HOUSTON-GALVESTON AREA COUNCIL

NORTHERN BRAZORIA COUNTY | PEARLAND

SUBREGIONAL PLANNING INITIATIVE




TRANSPORTATION + LAND USE VISION PLAN

REPORT AND IMPLEMENTATION WORKBOOKS

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EXECUTIVE SUMMARY

STUDY AREA

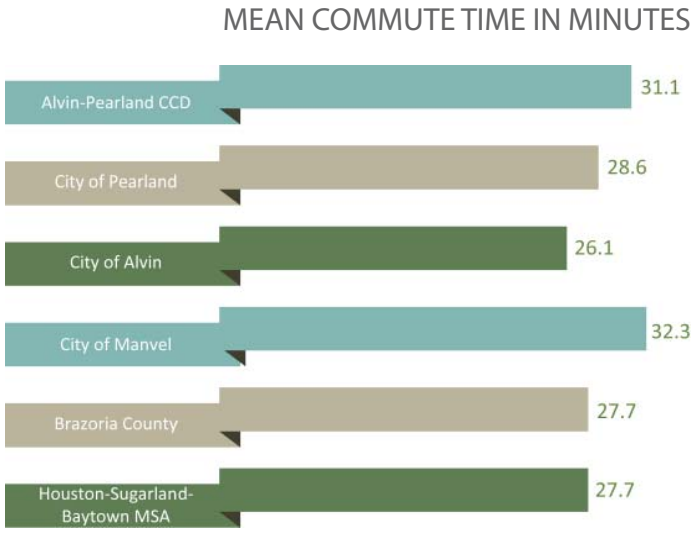
The SPI study area is located in Northern Brazoria County and includes four major jurisdictions:

- Brazoria County (northern portion)
- City of Pearland
- City of Alvin
- City of Manvel

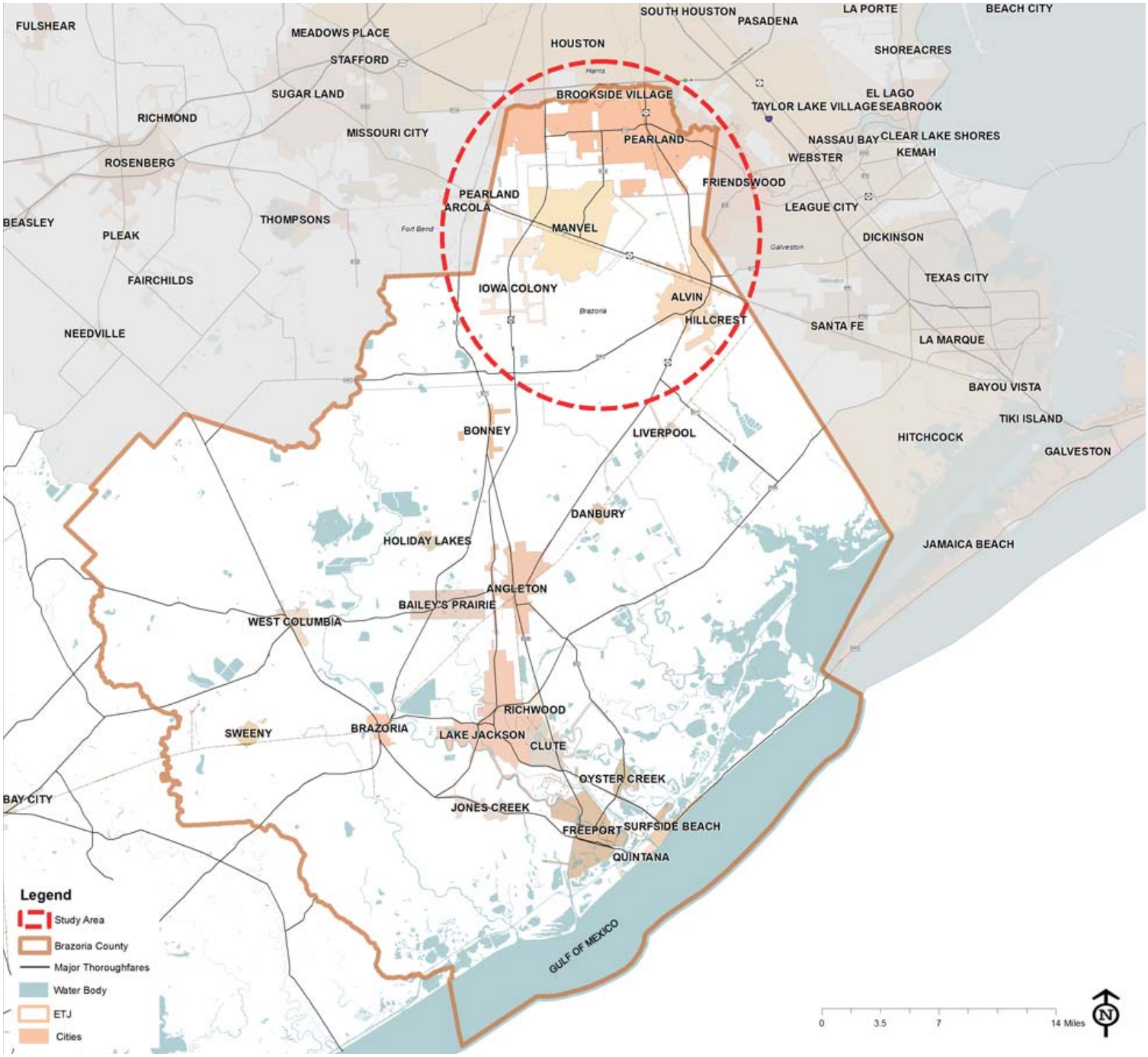
STUDY PURPOSE

In recent years, needs in the region have far outweighed available federal funds for transportation projects; therefore, jurisdictions with alternative means to fund projects locally are at an advantage for project implementation. The SPI program was created by TPC to identify future strategic investments that can help stretch limited funding further. The SPI process focuses on innovative strategies including the coordination of transportation and land use and locally driven actions that support regional and sub-regional goals. Projects and strategies identified through the SPI are intended to both "feed" the regional pipeline for inclusion in the RTP if they are appropriate for federal-aid funding, and help local governments think strategically about alternative solutions or projects that they can implement on their own.

Funded by a partnership between H-GAC, Brazoria County, the City of Pearland, the City of Alvin, the Greater 288 Partnership, and BayTran, the Northern Brazoria County/Pearland SPI investigated the existing land use and transportation conditions of northern Brazoria County and identified strategies that will best position the sub-region to maintain and improve mobility as its population and employment grows.



NORTHERN BRAZORIA COUNTY / PEARLAND SPI STUDY AREA



WHY IS THE STUDY NEEDED?

The SPI was developed to address the following issues in Northern Brazoria/Pearland:

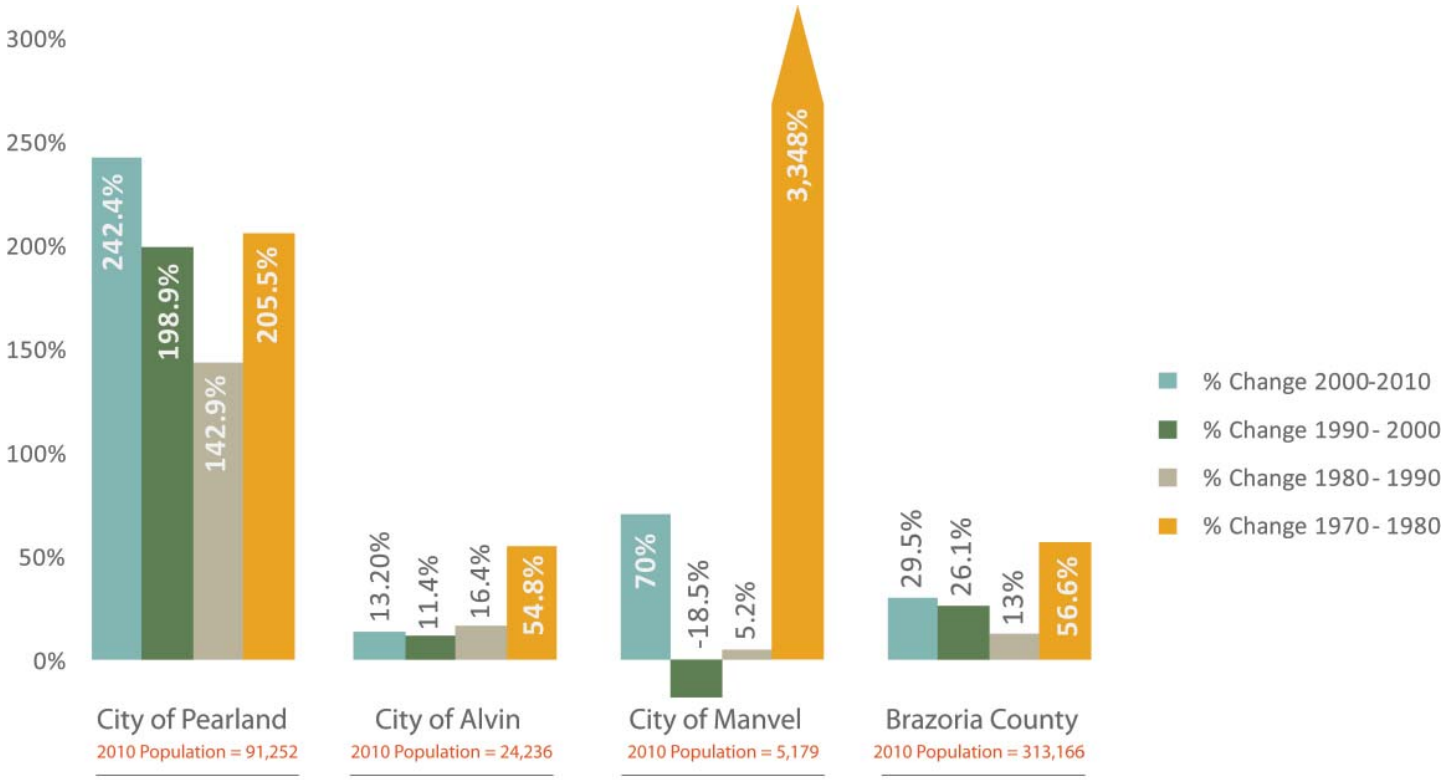
- Significant ***population growth*** in recent years
- Average mean ***commute time*** for major jurisdictions of almost ***29 minutes***
- Increasing congestion
- Need for coordinated transportation investments
- Approximately ***87%*** of employed residents ***commute outside of the study area*** for work

COMMUNITY ENGAGEMENT

The greatest priority in the SPI planning process is to ensure that the plan reflects the needs and vision of the residents of the Northern Brazoria County/Pearland sub-region. Through a robust public outreach and stakeholder engagement process, the plan seeks to strengthen local capacity to sustain and implement the short and long-term goals of the plan. The public enagement process included:

- Four Stakeholder Advisory Committee (SAC) meetings
- Six sponsoring agency staff meetings
- One elected official workshop
- Two Public workshops

NORTHERN BRAZORIA COUNTY / PEARLAND SPI STUDY AREA



Through the planning process, resident and stakeholder participants developed the following vision statement and goals.

Vision Statement:

The residents of the region will have a high quality of life built on livable transportation and land use solutions that promote economic development; cultural diversity; community health and safety; preservation of natural resources, and fiscal prudence.

Goals

- Engage the public in the decision making process
- Provide a wide range of transportation choices
- Promote economic development throughout the sub-region
- Maintain fiscal prudence
- Strengthen community well-being and safety
- Preserve and enhance natural resources

SCENARIO DEVELOPMENT & PROJECT EVALUATION

After an analysis of conditions and needs, several potential improvement projects were identified. These potential projects were evaluated based on an analysis of the following:

- How well they furthered the vision and goals
- Results of scenario evaluation
- Qualitative Criteria
  - Continuation of existing road widening projects
  - Municipality development
  - Connectivity
  - Construction design process
  - Parallel relief
  - Protection of Downtown
  - Preservation of community character
  - Environmental impacts
  - Transportation land use linkage
- Quantitative Criteria
  - Level of Service (LOS) score F
  - Fatal crash score
  - Total crash score

To assist in evaluating the long-term benefits of possible transportation investments, four different land use and transportation scenarios were developed. They included a mix of transportation and transit projects proposed by previous studies, findings from the technical analysis, public engagement, and consultation with the SAC. The roadway improvement projects included in the scenarios were identified in the 2035 RTP.

The scenario results suggest that better linkage of transportation and land use decisions can positively impact the mobility of residents within the sub-region by:

- Reduced long term capital costs
- Multi-modal transportation options
- Reduced Vehicles Miles Traveled (VMT), Vehicles Hours Traveled (VHT), and VMT in congestion
- Increased opportunities for pedestrians
- Reduced level of environmental impact

By coordinating transportation investment options and land and use decision-making, northern Brazoria County stakeholders can encourage transit-supportive densities, reduce environmental impacts, and make a measurable dent in commute times.

