and unforeseeable growth.

Having established a comprehensive understanding of the existing conditions along Cemetery Road, the following chapter will explore the efforts undertaken to inform the community about these conditions and solicit their ideas and feedback on potential improvements. This engagement was pivotal in ensuring that the voices of all stakeholders were considered and in providing the project team with additional context for understanding the needs and desires of the community.

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CHAPTER 3 | Public Engagement

Chapter 3, Public Engagement, summarizes the various methods used to promote public participation in the planning process and inform community members of potential impacts related to the conceptual recommendations for Cemetery Road. Information regarding each meeting and engagement method, as well as key findings, are summarized in the following sections. Further details such as individual responses can be found in Appendix C, Public Engagement Results.

STEERING COMMITTEE MEETINGS

To ensure the Study was aligned with the needs and vision of the communities served by Cemetery Road, a steering committee was formed to assist the planning process by guiding project recommendations and providing operational and development insights to inform conceptual alternatives. The Cemetery Road Steering Committee included staff from the Galveston County, the cities of Santa Fe, League City, and Dickinson, as well as members of Galveston County Drainage District 1 and elected officials. The steering committee met twice during the planning process and both meetings are summarized below.

Committee Meeting #1

The first steering committee meeting was held June 17, 2024. The focus of this meeting was to provide committee members an overview of the planning process and gain local insights to issues or concerns along the corridor. Many committee members expressed concerns regarding incoming development and flood risk, as Dickinson Bayou is the main drainage outlet in the area. Other members noted the importance of increasing roadway capacity as development intensifies along Cemetery Road to provide adequate level-of-service and reduce future congestion along the road.

Committee Meeting #2

The second steering committee meeting was held January 15, 2025. The focus of this meeting was to provide committee members an update to the Study and present two preliminary concepts for the corridor alternatives. Committee members shared their thoughts of each concept and provided input related to potential impacts or concerns regarding the future development of the preferred concept. This meeting was held before the second community workshop to allow the Steering Committee a chance to preview the conceptual alternatives and propose changes based on their knowledge of development patterns in their communities. For more information on the conceptual alternatives, please reference Chapter 4, Alternatives.

Focus Group Meetings

Two focus group meetings were held in February 2025 to gain additional insight to concerns or issues along the corridor. The two focus groups were comprised of city public works and engineering staff, drainage district staff, school district personnel, and local residents. Focus group members were given the opportunity to view the conceptual alternatives and provide feedback before the second community workshop.

Steering committee members reviewing conceptual alternatives at steering committee meeting #2.

Community Pop-up Event

To gather additional feedback after the first open house, the project team attended the Arcadia Christian Church Fall Fest on October 12, 2024. The project team hosted an informational booth and invited festival attendees to provide input on the existing conditions of the corridor and opportunities for improvements. While most attendees lived in areas outside the Study Area, many travel along Cemetery Road to access SH 6 or FM 517 and were able to provide thoughtful input on the corridor.

COMMUNITY OPEN HOUSES

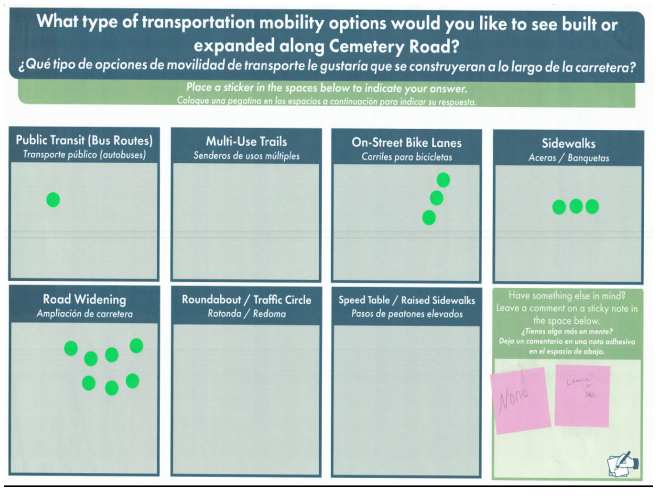
Meeting with the community, especially those who live along Cemetery Road and would be directly impacted by new development, was a key priority to ensure project recommendations aligned with community desires. Residents and other community members were given two opportunities to meet with H-GAC and Galveston County staff as well as other members of the project team. Postcards mailed directly to the residents along Cemetery Road, as well as yard signs and flyers distributed at key destinations in the area, spread the word about these workshops. Key takeaways from the events are summarized below.