SUMMARY OF RECOMMENDED PROJECTS

Ongoing efforts to engage stakeholders through interagency coordination and public outreach were keys to the success of the SPI planning process. The integration of land use and transportation solutions, discussion of priorities, and identification of potential future funding opportunities during the planning process culminated in the main findings of the plan. Recommended project and programs include:

- *Roadway improvements* - Intended to reduce congestion and improve connectivity throughout the SPI region
- *Land use policy strategies* - Intended to position for future improvements, particularly around identified 'Activity Centers'
- *Incremental transit improvements* - Intended to relieve congestion, enhance mobility to and from regional employment centers, provide transportation choice, and enhance economic development potential
- *Bicycle & pedestrian improvements* - Intended enhance livability and connect neighborhoods, parks, activity centers, and other major destinations
- Increased long-range transportation coordination among sub-regional partners
- Strategic status updates of certain transportation improvements

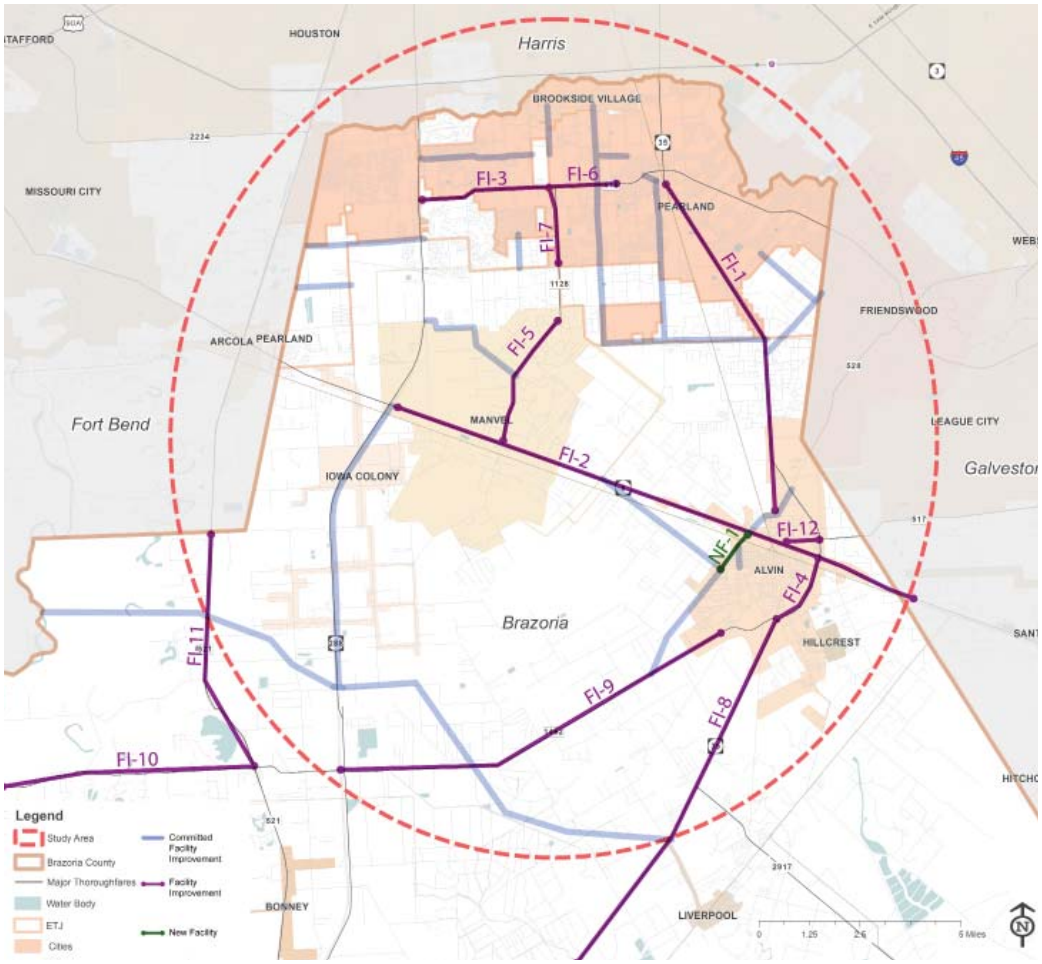
Each study recommendation is presented in a series of jurisdictional Implementation Workbooks. In the workbooks, the potential benefits achieved through the implementation of each recommendation are considered against the vision, goals, and objectives. The workbooks represent a strategic approach to implementation for each of the study's findings.

ROADWAY PROJECTS

Transportation system improvements identified during the SPI process include the advancement of currently unfunded projects shed during an update to the long-range plan in 2008. Through the SPI process, the value of these projects was tested through technical analysis and vetted through stakeholder and public engagement activities. The resulting list is recommended for adoption as priorities, and support achievement of the SPI vision by providing the following benefits:

- Congestion relief and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers
- Enhance future economic development potential
- Improve roadway safety
- Continue implementation activities in support of previous and ongoing planning efforts
- Support enhancement of hurricane evacuation facilities

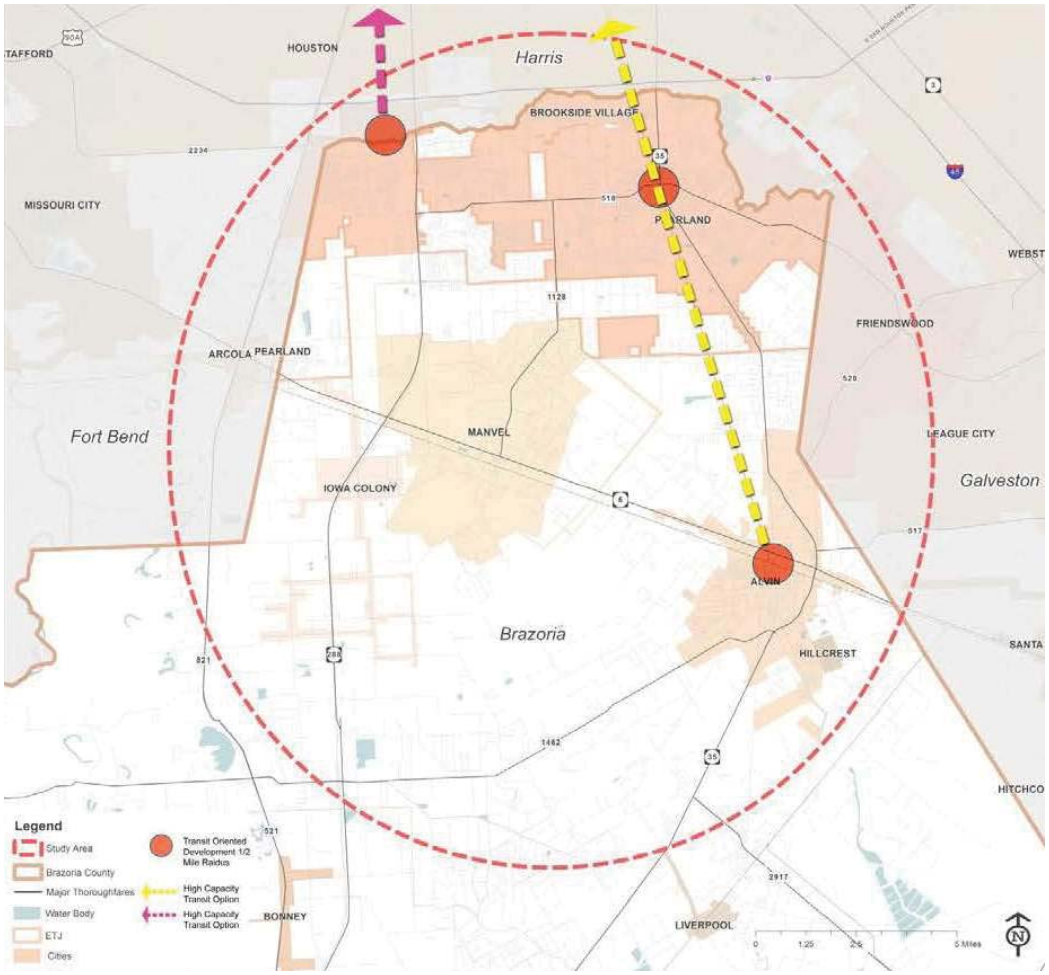
ROADWAY PROJECT RECOMMENDATIONS



"FI" = Facility Improvements "NF" = New Facilities
Semi-transparent lines represent currently planned future projects

Map ID	Roadway	From	To	Proposed Transportation Corridor Improvement Project
FI-1	SH 35	FM 518	S OF SH 6	Widen to 6-lane divided rural
FI-2	SH 6	SH 288	GALVESTON C/L	Widen to 6 & 8-lanes
FI-3	FM 518	SH 288	FM 865	Widen to 6-lane divided urban
FI-4	SH 35	SH 6	BS 35C SOUTH	4-lane tollway (most feasible toll alternative)
FI-5	FM 1128	SH 6	CR 100	Widen from 2 to 4 lanes w/bridges
FI-6	FM 518	FM 865	SH 35	Widen to 6-lane divided urban w/ flush median
FI-7	FM 1128	BROADWAY	BAILEY RD	Widen from 2 to 4-lanes divided curb and gutter
FI-8	SH 35	FM 2403	FM 523	Widen to 4-lane divided
FI-9	FM 1462	SH 288	SH 99	Widen from 2 to 4 lanes
FI-10	FM 1462	FORT BEND C/L	SUPER SPEEDWAY	Widen from 2 to 4-lanes
FI-11	FM 521	BRAZORIA/FORT BEND C/L	FM 1462	Widen 2 to 4-lanes
FI-12	FM 517	LP 409	SH 35	Widen to 4-lanes in sections
NF-1	FM 528	SH 35 BUSINESS	SH 6	Construct 2-lane urban undivided on new location with railroad grade separation (phase 1)

TRANSIT SYSTEM RECOMMENDATIONS



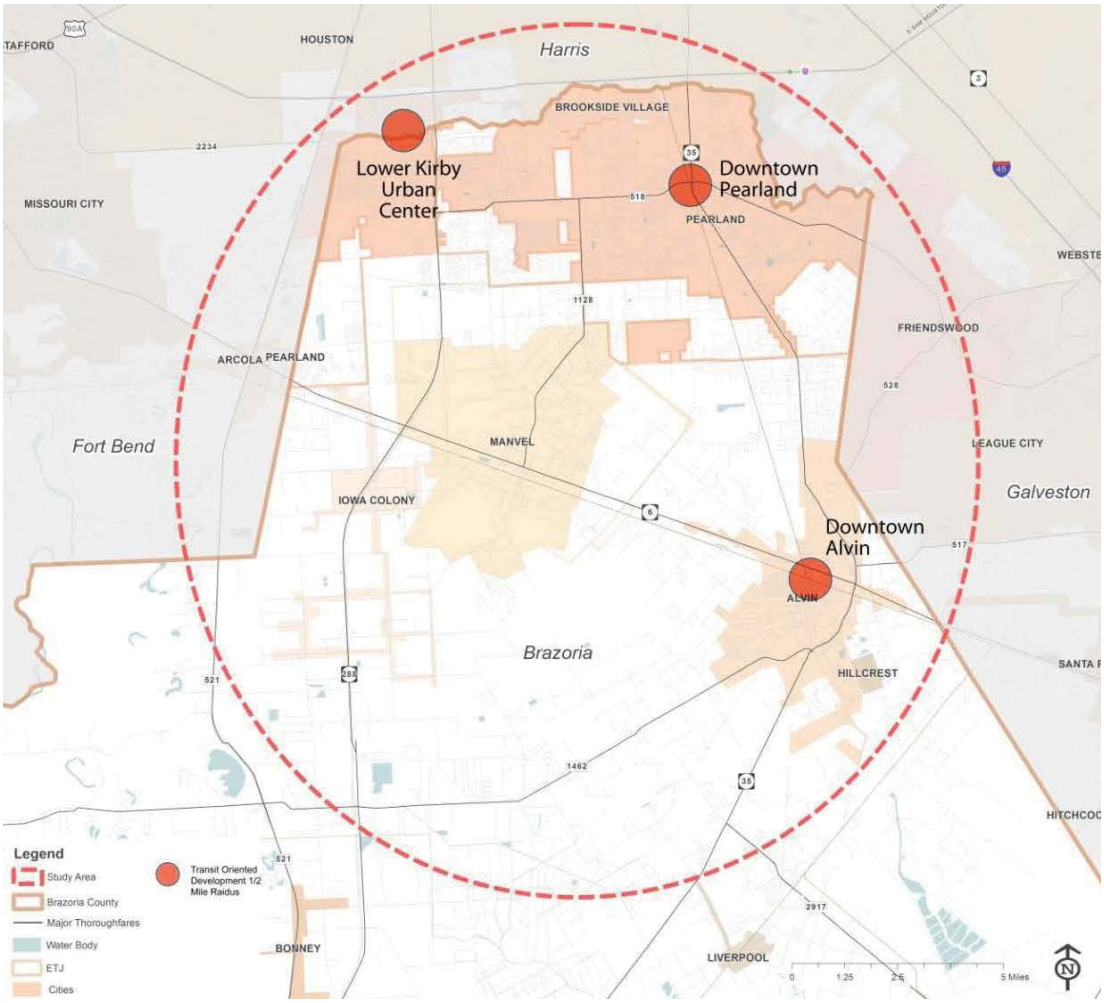
Recommended Transit System Improvements			
Location	**From**	**To**	**Description**
Kirby Drive	Lower Kirby Urban Center	Texas Medical Center	High-Capacity Transit along Kirby Drive
SH 35 / Railroad Right of Way	Downtown Alvin	Downtown Pearland, connecting to transit points north along Interstate 45.	High-Capacity Transit along SH 35 or within railroad right-of way from Downtown Alvin to Downtown Pearland

TRANSIT SYSTEM IMPROVEMENTS

A long term strategy to achieving a more sustainable land use and transportation vision for Northern Brazoria County / Pearland sub-regional Planning Initiative includes the implementation of transit. Map 02 illustrates the two potential transit opportunities identified through the SPI process. Benefits of the recommended transit project include:

- Relieve congestion and improve travel-times along major thoroughfares
- Enhance mobility to and from regional employment centers within the sub-region and to neighboring Counties
- Provide transportation choice
- Enhance future development potential
- Promote economic development
- Reduce Vehicle Miles Traveled

LAND USE RECOMMENDATIONS: FUTURE ACTIVITY CENTERS



LAND USE POLICY RECOMMENDATIONS & ACTIVITY CENTERS

As discussed in Section 4 – Scenario Development + Testing, three key focus areas emerged through the SPI process as having the potential to serve as future activity centers, where infrastructure investments can be targeted to increase economic development and attract residents. These three areas included the Lower Kirby Urban Center (formerly the Spectrum District), Downtown Pearland, and Downtown Alvin.

The plan also recommends a series of coordinated city land use policies intended to maximize future economic development in a manner that complements and enhances transportation investments.

These policies include the following:

- Coordinate major transportation investments with supportive land use policies
- Develop urban design guidelines to strengthen and retain community character
- Adopt mixed-use zoning districts where possible
- Adopt pedestrian and transit supportive districts to support transportation alternatives and emerging Activity Centers

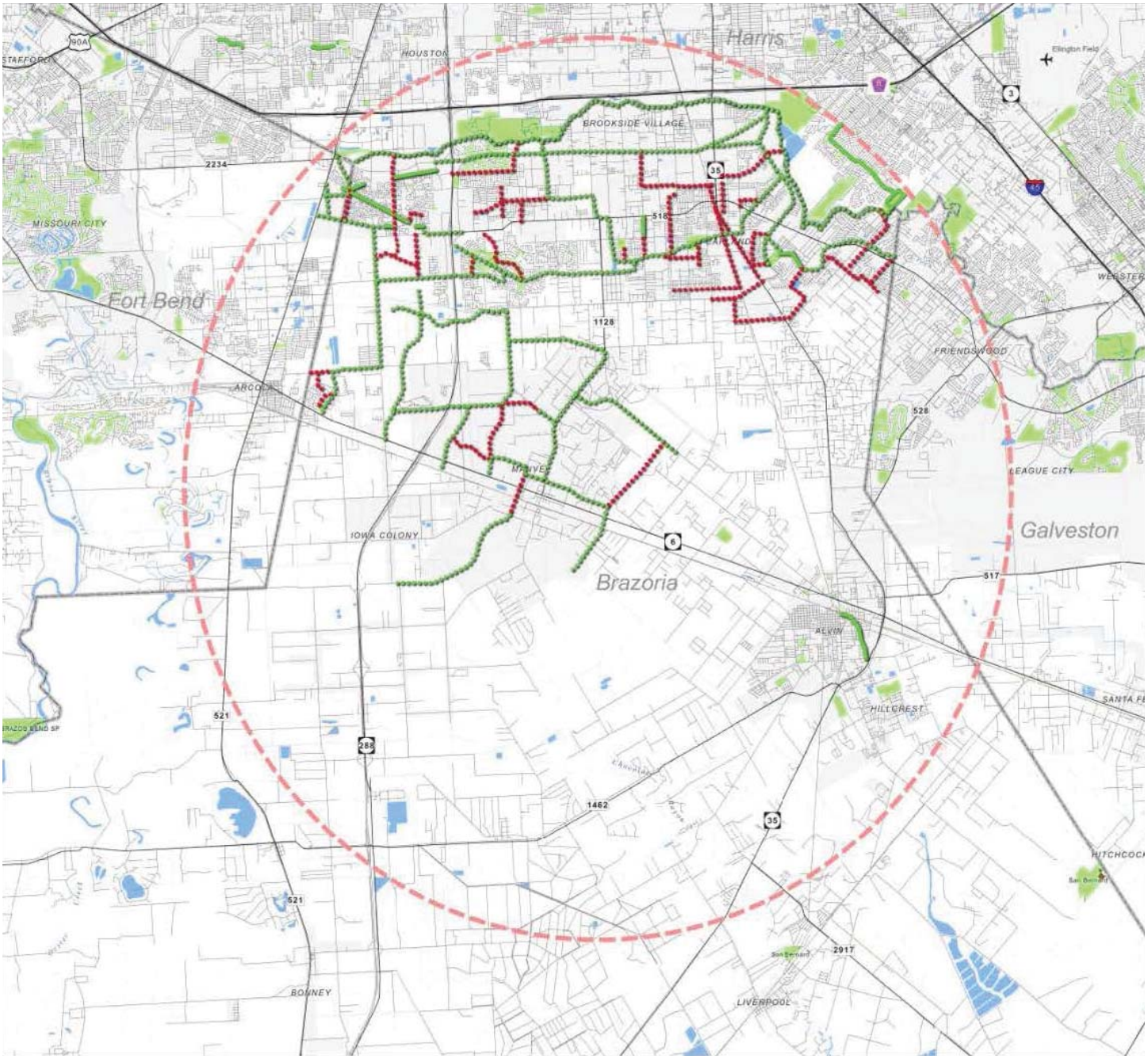
BICYCLE AND PEDESTRIAN IMPROVEMENTS

Bicycle and pedestrian projects are integral to developing livable communities. The City of Pearland, Alvin, and Manvel have developed city-wide bicycle/pedestrian/trail master plans. In the future, these proposed bicycle and pedestrian corridors could connect to each other to form a regional bicycle and pedestrian networks.

This project proposes to develop a sub-regional bicycle/pedestrian plan through H-GACs Pedestrian and Bicyclist Special District Program that would accomplish the following in support of SPI goals:

- Integration of key bicycle/pedestrian projects into the Regional Transportation Plan (RTP).
- Supports multi-modal transportation options;
- Contributes to a reduction in congestion, capital infrastructure costs, and environmental across the sub-region

SUB-REGION BICYCLE & PEDESTRIAN PLAN



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01 INTRODUCTION

1.1 About the Sub-Regional Planning Initiative

The transportation + land use vision plan (plan) outlines the findings and recommendations resulting from the year-long Northern Brazoria County-Pearland Sub-regional Planning Initiative (SPI). The communities and municipalities included in the SPI study area share many resources, including transportation thoroughfares and business and employment centers—as well as share many common needs and goals as the region orients itself for future growth and development. And as the communities within the sub-region continue to grow and develop, land use and transportation coordination with will become increasingly critical. Coordinating planning efforts allows local decision-makers to define common goals, balance competing interests, and coordinate efforts to maximize cost-effectiveness and efficiency.

The Houston-Galveston Area Council's (H-GAC) SPI process assists members of the H-GAC Metropolitan Planning Organization in achieving both local and regional goals by facilitating project identification and implementation strategies driven by the needs of cities and counties. As the federally designated Metropolitan Planning Organization (MPO) for the 8-County Houston-Galveston region, H-GAC is responsible for working with its member jurisdictions to identify projects to include in the federally required long-range regional transportation plan (RTP). The RTP is approved by the Transportation Policy Council (TPC), which consists of policy makers from the 26 cities and counties located within the 8-County region as well as representatives from the Texas Department of Transportation (TxDOT), the Metropolitan Transit Authority of Harris County (METRO), and three members appointed by the H-GAC Board of Directors.

Many cities and jurisdictions participated in this SPI process, including three funding partners—Brazoria County, the City of Pearland, and the City of Alvin. Through the SPI process, these jurisdictions identified local transportation needs and goals, as well as tailored implementation strategies. The regionally coordinated SPI plan emphasizes intergovernmental strategies to guide decision-making and investment.

Ultimately the plan sets forth a combination of strategic transportation investments and goals that, when coordinated with land use policy decisions, can support communities in achieving their local vision.

Following this executive summary, the plan includes the following sections:

02 EXISTING CONDITIONS

03 PLANNING PROCESS

04 SCENARIO DEVELOPMENT + TESTING

05 FUNDING PROFILE

06 FUTURE RECOMMENDATIONS

07 IMPLEMENTATION WORKBOOKS

08 MEASURE + BENCHMARK IMPLEMENTATION PROGRESS

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02 EXISTING CONDITIONS

2.1 Introduction

Located southwest of the City of Houston, the Northern Brazoria - Pearland sub-region is part of one of the fastest growing metropolitan areas in the United States.[1] Officials anticipate that this growth will continue over the coming decades, with an additional three million new residents projected to move to the Houston region by the year 2035. If population forecasts are correct, the region will have a total population of 8.8 million, and 60 percent employment growth.[2]

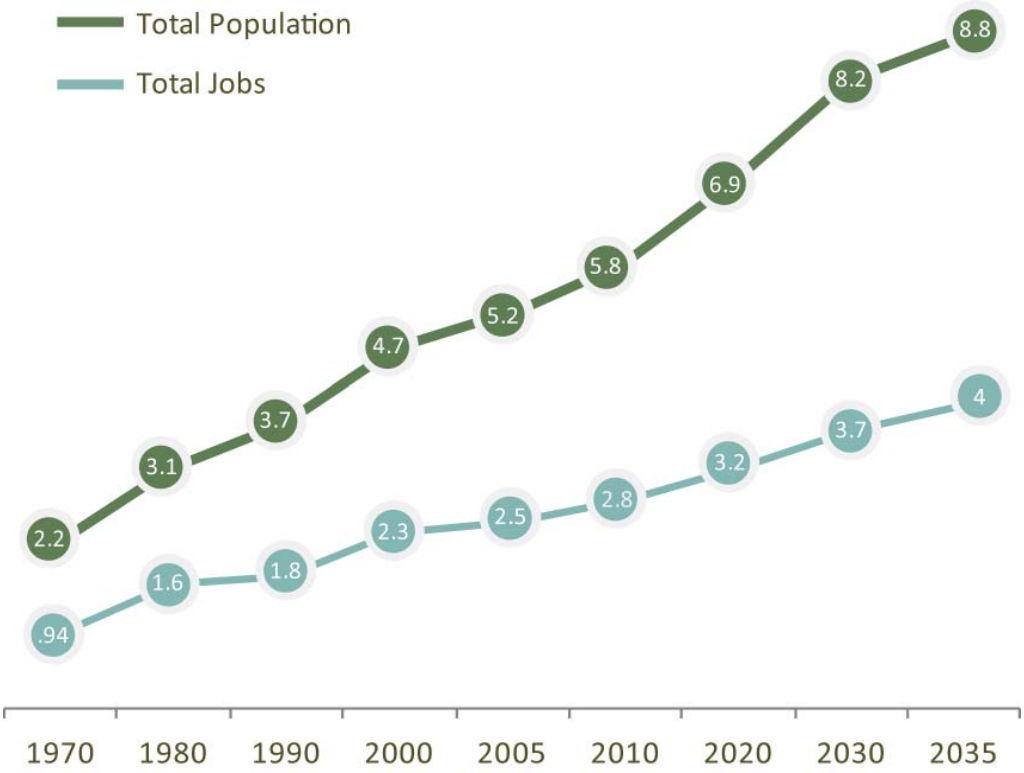
This robust growth is a positive indicator for the region's future, but it comes with challenges, particularly in terms of mobility. The region's ability to invest in transportation infrastructure is closely tied to fuel tax proceeds. Revenue from the fuel tax is projected to stay relatively flat through 2023, despite anticipated population growth.[3] Although people are generally traveling longer distances than in the past, their cars are becoming significantly more fuel efficient. The net result is that demand is the same or higher for facilities, but funds to improve the system are not keeping pace.