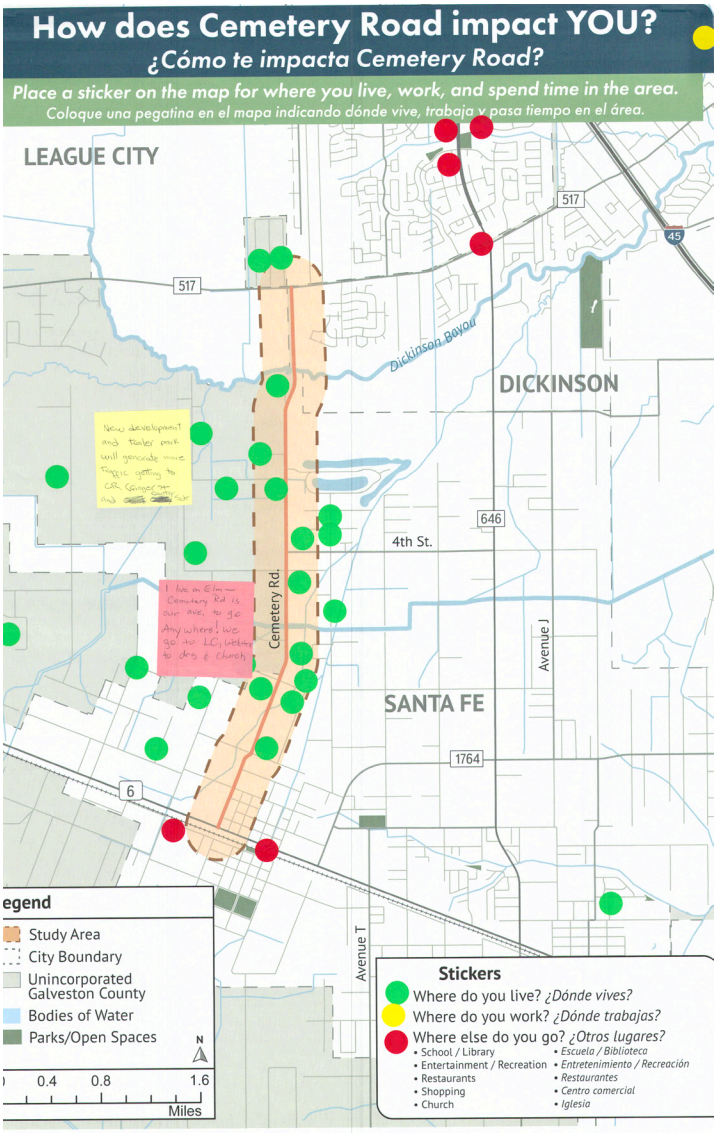
Open House #1

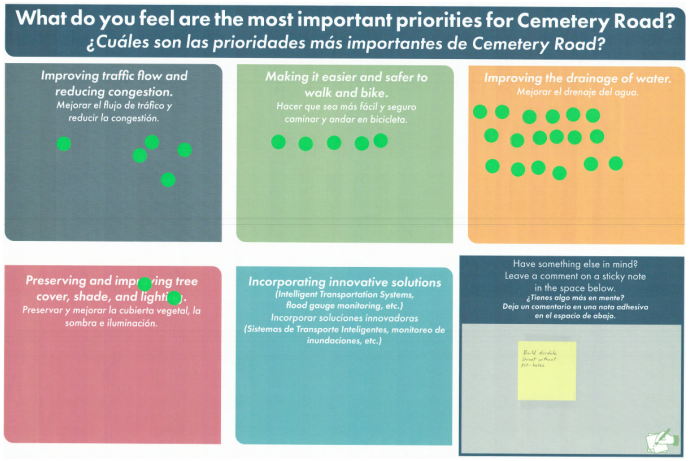
The first open house for the Study was held August 22, 2024, at the Runge Park Community Center. The main purpose of this event was to gather feedback regarding desired improvements or known issues from community members who live or travel along Cemetery Road.

Many of the attendees live along Cemetery Road or nearby streets and rely on it to access destinations like League City and Webster. Similar to the Steering Committee, some participants expressed concerns about the potential impact of new residential development near Cemetery Road on traffic congestion. As a result, opinions varied: some supported widening the corridor to accommodate future traffic, while others preferred keeping the road as-is to preserve its rural character.

Other key themes from the first open house included concerns about flooding and drainage, as many attendees pointed out that areas south of Carolyn Street often flood during heavy rain events, and also speculation surrounding the use of eminent domain to acquire right-of-way for roadway expansion.







Open House #2

The second open house was held March 25, 2025, at the Runge Park Community Center. The focus of this meeting was to present and gather feedback on three conceptual design alternatives for the Cemetery Road corridor.

Participants were asked to provide comments on roll plot layouts of each conceptual alternative and complete a six question comment card regarding their preferences. Many of the attendees live along Cemetery Road and expressed similar concerns shared at the first public meeting, including unwillingness to give up land for right-of-way acquisition, drainage and flooding concerns, and property access concerns.

A total of 44 comment cards were submitted at the end of the meeting, with half of the responses being in favor of no changes to the corridor. The results of the comment cards are summarized in *Figure 4: Conceptual Alternative Preferences*. While many participants were not in favor of the proposed conceptual alternatives, other participants noted the need for minor improvements to the road, including roadway lighting and drainage improvements. Of the three alternatives presented, Alternative A was preferred by 26 percent (26%) of respondents.

Overall, community members did not appear to be in favor of changes to Cemetery Road but some recognized that future development around the area will put a strain on the roadway network and potentially require Cemetery Road to be expanded to three or four lanes.

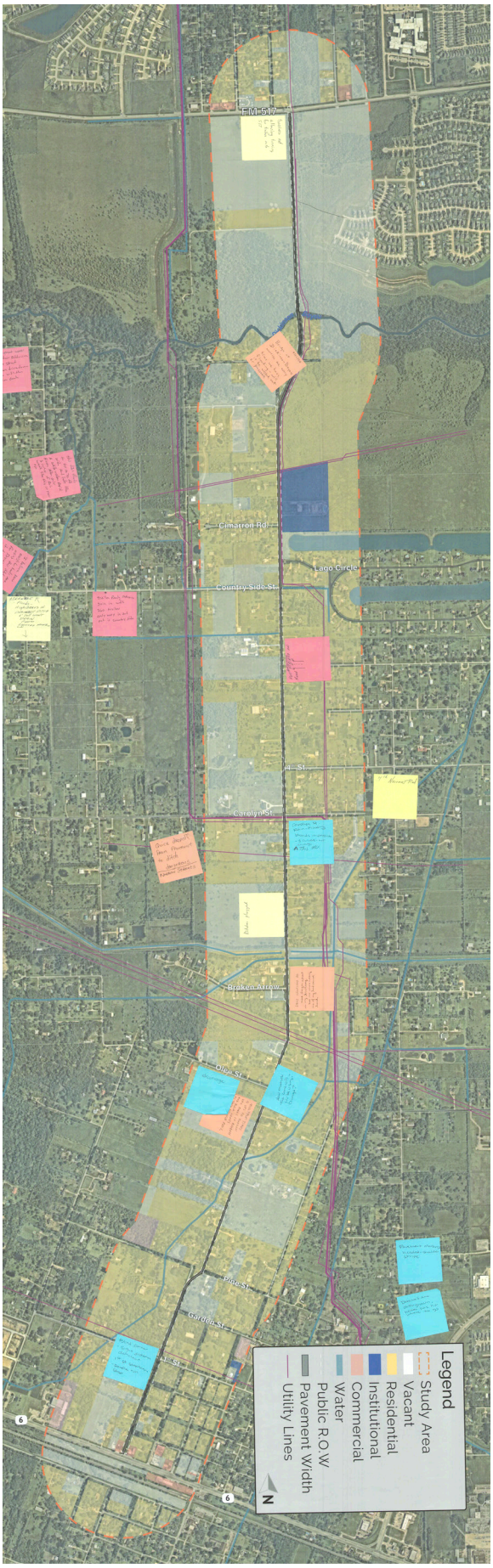
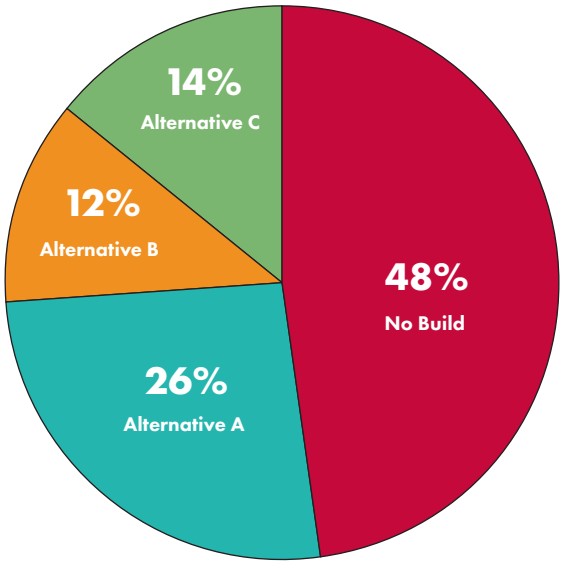


Figure 4: Conceptual Alternative Preferences



PUBLIC ENGAGEMENT CONCLUSION

Common themes identified from the engagement process include:

- **ROW Acquisition** - Many residents and community members expressed concern regarding the potential loss of land due to roadway expansion.
- **Drainage Issues** - Residents noted existing drainage problems along the corridor that may worsen with new development.
- **Traffic Alleviation** - Some residents felt as though traffic along the corridor will worsen as development occurs and note added capacity may help alleviate congestion.
- **Minor Improvements Needed** - Many community members agreed the corridor could benefit from minor improvements, such as street lighting or speed limit enforcement.