Residents in the Houston metropolitan area tend to depend on their cars for transportation—in 2010, 90.1 percent of workers in the Houston-Sugar Land-Baytown Metropolitan Statistical Area (MSA) commuted to work via a car. Currently, the region is producing about 4.2

1Forbes. Accessed 11 Feb 2013. Online: http://www.forbes.com/sites/morganbrennan/2013/01/23/americas-fastest-growing-cities/
2Data from 2035 Regional Transportation Plan Update (2010)

3http://ftp.dot.state.tx.us/pub/txdot-info/fin/cash_forecast.pdf Texas Department of Transportation. April 2013 Cash Forecast

Figure 2.1 Houston Galveston Region Growth, 1970 - 2035



Source: Bridging Our Communities 2035: The 2035 Houston-Galveston Regional Transportation Plan

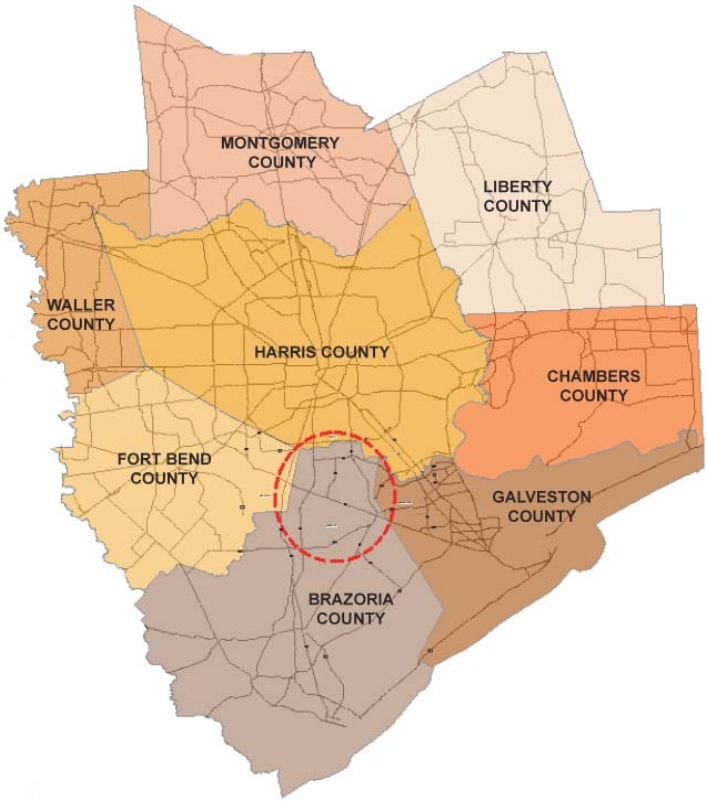
million vehicle hours per day; if the region does not add infrastructure, this figure will reach over 13 million hours per day by 2035—an increase of 210 percent.

The current conditions of the sub-region reflect those of the greater Houston region as a whole. The sub-region's population centers represent a range of development patterns, from suburban Pearland to small-town Alvin, to the rural residential character of Manvel. Freeport, Brazoria County's southernmost population and employment center, located just outside of the study area, is a major industrial port facility with a number of new investments and short-term growth opportunities. For example, Dow Chemical recently announced its intention to invest $4 billion into its Freeport site, which will include world-class natural gas-related facilities.

2.2 Study Area

Map 2.1 illustrates the Houston-Galveston Metropolitan Planning Area eight-county region. Primarily comprised of a northern section of Brazoria County, the red circle represents the sub-region study area. The sub-region is bordered by Fort Bend County to the west, the City of Houston to the north, and the Cities of Friendswood and League City to the east. Within the sub-region, there are three cities: the City of Pearland, the City of Alvin, and the City of Manvel. Additionally, there are three towns, including Iowa Colony, Hillcrest, and Brookside Village. Following is a brief summary of Brazoria, Alvin, and Pearland's population and transportation environments.

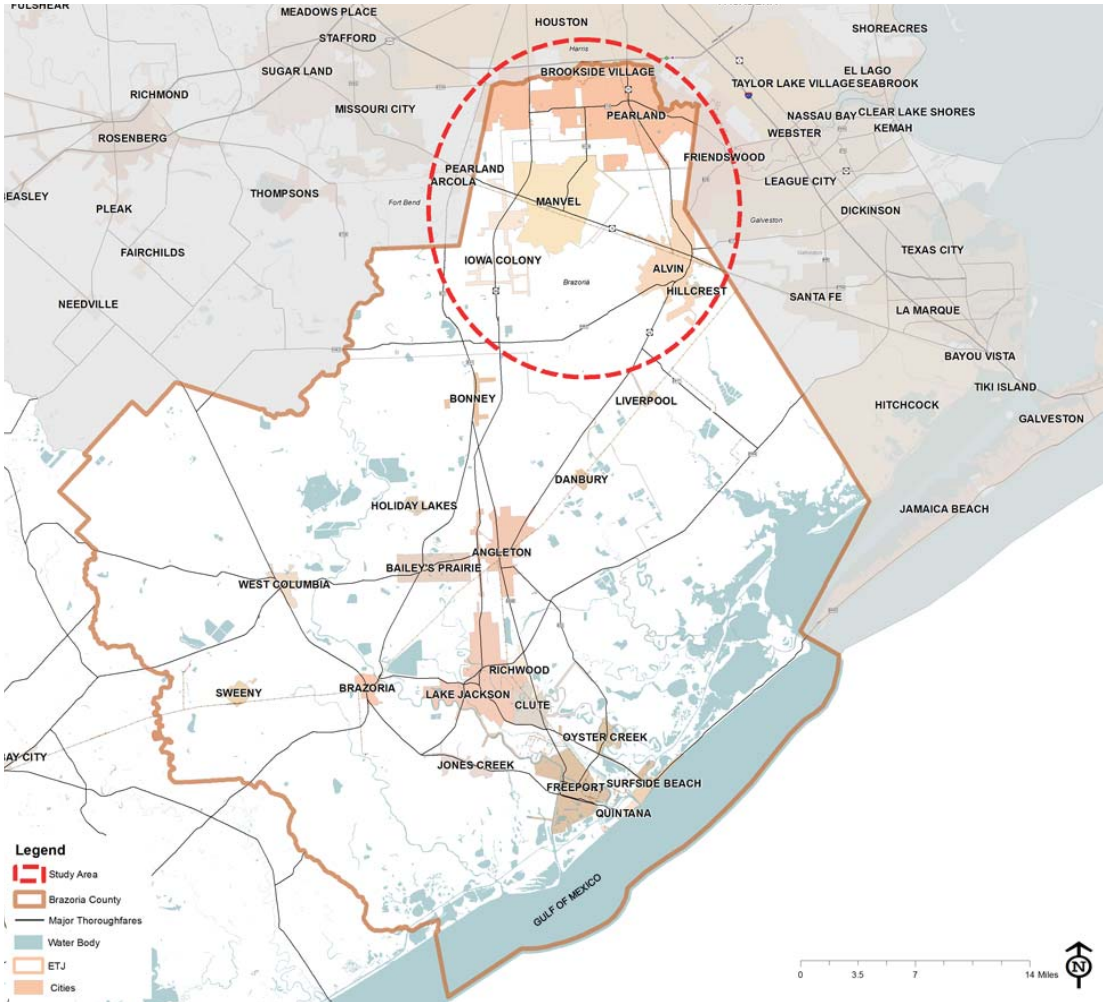
Map 2.1 Houston-Galveston Metropolitan Planning Area + Study Area



Brazoria County

As illustrated in Map 2.2, Brazoria County stretches from Beltway 8 in Houston to Freeport and the Gulf of Mexico. From its southernmost point on the Gulf to its northernmost point in Pearland, the County spans 55 miles. There are two primary population centers: the northern region (the SPI study area) and the Lake Jackson/Freeport area on the Gulf coast. Clockwise from the east, Brazoria County is bordered by Galveston County, the Gulf of Mexico, Matagorda County, El Campo County, Fort Bend County, and Harris County. Its northern boundary is demarcated by Clear Creek. Since the 1930s, Brazoria County has had double-digit growth rates every decade. Currently the county comprises 5.3 percent of the Houston area population.

Map 2.2 Northern Brazoria County / Pearland SPI Study Area



City of Pearland

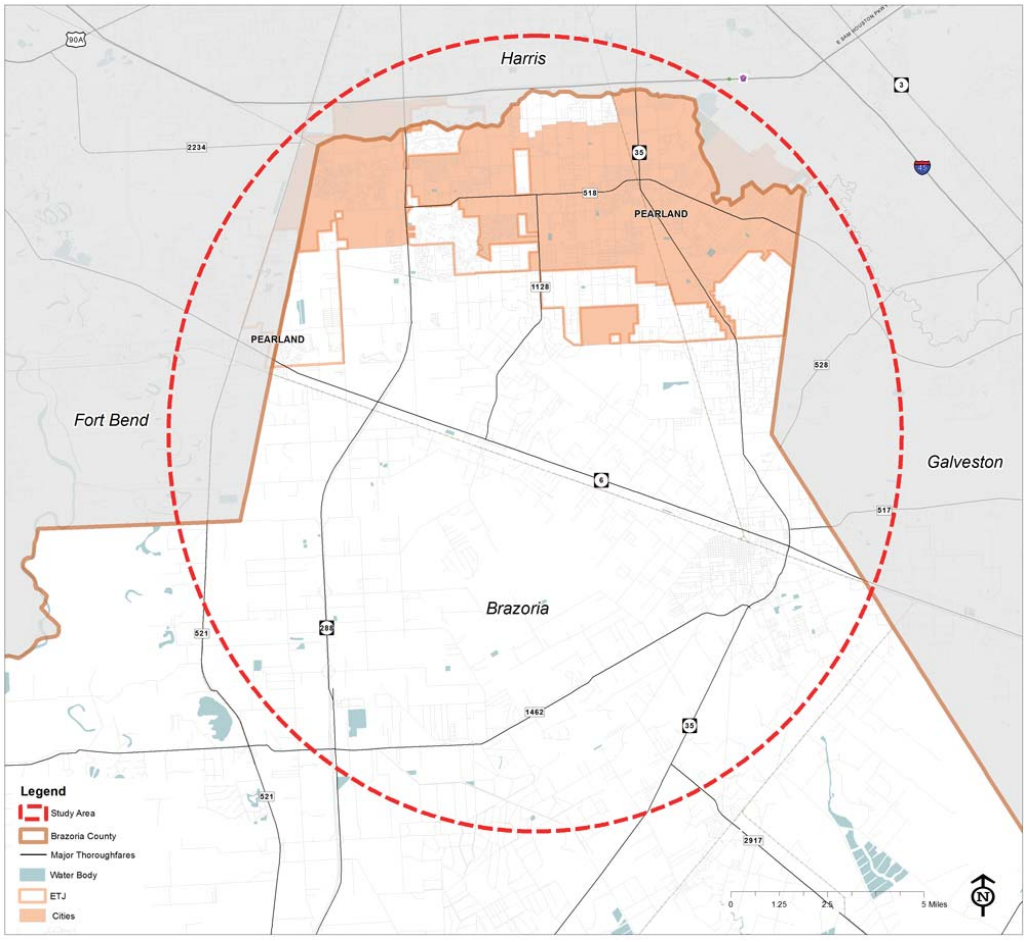
With 91,252 residents, the City of Pearland, illustrated in Map 2.3, is the most populous municipality in Brazoria County.[4] It is the third largest city in the Texas Gulf Coast area, after Houston and Pasadena. With a 142 percent jump in growth over the last ten years, it is the second fastest growing city in the state, and the fifteenth fastest in the nation.[5] Pearland has the second largest footprint on Texas' Gulf Coast, and includes areas from both Harris County and Fort Bend County. In addition to population growth, Pearland has attracted significant development interest as well, with multiple major developments announced during the course of this study. [6]

Although Pearland's residential and employment base has rapidly expanded, transportation infrastructure has not kept pace. Its roadways are congested, and many residents have long daily commutes into Houston, particularly into the Texas Medical Center area — more Texas Medical Center employees originate from Pearland zip codes than any other zip code in the Houston metropolitan area.[7]

4U.S. Census 2010 Demographic Profile
5Pearland Economic Development Corporation. "Growth: Pearland Demographic Overview." July , 2011. Online: http://www.pearland-edc.com/media/docs/PearlandDemographics.pdf
6Pearland Economic Development Corporation

7Texas Medical Center GIS. 2011 Employee - Zip Code Density Map by Employee Count & Zip Code

Map 2.3 City of Pearland

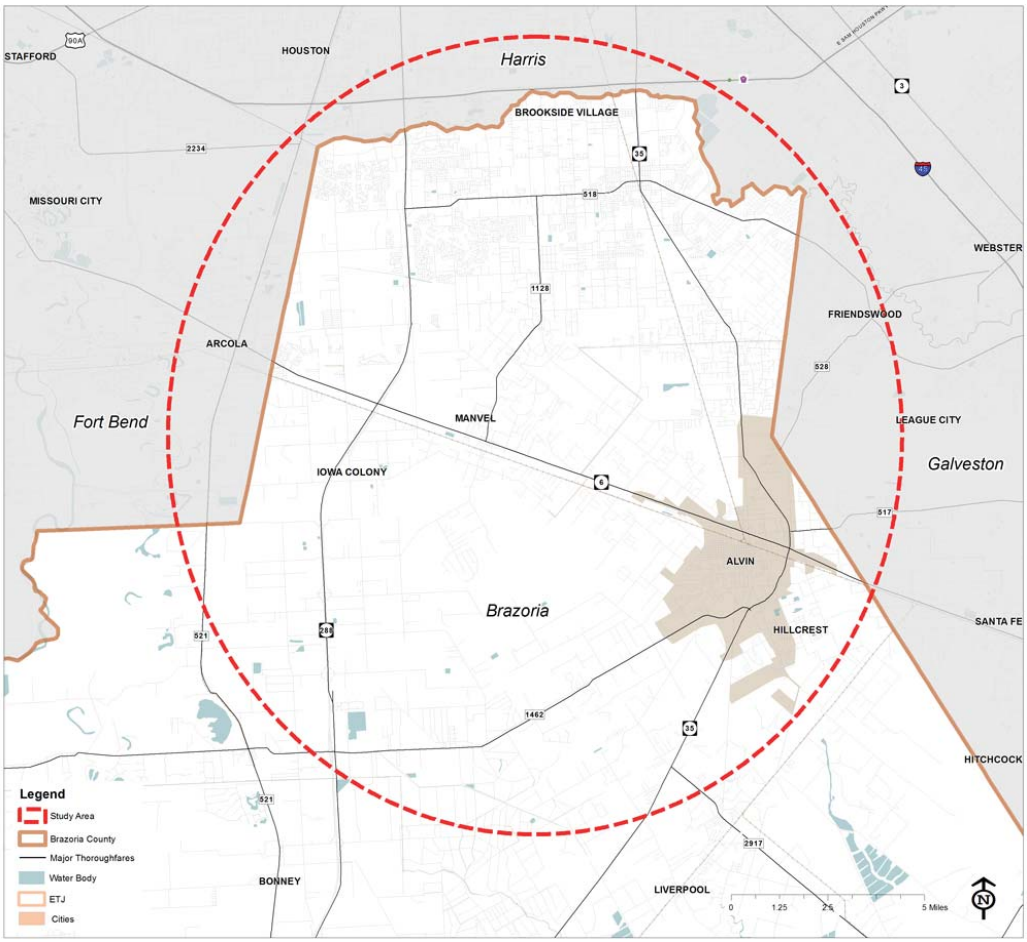


City of Alvin

The City of Alvin is approximately ten miles south of the City of Pearland. Alvin is a historic small town of 24,236 people, with a well-defined town center and traditional grid of roadways. The City developed as an important railroad stop and still has its original depot today. In addition to its traditional core, Alvin has several outlying, non-contiguous areas near FM 1462.

In 2005, the City of Alvin completed its Comprehensive Plan. Conducted in response to growth and a desire to guide it, the plan was developed under a theme of being a "Crossroads." During the planning process, residents voiced their desire to ensure that future development remain compatible with Alvin's small town character, as well as a desire to see energy refocused on its downtown.

Map 2.4 City of Alvin



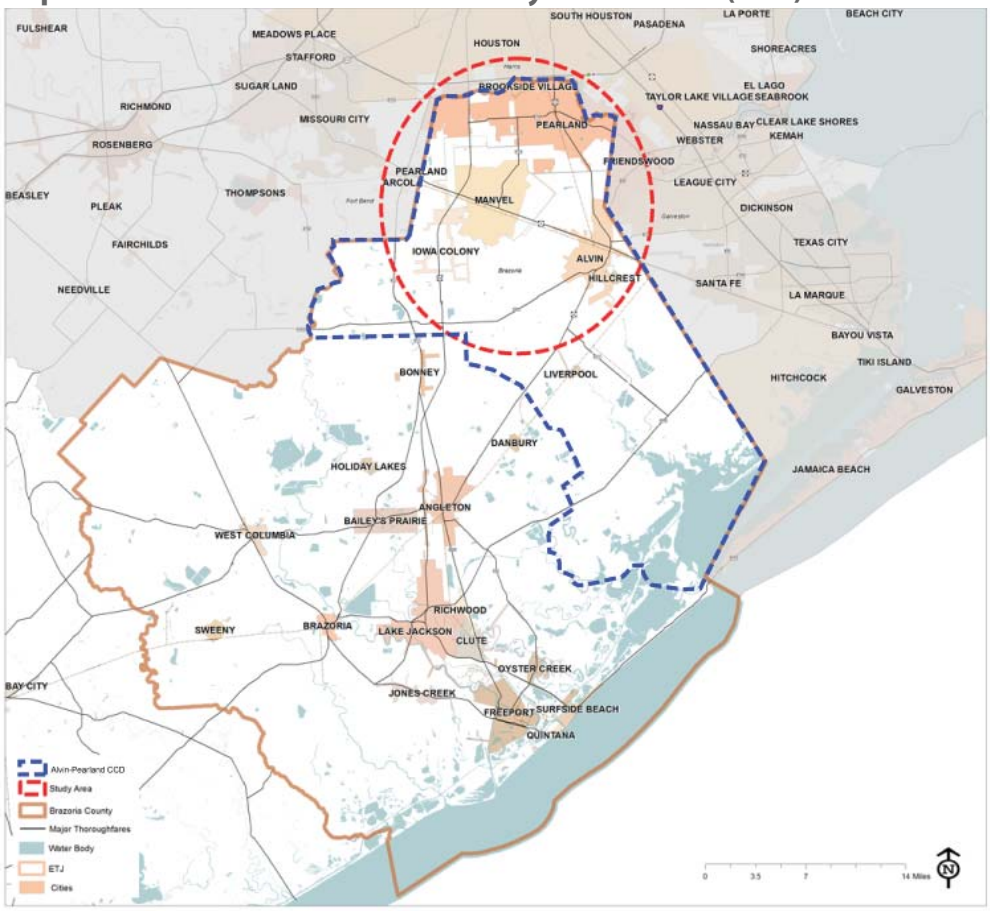
2.3 Demographic Overview

One of the first steps in transportation planning is to understand the demographics of the population. Because the sub-region is not defined by the Census, the Alvin-Pearland Census County Subdivision (CCD) illustrated in Map 2.5 was used as a proxy.[1]

In 2010, the Alvin-Pearland CCD had a population of 176,201, which encompassed about 56 percent of all of Brazoria County residents. With a median age of 34.7 years-old, the Alvin-Pearland CCD has a slightly younger population than Brazoria County as a whole (median age of 35.3) but older than the metropolitan area (median age of 32.2). As illustrated in Figure 2.2, the sub-region is less racially diverse than the metropolitan area and has a significantly lower percentage of Hispanic/Latino residents (26.2 percent versus the metro area's 35.3 percent). The City of Pearland is the most diverse of the sub-region's three cities, and has a similar racial breakdown to the broader Houston-Sugar Land-Baytown MSA, with the exception of its smaller percentage of Hispanics/Latinos. Of all the geographies examined, the City of Alvin has the highest percentage of White residents, and also the highest percentage of Hispanic/Latino residents. The City of Manvel stands out among the Alvin-Pearland CCD for its median age of 36.6 years, which is significantly higher than both Pearland and Alvin when considered independently. Appendix 1.2 contains a summary of the population,

1Although the Alvin-Pearland CCD extends far past the sub-region boundary, the area outside the boundary is sparsely populated and does not greatly affect the demographic data used as a proxy.

Map 2.5 Alvin-Pearland Census County Subdivision (CCD)



age, and racial composition of the CCD, sub-region cities, Brazoria County, and the Houston-Sugarland-Baytown metropolitan statistical area.

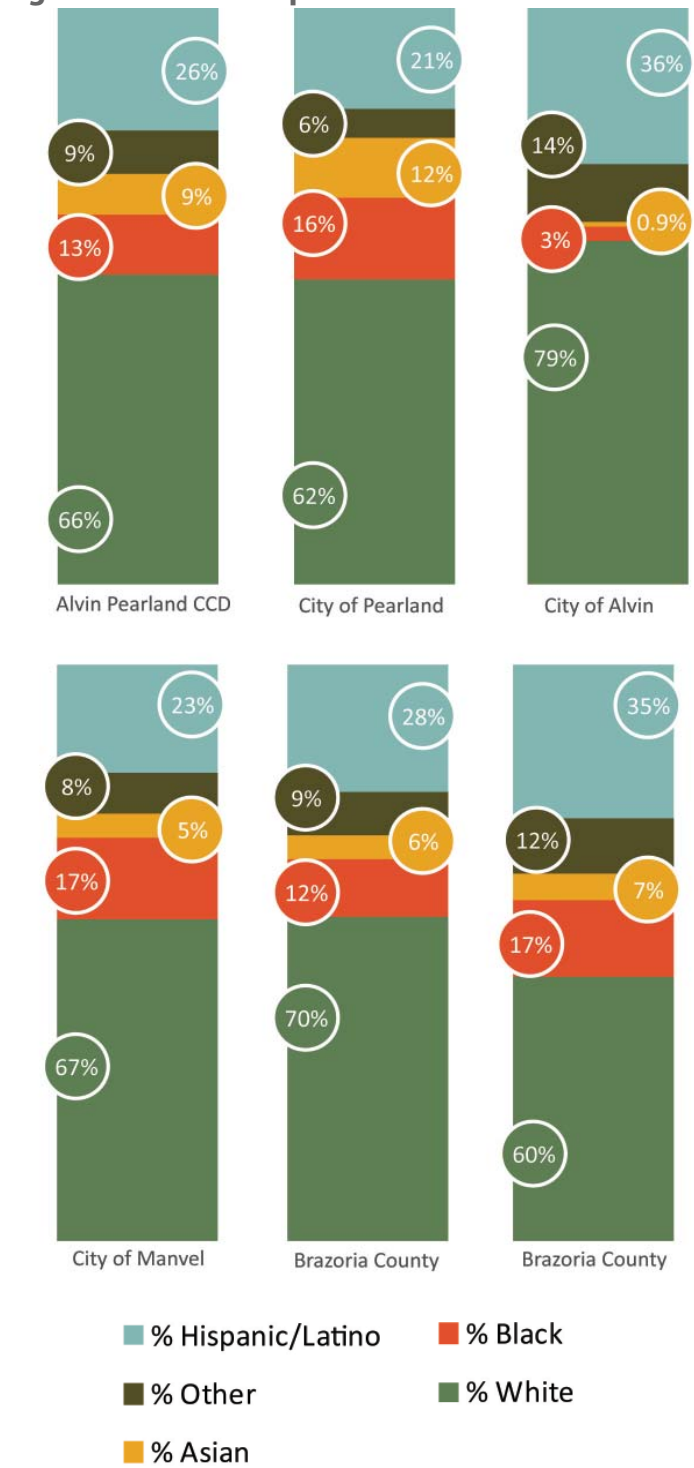
The sub-region's household characteristics also reflect that of the broader Houston metro area. The Alvin-Pearland CCD has a higher percentage of families with children (41.8 percent) versus the MSA (36.2 percent). This is likely the result of Pearland's high percentage of families with children (43.8 percent). Both the City of Alvin and the City of Manvel have a percentage of households with a person over 65 years-old (21.8 percent and 20.2 percent) respectively, especially when compared to Brazoria County as a whole (10.1 percent); Alvin also has a lower percentage of family households (70.4 percent) than its neighbors in Brazoria County. The Houston MSA has a larger average family size than each geography contained in the sub-region.

2.3.1 Population Density

Population density is an important factor in transportation planning, as it influences an area's ability to support its population base. Map 2.6 illustrates the sub-region's population density in 2011 by people per Transportation Analysis Zone (TAZ). The highest densities within the sub-region are located in the northwestern area of the City of Pearland and along the boundary of Brazoria and Galveston County. These areas have experienced significant single-family residential development in recent years. Population densities are lower in the City of Manvel and areas south of SH 6.

While the entire study area is expected to increase in population and relative density by the year 2035, densities are expected to increase the most in the northwestern portion of the City of Pearland, most of the areas west of the SH 288, and along the boundary of Brazoria and Galveston County. The central portion of the study area will also likely experience growth. See Appendix 1.3 for a map illustrating 2035 population growth.