These strengths and challenges informed the development of design alternatives for the corridor in partnership with H-GAC, Galveston County, and local stakeholders. These alternatives illuminate potential approaches for ensuring that Cemetery Road evolves to meet the mobility needs of the community, enhance safety and resilience, and support growth in a sustainable manner.

Community members reviewing conceptual alternatives at Open House #2

Community members reviewing incoming development around the Study Area

CHAPTER 4 | Alternatives Analysis

Findings from the existing conditions assessment and public engagement efforts resulted in the creation of three conceptual design alternatives for Cemetery Road. These conceptual designs represent potential configurations of the corridor, including the number and width of lanes, facilities for pedestrians and cyclists, amount of dedicated Right-of-Way, and drainage utilities. In this chapter, the conceptual alternatives are presented, analyzed, and compared, serving as a roadmap for decision makers to prioritize future improvements to Cemetery Road.

ALTERNATIVES DEVELOPMENT

Two conceptual design alternatives for Cemetery Road - Alternatives A and B - were initially developed in response to the challenges and opportunities identified in the existing conditions assessment. These alternatives also incorporated the ideas and opinions expressed during the first Steering Committee meeting, ensuring that key stakeholder insights were incorporated in the designs. At Open House #1, these alternatives were presented to the public alongside key findings from the existing conditions assessment, providing a comprehensive overview of the study's starting point.

Following Open House #1, the alternatives underwent further refinement based on feedback received during the second Steering Committee meeting and the focus group meetings. These sessions provided valuable feedback and allowed for a deeper exploration of community preferences and concerns. It was during the focus group meetings that the idea for a third conceptual design alternative - Alternative C - emerged, showcasing the evolving and collaborative nature of this study.

Finally, the three refined alternatives - A, B, and C - were presented at Open House #2. This event aimed to gauge community preferences and inform the alternatives evaluation. The presentation of these alternatives at Open House #2 marked a significant milestone in the study, showcasing the evolution of the designs and ongoing commitment to the community's needs.

On the following pages, the No Build, or existing, configuration of Cemetery Road as well as the three conceptual design alternatives are presented and described in detail. As discussed in Chapter 3, Public Engagement, the No Build configuration was the most highly favored of the four by participating members of the community throughout this study. While the No Build configuration is not up for consideration for future design, it serves as a helpful baseline for evaluating and comparing the three conceptual alternatives.

Open House #2 attendees providing comments on conceptual alternatives for the Cemetery Road corridor

NO BUILD

Roadway Features

The Cemetery Road corridor currently has one 11-foot lane for exclusively vehicular travel in each direction, with no shoulders, curbs, or sidewalks, making the total pavement width 22 feet. The public ROW width along the corridor varies from 44 feet to 95 feet. There are currently no facilities for pedestrians or cyclists along the corridor. *Figure 5: No Build Cross-Section* illustrates the current cross-section of Cemetery Road.

Drainage

The current drainage system along Cemetery Road is open ditch, which is typical for roadways in rural contexts or near flooding bodies of water like Dickinson Bayou. During a typical 100-year flooding event, the area around Cemetery Road experiences approximately 1.5 feet of rainfall over 24 hours, resulting in 16.3 acre-feet of stormwater runoff.

Flooding is already a prevalent concern for residents and business owners in the area, and incoming developments may increase stormwater runoff due to increased impervious cover. Therefore, the open ditch drainage system along Cemetery Road is insufficient to handle the drainage demands of the surrounding area.

Traffic and Future Level-of-Service

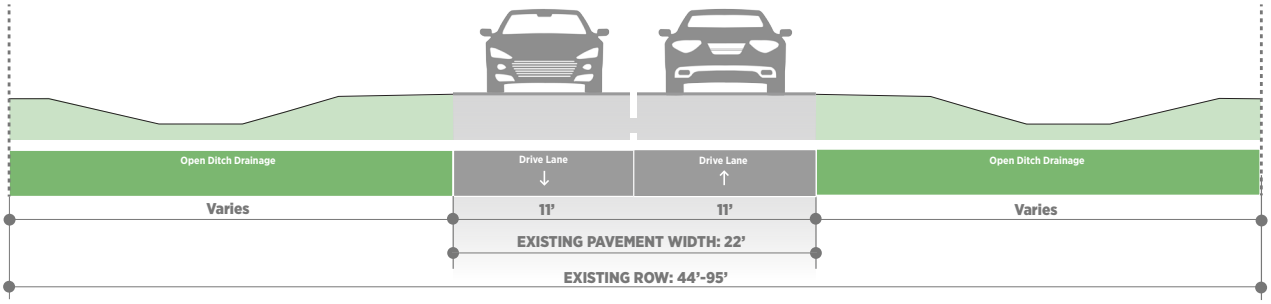
As discussed in Chapter 2, Existing Conditions, traffic in the vicinity of Cemetery Road has a baseline growth rate between 3.63 and 4.05% per year, putting average daily traffic along the corridor up to 7,024 vehicles per day. However, when considering the additional traffic generated by incoming developments, approximately 13,075 vehicles are expected to traverse the corridor on an average day in 2045.

The volume-to-capacity ratio (V/C) in the PM peak is expected to reach 0.681 in 2045, as a weighted average across all segments along the corridor, which is still considered stable and efficient traffic flow. If annual growth remains consistent until year 2057, the No Build configuration of Cemetery Road will reach a V/C of 0.9, which is considered significant congestion. To summarize, if Cemetery Road remains in its existing configuration, traffic level-of-service is expected to deteriorate, and the corridor would no longer be able to sufficiently serve traffic demand in 18-32 years.

Public Perception

As discussed in Chapter 3, Public Engagement, survey respondents, open house participants, and key stakeholders agree that the existing configuration is insufficient in terms of safety and drainage control and future development around the area will put a strain on the corridor in terms of traffic. However, there is also a prevailing concern about how reconstructing the corridor might impact private property and disrupt the rural small town culture. At Open House #2, 20 participants (48%) indicated in an end-of-study survey that they would prefer Cemetery Road remain as-is rather than adopt one of the conceptual alternatives.

Figure 5: No Build Cross-Section



CONCEPTUAL ALTERNATIVE A

Roadway Features

Alternative A is a three-lane concept for the full length of Cemetery Road from SH 6 to FM 517 with a 14-foot center turn lane. This alternative includes a 10-foot shared use path along the west side of the roadway from SH 6 to Countryside Street where it transitions via a protected crossing to the east side of the street to FM 517. There will be a five-foot sidewalk on both sides where the shared use path is not located.

A continuous center turn lane would allow for turning vehicles to clear the way for other vehicles to continue driving straight, allowing traffic to flow freely. However, this lane can also create unsafe conditions in which drivers "play chicken," providing a potentially dangerous head-on conflict where drivers are uncertain of who has the right of way.

Expanding Cemetery Road from the No Build configuration to the Alternative A cross-section would add 1.13 acres of public ROW and result in impacts to 62 privately-owned parcels along the corridor. Alternative A would cost on the order of $21 million to construct, which includes electrical work, signage and striping, curb and gutter drainage, and detention ponds.