Figure 2.2 Race Composition



Source: United States Census, 2010; Community Surveys, 2006-2011

2.3.2 Regional Population Growth

H-GAC forecasts that the Houston-Galveston region is expected to grow to over 9 million people and 4 million jobs from now until 2040. Growth is expected to concentrate near the region's highways: and by 2035, 80 percent of residents and 92 percent of jobs will be located within two miles of the nearest highway.[1]

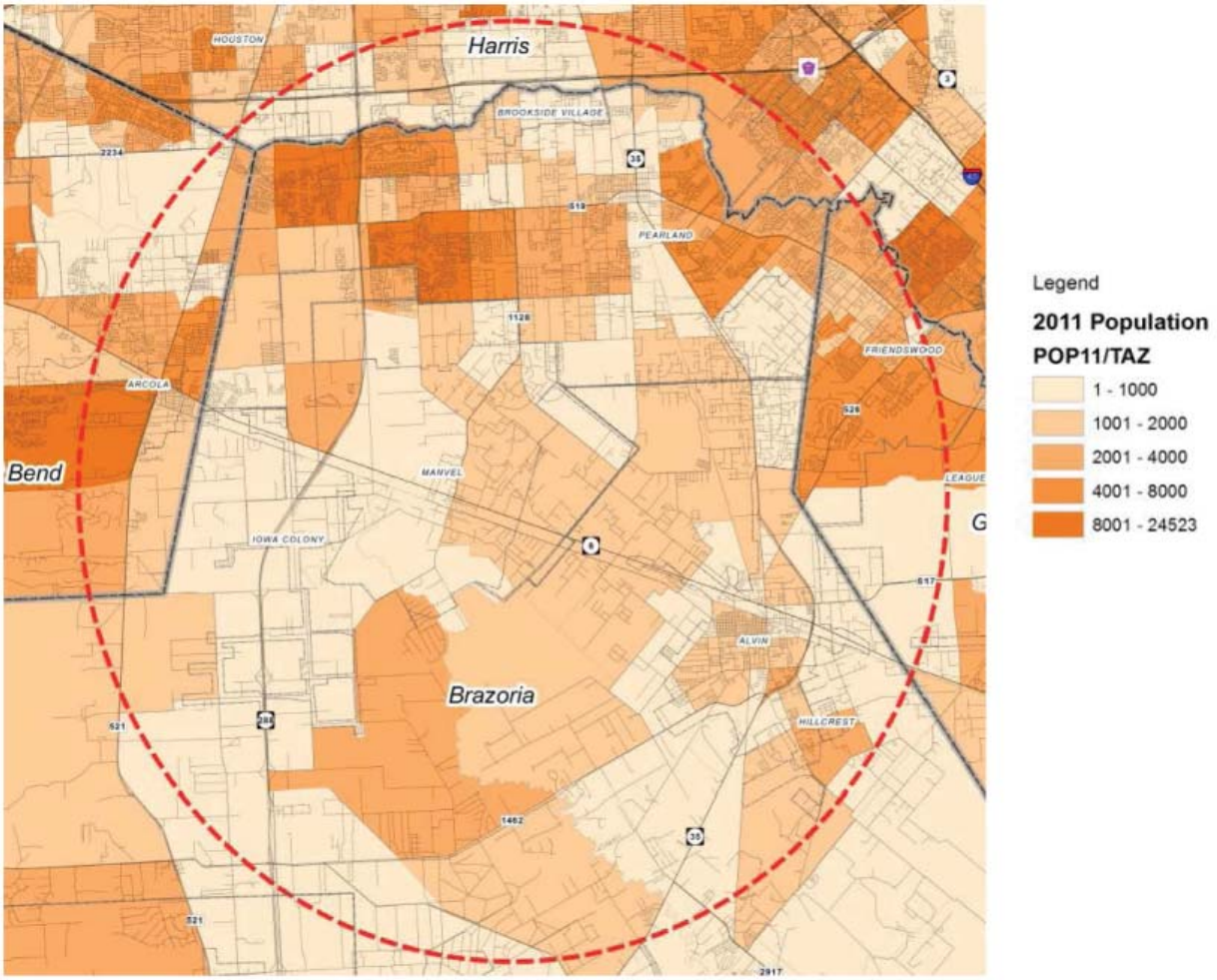
H-GAC expects this growth to occur at different rates throughout the region, based on a radial geographic pattern. The sub-region, shown by the red circle in Map 2.7, is part of Zones 3 and 4 of the pattern. These zones are anticipated to have the highest percentages of growth: 23 percent and 44 percent, respectively. By the year 2040, Brazoria County is expected to reach a population of 570,874 and expand its job base to over 130,000.

In addition to H-GAC's regional population projections, some of the sub-region's cities have also made shorter-term population projections. The City of Pearland projects a total population of 117,400 residents by 2017[2], which will represent an increase of 28.7 percent since 2010. While some of projected growth includes new residents moving into the City, some is also attributed to planned annexations.

1H-GAC 2035 and 2040 Regional Forecasts

2City of Pearland Five-Year Forecast Fiscal Years 2013-2017. Online: http://www.cityofpearland.com/vertical/Sites/%7BCA80BAF8-A883-4878-AB6D-7FC8DAE7D62E%7D/uploads/14_-_5-Year_Forecast.pdf

Map 2.6 2011 Sub-region Population Density



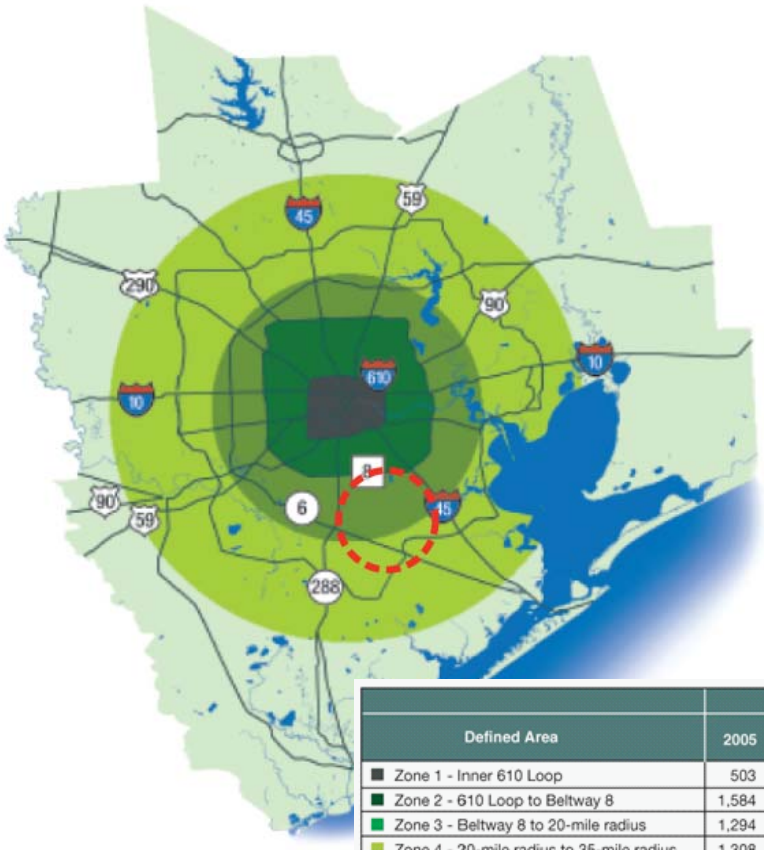
The City of Alvin has also made population projections. As part of the City's Comprehensive Planning process, a number of growth models were developed, ranging from very conservative to aggressive. By 2025, the low growth projection is that the City of Alvin will have 31,917 and the more aggressive projection is 61,297 people. The middle ground projection for Alvin is 43,560 by year 2025. The City of Manvel does not currently have population projections available, but based on its physical size and current zoning, Manvel has the potential to grow to a population of 140,000.

2.4 Sub-region Economic Profile

There are two lenses through which to view the economy of the sub-region: the employment of its residents and the businesses and jobs based within the sub-region.

Figure 2.3 summarizes the sub-region's labor force and employment levels. According to the 2010 Census, 70.9 percent of Alvin-Pearland CCD residents over the age of 16 are in the work force, and unemployment was at 3.5 percent in 2010, compared to a national rate of 9.65 percent. The percentage of adults in the work force is higher in the sub-region than in Brazoria County as a whole and the MSA, and its unemployment figure is also lower. Additionally, as illustrated in Figure 2.4, the median income for households in the Alvin-Pearland CCD was $75,257, versus $64,633 county-wide and $53,942 in the MSA. The CCD's percentage of families under the poverty line is also lower than the MSA, but the City of Alvin has a slightly higher percentage of 14.2 percent. Appendix 1.4 contains more detailed statistics regarding the sub-region's economic profile.

Map 2.7 Regional Growth Zones



Defined Area	Population (1000s)				Employments (1000s)			
	2005	2035	Change	% of Total Change	2005	2035	Change	% of Total Change
Zone 1 - Inner 610 Loop	503	693	191	5%	579	876	297	19%
Zone 2 - 610 Loop to Beltway 8	1,584	1,960	377	11%	834	1,230	396	26%
Zone 3 - Beltway 8 to 20-mile radius	1,294	2,082	788	23%	579	897	318	21%
Zone 4 - 20-mile radius to 35-mile radius	1,308	2,851	1,543	44%	358	719	362	24%
Zone 5 - 35-mile radius to Rest of Region	526	1,097	571	16%	193	348	155	10%
Regional Total	5,214	8,684	3,470	100%	2,542	4,069	1,527	100%

Note: Zones are exclusive of each other

Figure 2.3 2010 Population in Labor Force and Unemployment

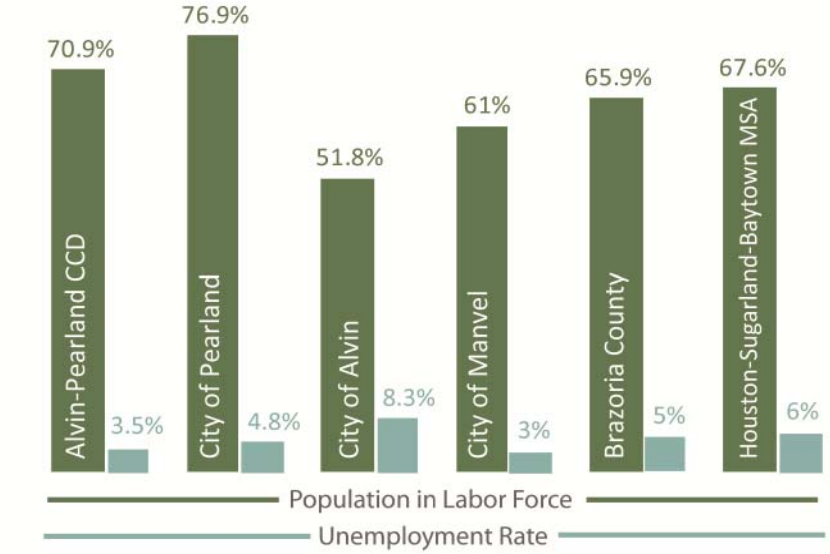
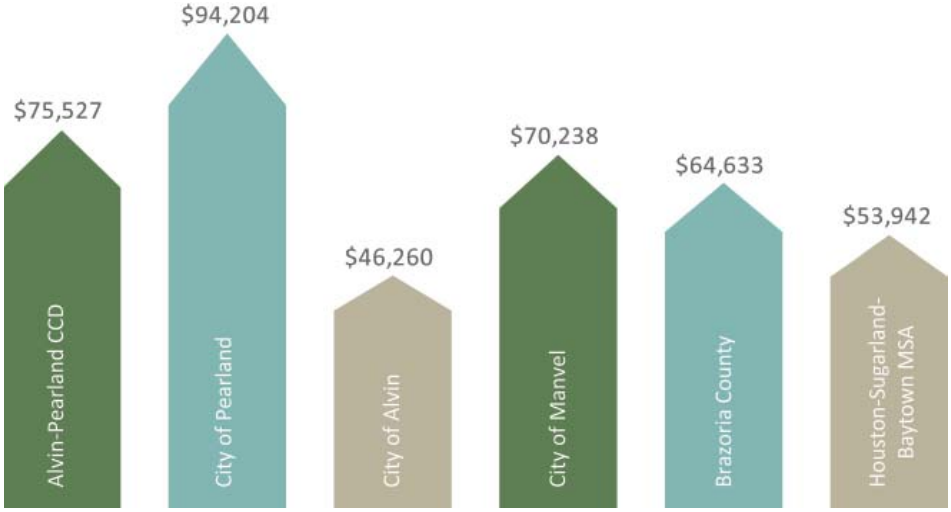


Figure 2.4 Median Household Income



2.4.1 Business + Industry

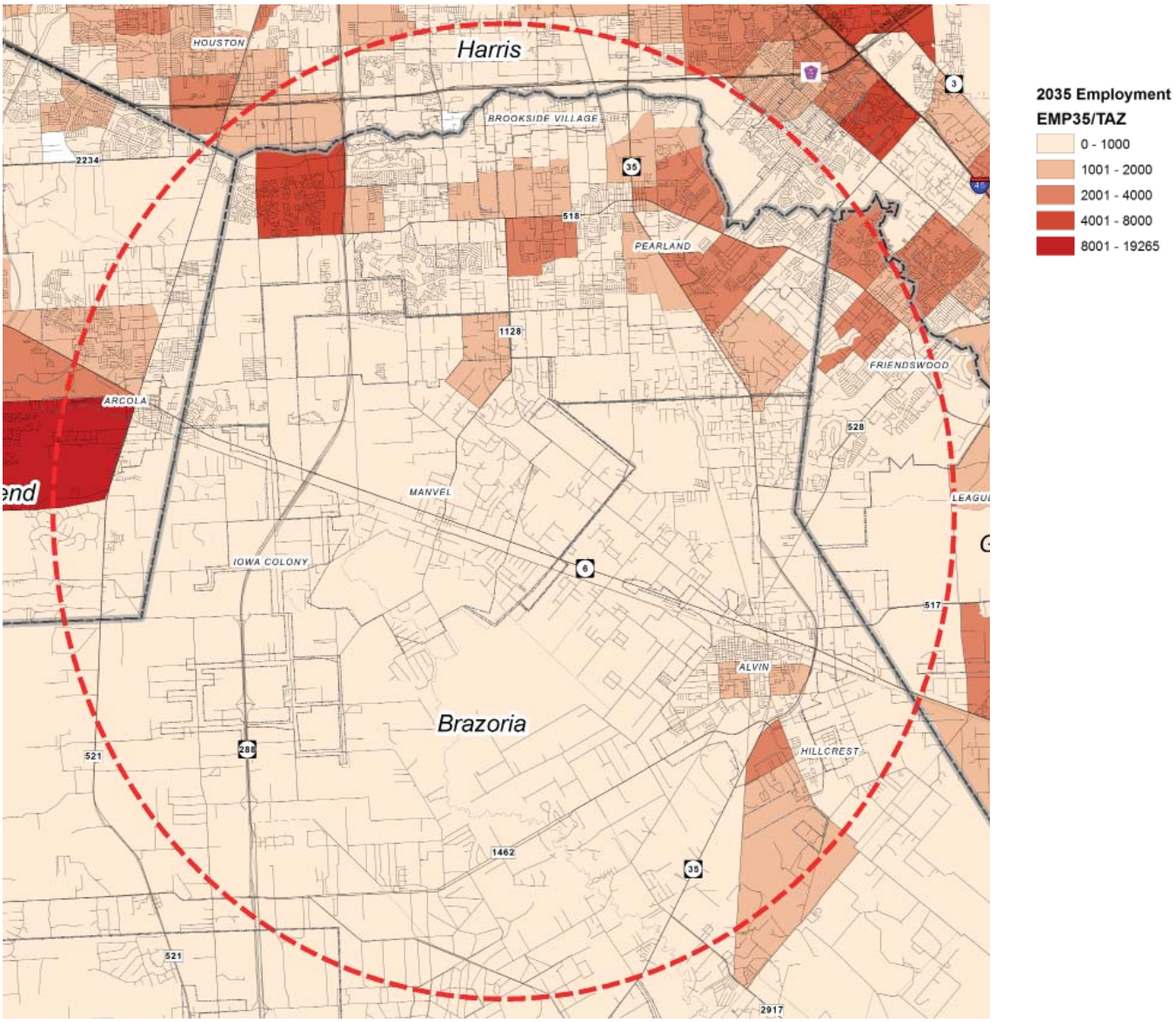
Detailed business and industry information about the sub-region is limited due to the specificity of its boundaries. Instead, data was gathered for the City of Pearland, the City of Alvin, and Brazoria County. According to the 2010 Census, Pearland was home to 8,129 businesses and Alvin was had 1,886. There were 997 employer establishments (businesses that had some paid employment within the Census year) in Pearland, and 430 in Alvin. The industries of these employer establishments were similar in Pearland and Alvin: both cities had high percentages of employees in Retail Trade, Manufacturing, and Accommodations and Food Services. Both cities also had similar industry breakdowns compared to the County, but with lower percentages of Manufacturing. See Appendix 1.4 for additional business and industry statistics.