Drainage

The proposed drainage system along Cemetery Road for Alternative A is curb and gutter. Curb and gutter constitutes a large concrete pipe buried under the ground adjacent to the roadway, sometimes under the sidewalk and/or bikeway or under the median if there is one. This can allow for a reduced cross-section width, with greater potential to add landscaping or facilities for pedestrians and cyclists.

Because it is underground and surrounded by concrete, a curb and gutter system conveys stormwater to a discharge point elsewhere, rather than allowing the water to evaporate into the air or be absorbed by the soil. As opposed to open ditch drainage, which requires routine maintenance to prevent debris and vegetative accumulation, curb and gutter drainage provides less labor-intensive aesthetic appeal.

This type of drainage system has a more constrained capacity, which can only be increased by excavating the pipe and installing a larger one. When appropriately sized for extreme flooding scenarios, a curb and gutter system prevents water from rising onto the roadway pavement, which could otherwise precipitate closures or vehicle stalling. However, it is imperative that the drainage needs of the surrounding areas are fully investigated so that the appropriate drainage system is selected.

Due to the additional impervious cover from the expanded cross-section, Alternative A would result in 22.41 acre-feet of stormwater runoff during a typical 100-year flooding event, 6.09 more acre-feet than in the No Build configuration. To accommodate this stormwater runoff, it would cost approximately $430,000 to construct appropriately-sized detention ponds.

Traffic and Future Level-of-Service

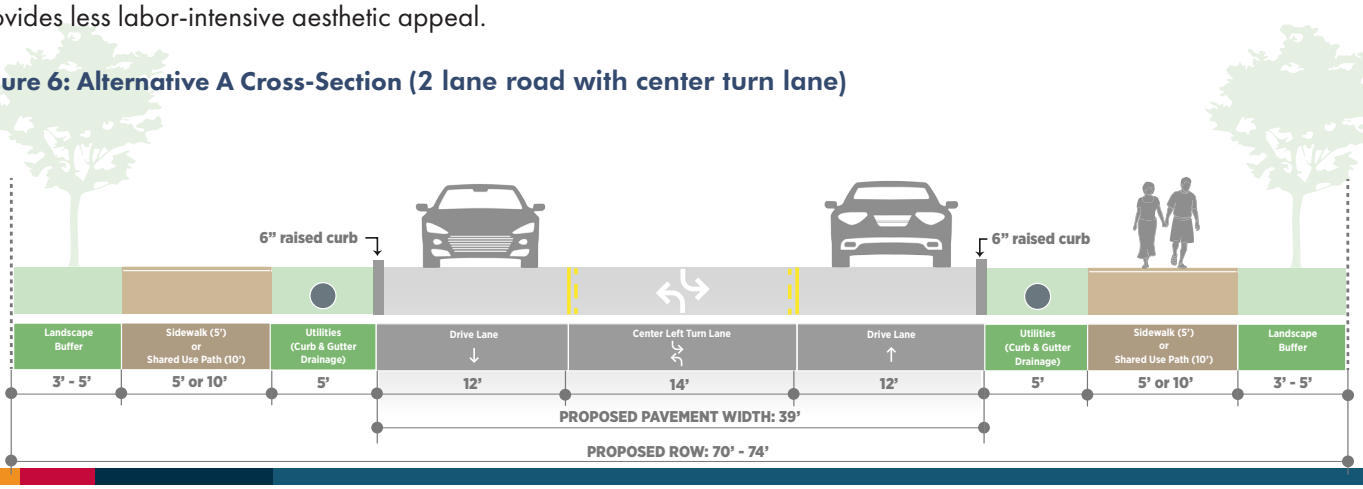
By implementing Alternative A, traffic conditions are expected to deteriorate slightly: the volume-to-capacity ratio (V/C) would be 0.683 in year 2045, a 0.3% increase compared to the No Build V/C. If annual growth remains consistent, the Alternative A configuration of Cemetery Road will reach a V/C of 0.9, which is considered significant congestion, around year 2057. To summarize, if Alternative A is implemented, Cemetery Road would no longer be able to serve traffic demand within 13-32 years.

Public Perception

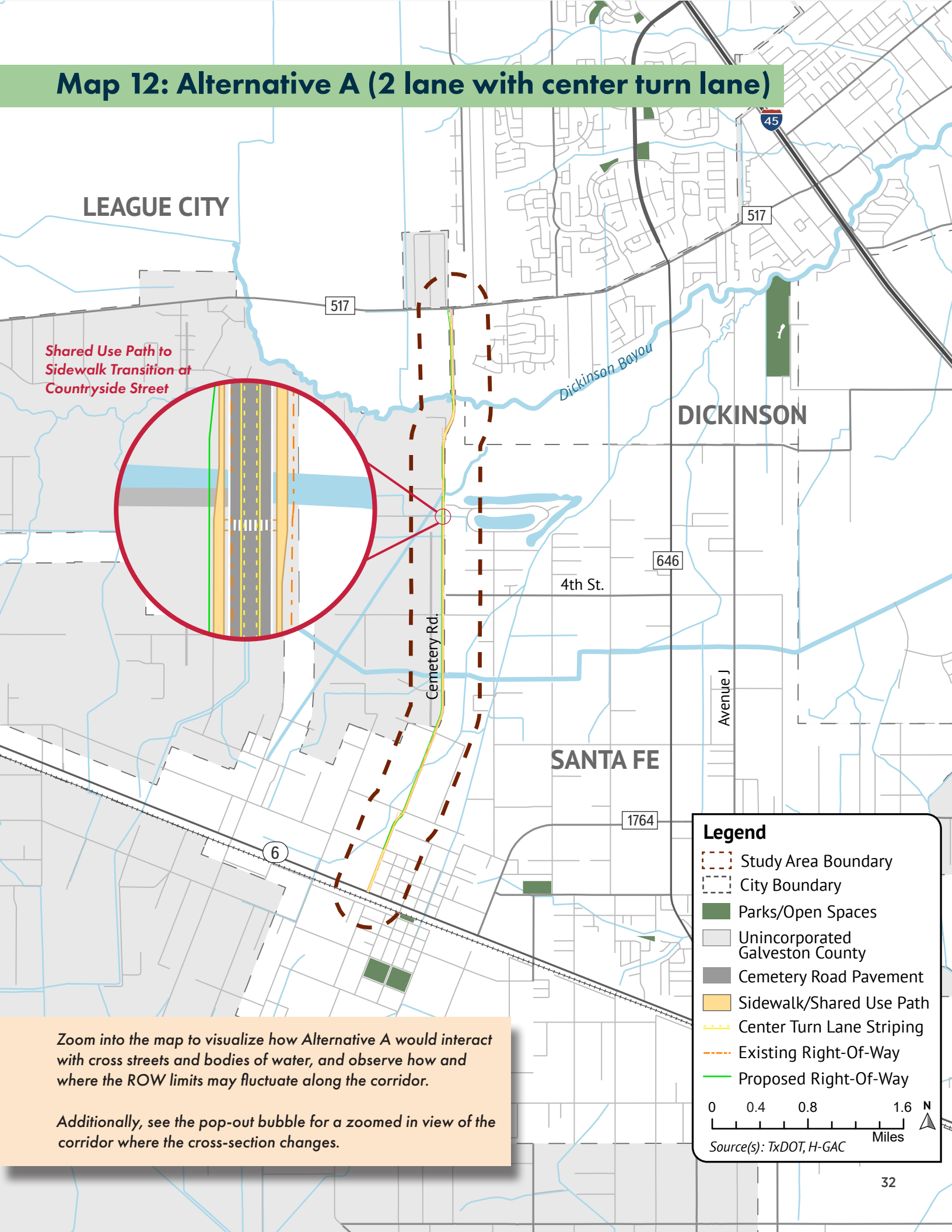
At Open House #2, 11 participants (26%) indicated in an end-of-study survey that they would prefer Alternative A to the other conceptual alternatives and the No Build configuration. This is likely due to the strong desire to minimize impacts to drainage, private property, and local culture.