2.4.2 Employment Density

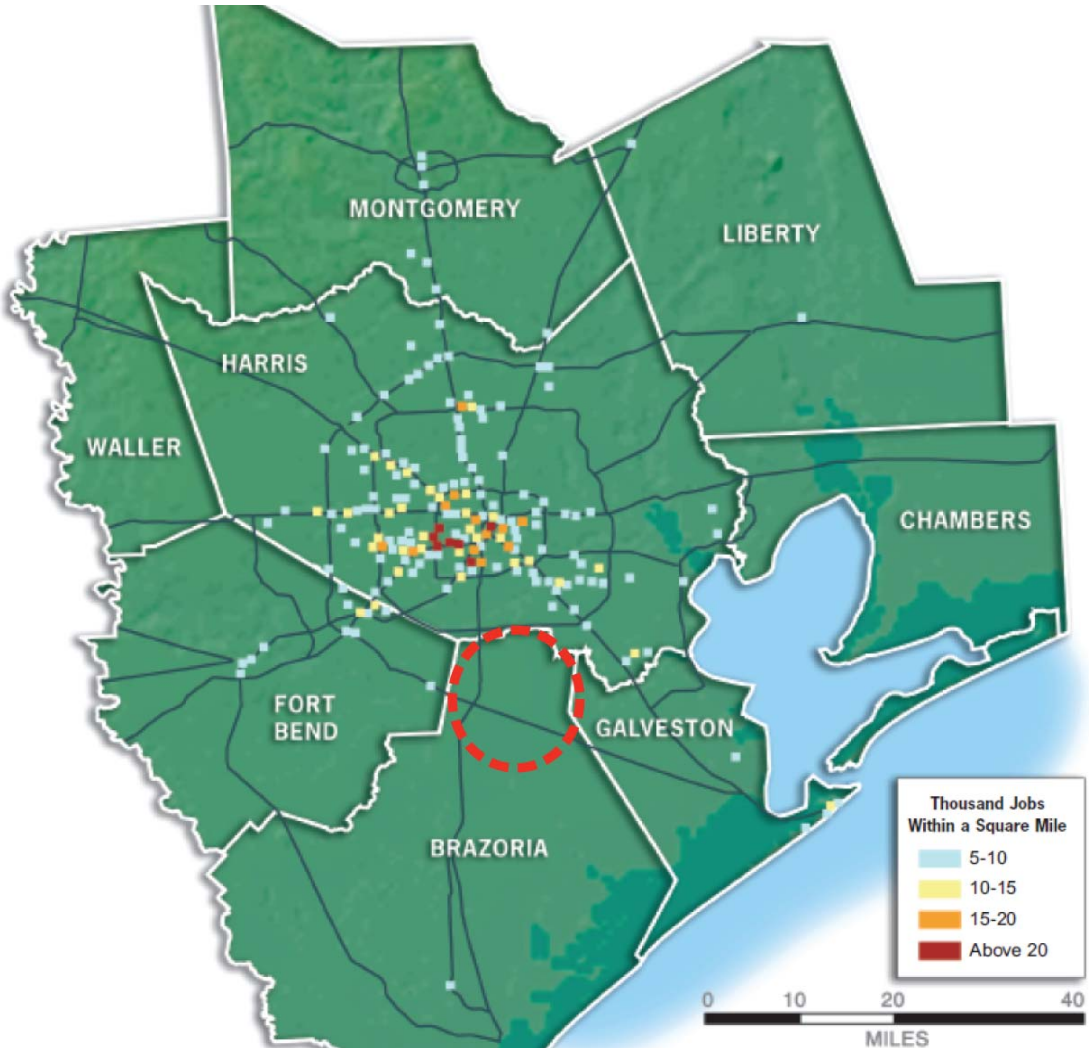
Employment density within the sub-region roughly mirrors population density. In 2011, the largest of concentrations of jobs are in Pearland along the major highways, and south of Alvin. See Appendix 1.4 for a map illustrating employment density.

By 2035, additional jobs are expected within the sub-region. As illustrated in Map 2.8, these new jobs are anticipated to be in Fort Bend, located just west of the study area. Additionally, job growth is expected just south of the Alvin Bypass.

Map 2.8 2035 Job Density



Map 2.9 2035 Employment Centers



Source: H-GAC 2035 Regional Growth Forecast, 2006

2.4.3 Sub-region Employment Growth

A regional forecast study completed by H-GAC mapped centers of employment in the region, which showed the locations of areas by thousands of jobs per square mile in 2005. Most of these areas are concentrated inside the IH 610 loop, particularly in downtown Houston, the Medical Center, and other parts of southwest and northwest Houston. H-GAC also modeled future employment distribution in 2035 (Map 2.9); although there are more of these centers and they are more widely scattered—particularly along major highways—none are projected to be within the study area.

Although no large employment centers were projected within the sub-region, new jobs are anticipated. For example, the City of Pearland has a number of new job centers, such as the 9.45-acre Pearland Industrial Park,

which will have 100 employees; Merit Medical Systems on Kirby Drive will be building a new facility to house 220 employees; and major medical provider Kelsey-Seybold's Administrative offices located on 18 acres in the Shadow Creek Ranch area—with initial employment of 750 people. Also in Pearland, the Pearland Surgery Center is planned for 5 acres on Kirby Drive. In Alvin, Reactor Services International completed a new 5,000 square facility and the Texas New-Mexico Systems Operation Center has opened a 13,000 square foot facility. Recently, Ascend Performance Materials announced that they will construct a new propane dehydrogenation facility in Alvin creating 100 jobs and $1.2 billion in capital investments. Pearland and Alvin have also partnered to attract Denbury, a gas separation plan; plans to build a $100 million dollar plant in the region. Further south, there is a new investment at Chocolate Bayou—a 47.2 million outlay for the Ascend Materials and Cyanco plant 35-million project by University General Hospital in Alvin, creating over 200 jobs.[1]

The expansion of employment centers south of the sub-region will also influence population and employment growth. For example, Dow chemical recently announced that it will invest more than $4 billion in a Freeport-area site to include four new manufacturing plants. Combined, these south-county projects will create thousands of short-term construction jobs and hundreds new long-term high-paying jobs to operate and maintain the facilities. Additionally, the expansion of the Panama Canal is projected to strongly increase the role local ports play in exporting liquefied natural gas and its by-products. Though it is currently uncertain how the study area will be changed by these economic developments, Pearland, Alvin, and the surrounding unincorporated areas of Brazoria County will likely house the majority of new related residents.

2.4.4 Sub-region Commute Patterns

In the sub-region, 83.7 percent of workers drove alone to work, whereas 10.4 percent carpooled, 0.3 percent used transit, 0.8 percent walked, and 2.9 percent worked at home (Figure 2.5).[2] These are similar percentages to residents county-wide and in the MSA, but the sub-region does have a lower mode split for transit and walking than the MSA. This is most likely due to the fact that transit has a limited presence in the area. As illustrated in Figure 2.6, the most marked difference is in the median travel time to work: 31.1 minutes for workers within the sub-region, but 27.7 minutes for overall County residents and the MSA. The number of vehicles available by household was consistent across the sub-region, Brazoria County and the MSA, but a larger percentage of Alvin households have no vehicle available. See Appendix 1.4 for additional commuting statistics.

Figure 2.5 Sub-region Commuting Patterns 2010

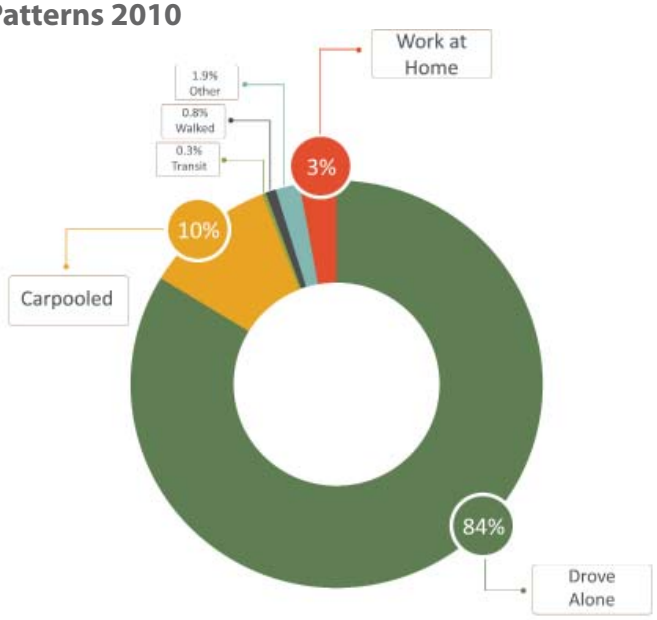
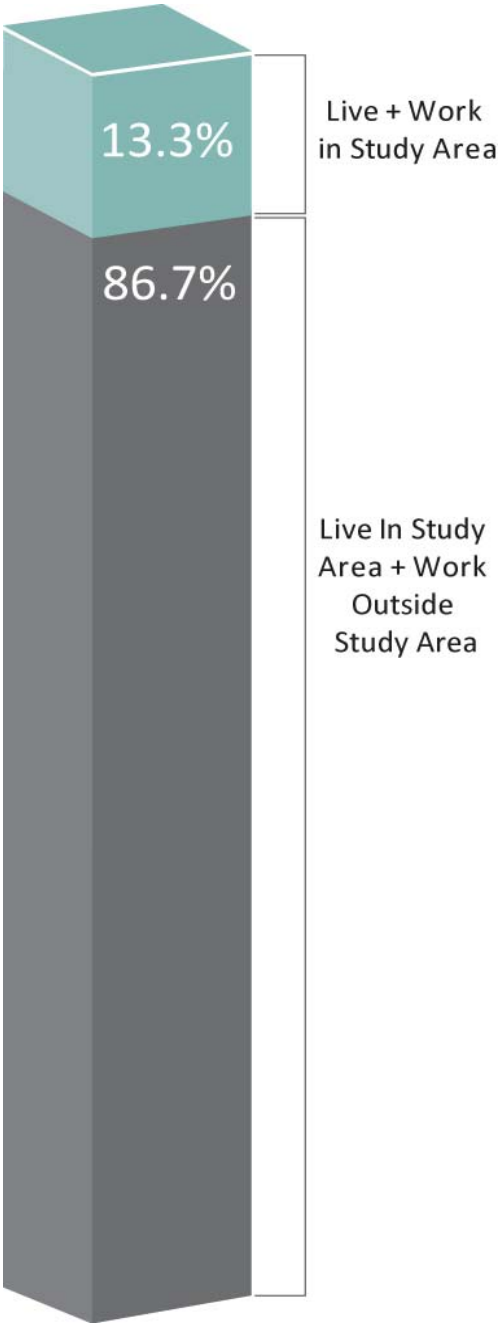


Figure 2.6 Mean Commute Time in Minutes

1 "Gaining Momentum: City of Alvin State of the City Address." October 11, 2011
2 U.S. Census 2010

Figure 2.7 Resident/Work Locations



Source: 2010, Housing and Transportation Affordability Index

Of the population who either work and/or live in the sub-region, 62,722 people live within the sub-region but commute outside of the region for work. Less than half of that figure—24,202 people—live outside of the sub-region but work inside of it. Only 28.5% of residents living within the sub-region also work in the sub-region.