Figure 6: Alternative A Cross-Section illustrates this design for Cemetery Road, and *Map 12: Alternative A* illustrates how it will fit into the context of the Cemetery Road corridor.

Figure 6: Alternative A Cross-Section (2 lane road with center turn lane)



Map 12: Alternative A (2 lane with center turn lane)



Zoom into the map to visualize how Alternative A would interact with cross streets and bodies of water, and observe how and where the ROW limits may fluctuate along the corridor.

Additionally, see the pop-out bubble for a zoomed in view of the corridor where the cross-section changes.

CONCEPTUAL ALTERNATIVE B

Roadway Features

Alternative B is a four-lane concept for the full length of Cemetery Road from SH 6 to FM 517 with a 14-foot center turn lane and raised median. As with Alternative A, this concept includes a 10-foot shared use path along the west side of the roadway from SH 6 to Countryside Street where it transitions via a protected crossing to the east side of the street to FM 517. There will be a five-foot sidewalk on both sides where the shared use path is not located.

Expanding Cemetery Road from its existing configuration would add 2.55 acres of public ROW and result in impacts to 81 privately-owned parcels along the corridor. Alternative B would cost on the order of $30 million to construct, which includes electrical work, signage and striping, curb and gutter drainage, and detention ponds.

Drainage

The proposed drainage system along Cemetery Road for Alternative B is curb and gutter. Due to the additional impervious cover from the expanded cross-section, Alternative B would result in 38.27 acre-feet of stormwater runoff during a typical 100-year flooding event, 21.94 more acre-feet than in the No Build configuration. To accommodate this stormwater runoff, it would cost approximately $670,000 to construct appropriately-sized detention ponds.

Traffic and Future Level-of-Service

By implementing Alternative B, traffic conditions are expected to improve along the entire corridor. The V/C in the PM peak is expected to be 0.45 in 2045, as a weighted average across all segments along the corridor, which is an improvement of 34 percent (34%).

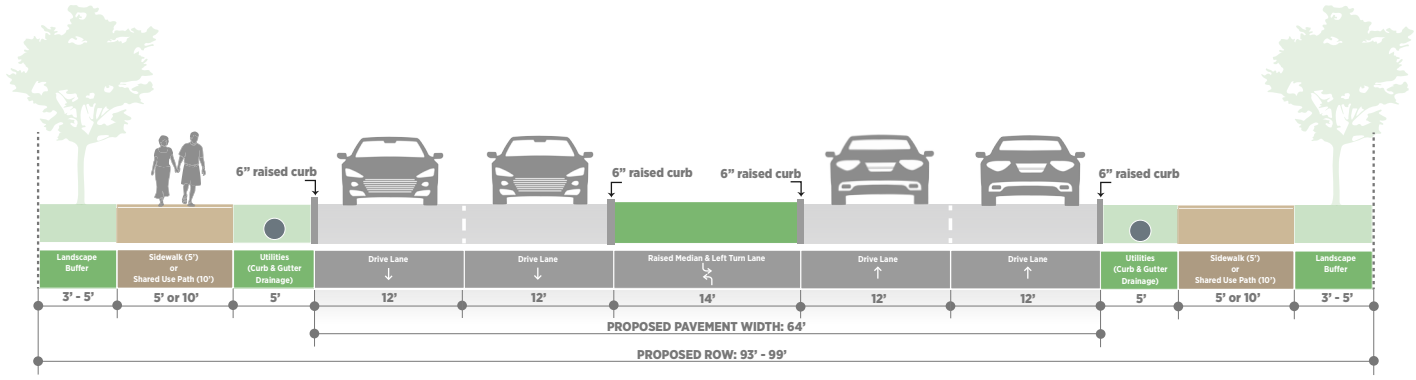
If annual growth remains consistent, the Alternative B configuration of Cemetery Road will reach a V/C of 0.9, which is considered significant congestion, around year 2072. If Alternative B is implemented, Cemetery Road would no longer be able to serve traffic demand within 23-47 years.

Public Perception

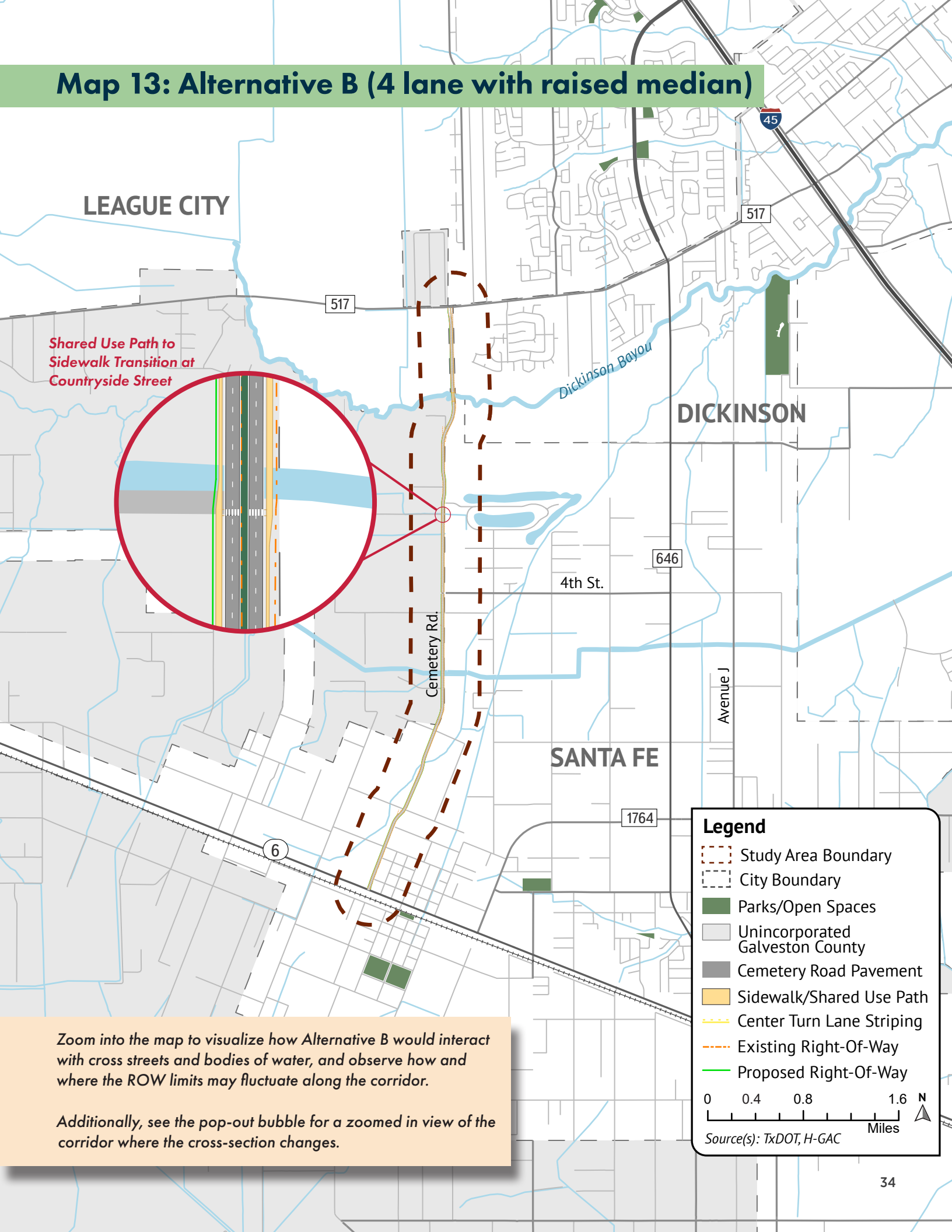
Although Alternative B would improve traffic and safety conditions along the Cemetery Road corridor, it appears to be the least popular conceptual alternative among participating members of the public because it will have the greatest impacts to drainage and private property. At Open House #2, only 5 participants (12%) indicated in an end-of-study survey that they would prefer Alternative B to the other conceptual alternatives and the No Build configuration.

Figure 7: Alternative B Cross-Section illustrates this design for Cemetery Road, and *Map 13: Alternative B* illustrates how it will fit into the context of the Cemetery Road corridor.

Figure 7: Alternative B Cross-Section (4 lane road with raised median and left-turn bays)



Map 13: Alternative B (4 lane with raised median)



Zoom into the map to visualize how Alternative B would interact with cross streets and bodies of water, and observe how and where the ROW limits may fluctuate along the corridor.

Additionally, see the pop-out bubble for a zoomed in view of the corridor where the cross-section changes.

CONCEPTUAL ALTERNATIVE C

Roadway Features

Alternative C is a three-lane concept (identical to Alternative A) from SH 6 to Carolyn Street where it transitions to a four-lane concept from Carolyn Street to FM 517 (identical to Alternative B). The four-lane concept contains two 12-foot lanes and a raised 14-foot continuous median. As with both Alternatives A and B, this configuration includes a 10-foot shared use path along the west side of the roadway from SH 6 to Countryside Street where it transitions via a protected crossing to the east side of the street to FM 517. There will be a five-foot sidewalk on both sides where the shared use path is not located.

Expanding Cemetery Road from its existing configuration would add 1.83 acres of public ROW and result in impacts to 69 privately-owned parcels along the corridor. Alternative C would cost on the order of $25 million to construct, which includes electrical work, signage and striping, curb and gutter drainage, and detention ponds.

Drainage

The proposed drainage system along Cemetery Road for Alternative C is curb and gutter drainage. Due to the additional impervious cover from the expanded cross-section, Alternative C would result in 38.27 acre-feet of stormwater runoff during a typical 100-year flooding event, 13.79 more acre-feet than in the No Build configuration. To accommodate this stormwater runoff, it would cost approximately $537,000 to construct appropriately-sized detention ponds.

Traffic and Future Level-of-Service

By implementing Alternative C, traffic conditions are expected to improve slightly along the entire corridor. The V/C in the PM peak is expected to be 0.56 in 2045, as a weighted average across all segments along the corridor. The weighted average V/C of the corridor would improve by 18 percent (18%).

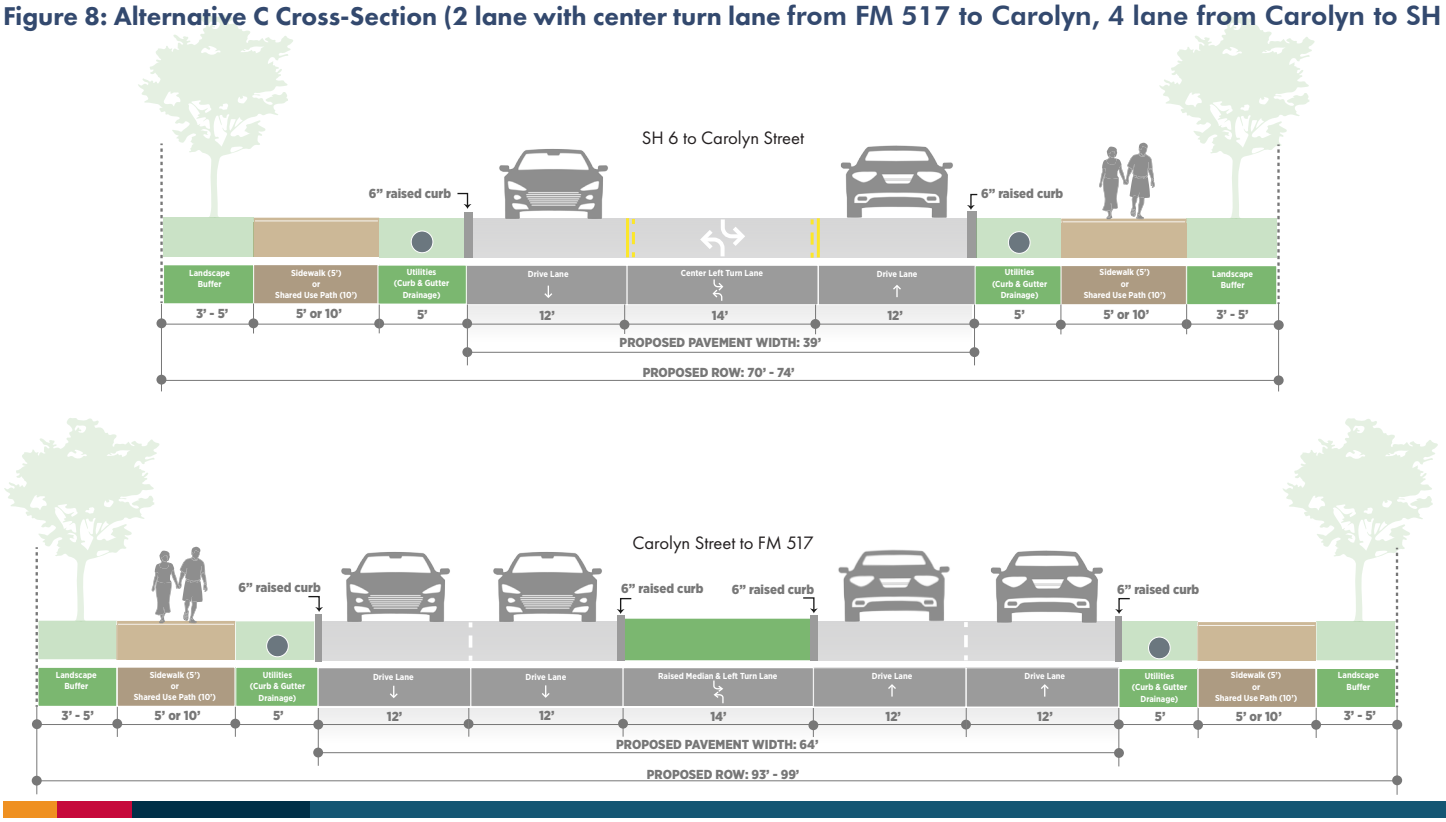
If annual growth remains consistent, the Alternative C configuration of Cemetery Road will reach a V/C of 0.9, which is considered significant congestion, around year 2065. If Alternative C is implemented, Cemetery Road would no longer be able to serve traffic demand in 23-40 years.

Public Perception

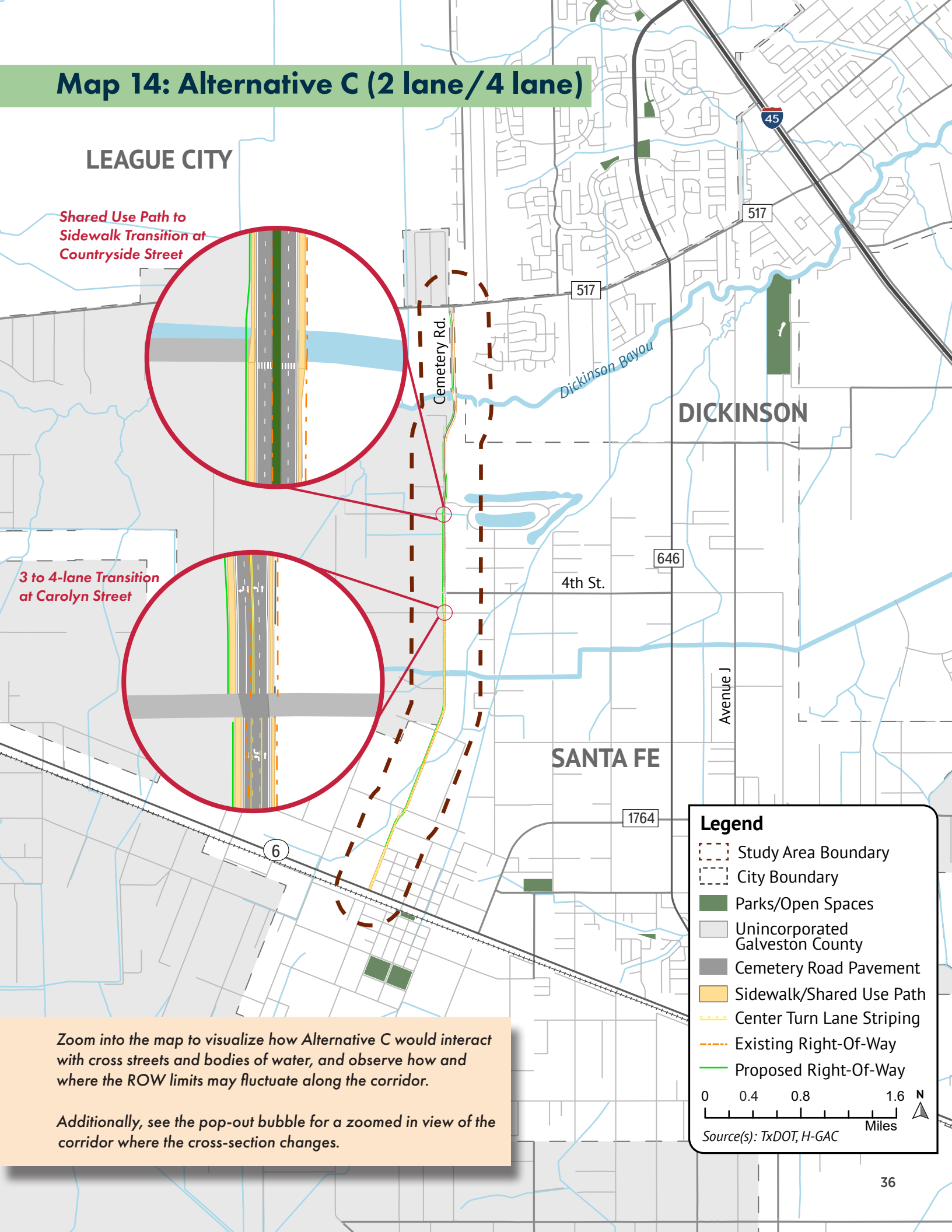
At Open House #2, only 6 participants (14%) indicated in an end-of-study survey that they would prefer Alternative C to the other conceptual alternatives and the No Build configuration. This configuration was perceived by participating members of the public to be a reasonable compromise between maximizing traffic and safety improvements and minimizing impacts to drainage, private property, and local culture.

Figure 8: Alternative C Cross-Section illustrates this design for Cemetery Road, and *Map 14: Alternative C* illustrates how it will fit into the context of the Cemetery Road corridor.

Figure 8: Alternative C Cross-Section (2 lane with center turn lane from FM 517 to Carolyn, 4 lane from Carolyn to SH 6)



Map 14: Alternative C (2 lane/4 lane)



Zoom into the map to visualize how Alternative C would interact with cross streets and bodies of water, and observe how and where the ROW limits may fluctuate along the corridor.

Additionally, see the pop-out bubble for a zoomed in view of the corridor where the cross-section changes.

EVALUATION OF ALTERNATIVES

To determine which of the three conceptual alternatives would best serve the needs of the community, performance measures were selected to analyze and compare them. How each alternative performed in terms of these measures is summarized in *Table 4: Alternatives Evaluation*. Because this is a high-level planning study and the alternative designs for Cemetery Road are in the conceptual phase, these performance measures are evaluated qualitatively, in terms of most to least favorable.
In Table 4, most favorable performance is indicated in green, least favorable in red, and neither most or least favorable in orange. The performance measures are listed below:

- **Right-of-Way (ROW) Needed** - Total acres of additional ROW needed to construct the conceptual alternative.
- **Parcels Impacted** - Total count of parcels along the corridor that would be impacted by the construction of the conceptual alternative.
- **Drainage Impacts** - Estimated additional stormwater runoff (in acre-feet) due to impervious cover. The methodology for quantifying runoff is provided in Appendix D: Drainage Impacts.
- **Level-Of-Service** - Percent change of PM peak hour volume-to-capacity ratio between No Build conditions and alternative conditions. Calculations are provided in Appendix F: Traffic Performance Evaluation.
- **Construction Cost** - Planning-level order-of-magnitude construction cost estimate (2025 dollars), which includes the estimated high-level planning costs of acquiring additional land for stormwater detention (See Appendix D: Drainage Impacts, for the methodology). The entire cost estimate calculation is provided in Appendix E: Construction Cost Estimate.
- **Estimated Service Life** - Number of years until the corridor will reach a Level-of-Service D and may need reconstruction to accommodate increased traffic. Calculations are provided in Appendix F: Traffic Performance Evaluation.
- **Public Preference** - Number of votes in favor of the alternative collected during Open House #2. Detailed findings from Open House #2 can be found in Appendix C: Public Engagement.

Table 4: Alternatives Evaluation

Performance Measure	No Build	A	B	C
ROW Needed	0 acres	1.13 acres	2.55 acres	1.83 acres
Parcels Impacted	0 parcels	62 parcels	81 parcels	69 parcels
Drainage Impacts	0 ac-ft	6.09 ac-ft	21.94 ac-ft	13.79 ac-ft
Level-Of-Service	0 percent	+0.3 percent	-34 percent	-18 percent
Construction Cost	$0	$21 M	$30 M	$25 M
Estimated Service Life	18-32 years	13-32 years	23-47 years	23-40 years
Public Preference	20 votes	11 votes	5 votes	6 votes

NOTE: All performance measures are estimates and not exact - actual impacts may differ from these estimates.

ALTERNATIVES ANALYSIS CONCLUSION

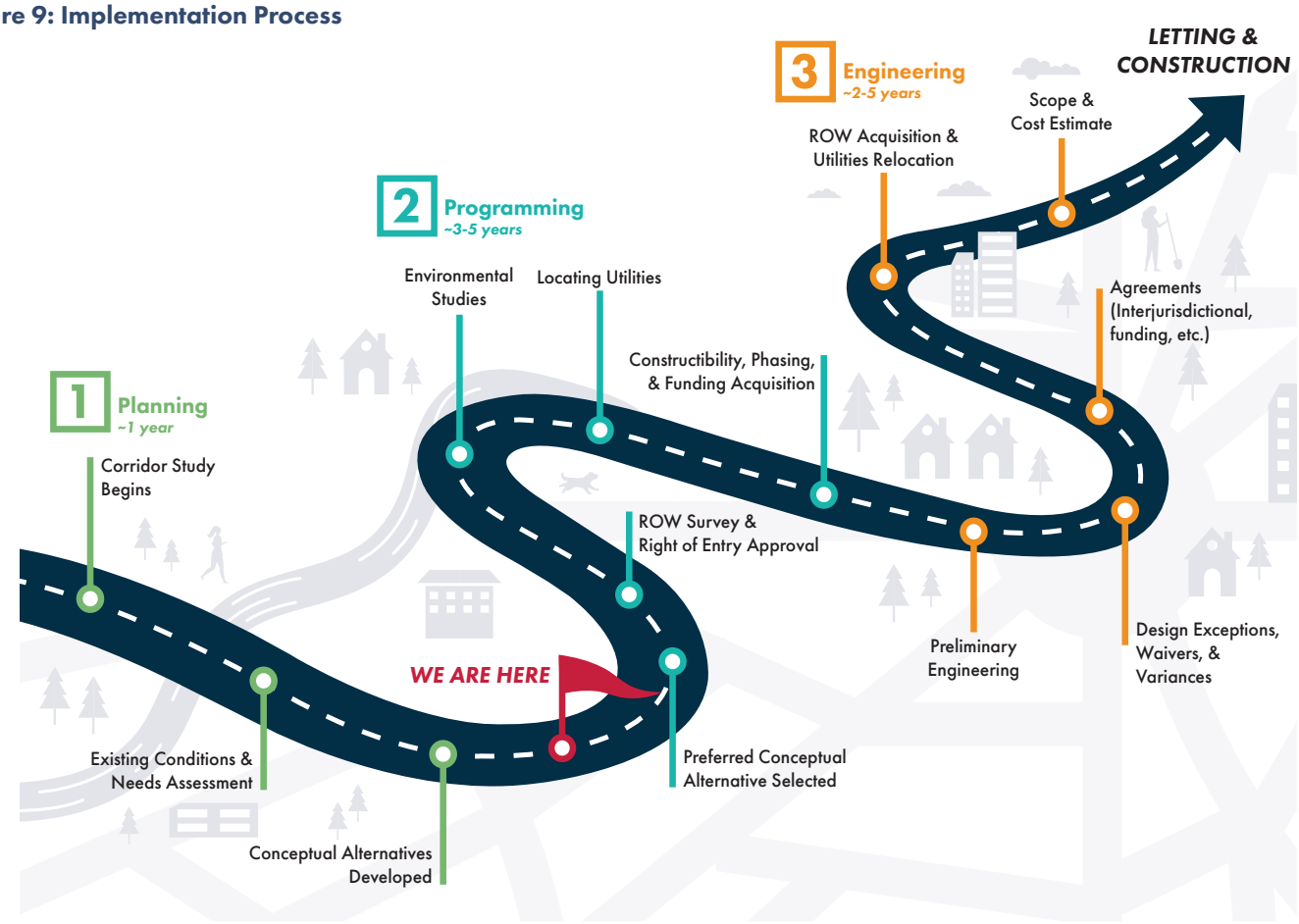
The three conceptual alternative designs for Cemetery Road, derived from the Existing Conditions Assessment and public engagement, represent potential future conditions for the corridor. Design features include the number and width of lanes, facilities for pedestrians and cyclists, amount of public right-of-way, and drainage utilities; however, these features are strictly conceptual and engineering-level design is still necessary. All three alternatives would improve the roadway surface; provide safe and separate paths for pedestrians and bicyclists, which includes crosswalks at the intersections with SH 6, Countryside Street, and FM 517; improve drainage facilities by replacing the existing open ditch drainage with curb and gutter; provide more landscaping and shade; and improve operations of the intersection of Cemetery Road at SH 6 through the installation of a new signal. These improvements will likely result in the reduction and prevention of vehicle crashes along the corridor. Additionally, in reconstructing the corridor, the bridge across Dickinson Bayou should also be reconstructed to allow for safe and easy passage over the waterway at all times, but especially during floods.

However, there are trade-offs for each alternative in terms of the performance measures.

- **Alternative A** does not improve traffic conditions and has the shortest service life but is the most cost effective of the conceptual alternatives and minimizes impacts to drainage and private property; however, it is not an improvement from the No Build configuration and would be more negatively impactful than leaving the corridor as-is.
- **Alternative B** significantly improves traffic conditions both in the short- and long-term but has the greatest negative impact on drainage and private property; it is also the least favored within the community.
- **Alternative C** strikes a balance between Alternatives A and B for every performance measure; it provides the benefit of improving traffic conditions with less impact to drainage and private property.

The results of this analysis are intended to serve as a roadmap for decision makers to prioritize future improvements to Cemetery Road. Ultimately, it is the responsibility of these decision makers to weigh the trade-offs, select a design they wish to implement, and coordinate on the implementation process. A high-level outline of the implementation process, which includes this corridor study, is illustrated below in Figure 9.

Figure 9: Implementation Process



CEMETERY ROAD CORRIDOR STUDY