These figures are consistent with other studies. According to a 2012 study by the Texas Medical Center, 4,603 people from a northern Brazoria zip code commute into the medical center for work.[1] The sub-region's average commute times ranged from 26.1minutes in Alvin up to 32.3 minutes in the City of Manvel. Commutes of this length suggest trips into Houston and possibly to Freeport and other port-related jobs on the Gulf of Mexico. Such commuting patterns are consistent with recent growth patterns within the greater H-GAC region, in which residential development supports the growth of 'bedroom' communities throughout the metro area.

1Texas Medical Center 2012 Top 10 TMC Employee Zip Code Density Map

Figure 2.8 Location of Employment and Residence

	2010	
	Count	**Share**
Employed in the Selection Area	33,834	100%
Employed in the Selection Area but Living Outside	24,202	71.5%
Employed and Living in the Selection Area	9,632	28.5%
Living in the Selection Area	72,354	100%
Living in the Selection Area but Employed Outside	62,722	86.7%
Living and Employed in the Selection Area	9,632	13.3%

2.2.5 Housing Characteristics

According to Census data, 93.1 percent of housing units in the Alvin-Pearland CCD are occupied, compared to 89.8 percent region-wide and 90.1 percent county-wide. The sub-region also has a higher rate of owner

occupancy than the region. Most housing units within the sub-region are single-unit, detached structures, with 80.5 percent of units in Pearland and 54.0 percent in Alvin. Mobile homes make up 12.3 percent of housing in the Alvin-Pearland CCD.

A plural majority of units in the sub-region were built recently, with 39.4 percent of housing units built in 2000 or later. In Pearland, the majority of homes were built in 1990 or after. About half of all sub-region residents moved into their existing homes in 2005 or later. See Appendix 1.5 for additional information regarding the sub-region's housing characteristics.

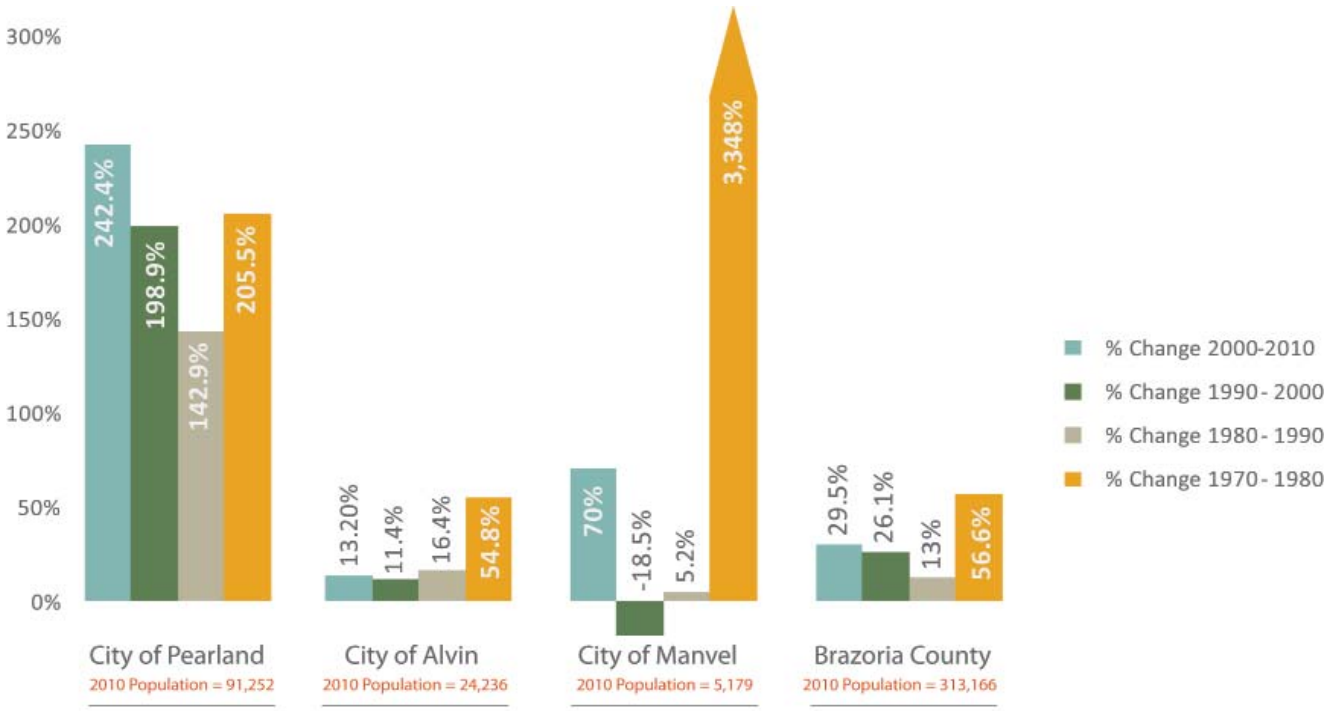
2.4.6 Trends + Present Growth

For the last several decades, the population trend in the sub-region has been one of growth. Figure 2.9 illustrates population change for the County and cities of Pearland, Alvin, and Manvel from 1970 through 2010.

All three cities and Brazoria County have exhibited growth in this timeframe; the period of 1960 to 1980 was especially marked by brisk growth. Between 1980 and 1990, growth slowed, but was still strong in all four geographies. The sub-region experienced substantial growth between 2000 and 2010, with Pearland growing by 242.4 percent, Alvin by 13.2 percent, and the City of Manvel reversing the previous decade's decline to grow by 70 percent. Brazoria County as a whole grew by 29.5 percent between 2000 and 2010.

Much of this growth has occurred as new single family, suburban-style neighborhoods, particularly the large-scale residential developments that evolved in Pearland and Manvel. With the zoning codes in place by each municipality, this trend of single-family suburban home growth is expected to continue. See Appendix 1.3 for more population change data.

Figure 2.9 Sub-region Population Change, 1970-2010

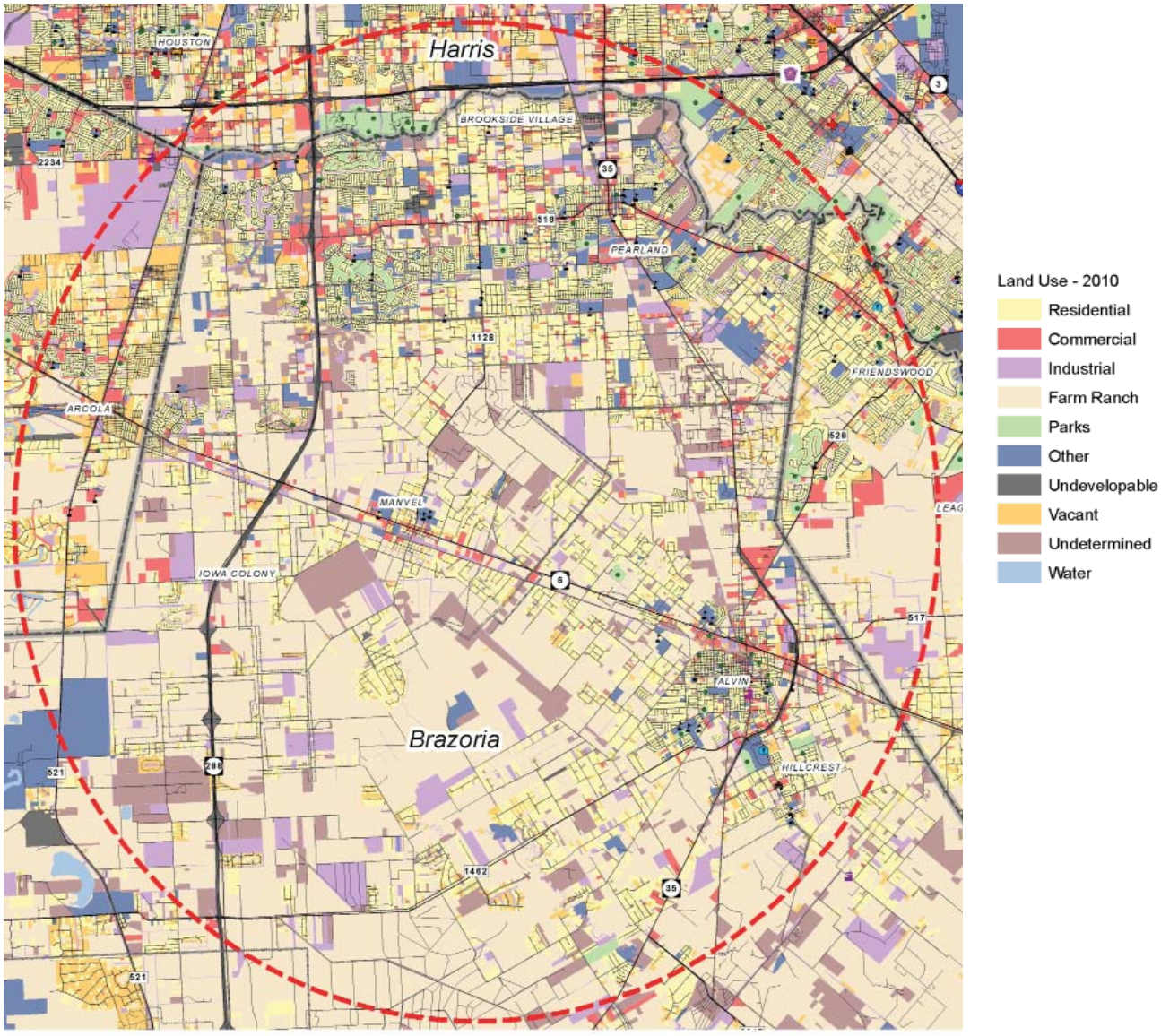


Sources: City of Alvin Comprehensive Plan; Texas State Historical Association's Texas Almanac

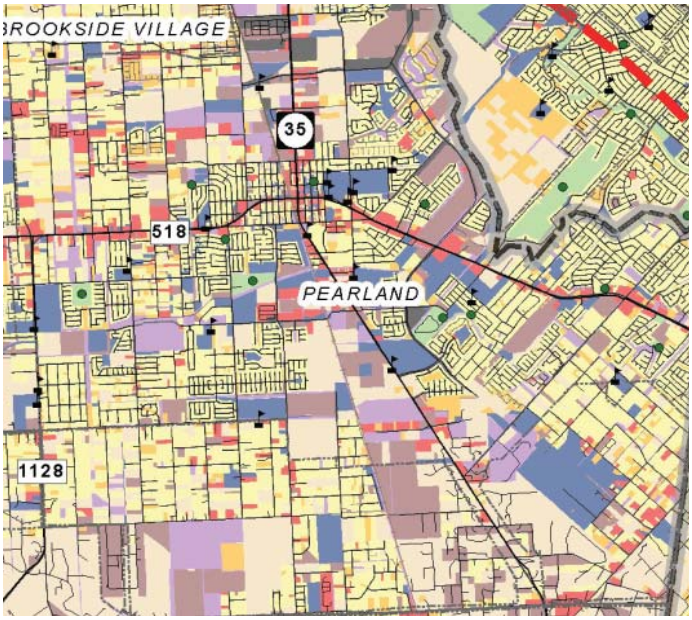
2.5 Land Use + Development Patterns

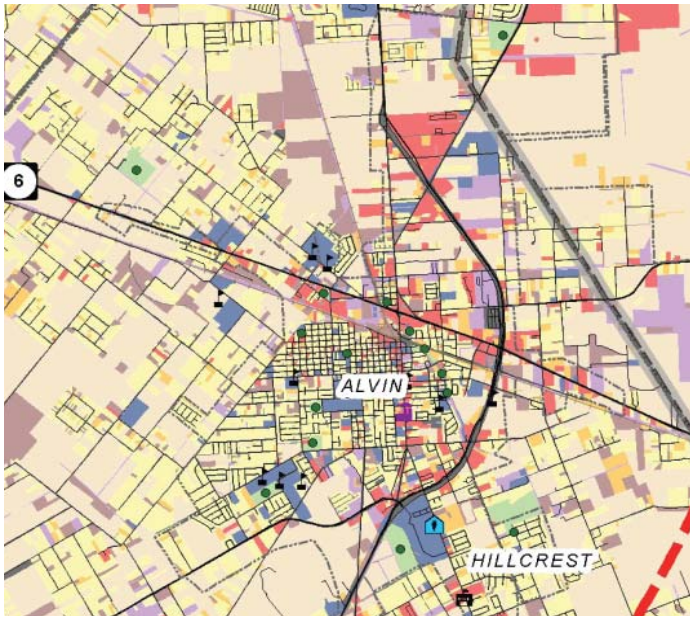
Map 2.10 illustrates existing land use within the sub-region and Map 2.11 depicts the Cities of Pearland and Alvin. Pearland is comprised of predominantly single-family residential uses in typical suburban-style developments. Commercial uses line Walnut Street and Main Street. Brookside Village is almost entirely rural-style residential, with residential lots oriented alongside north-south and east-west, two-lane thoroughfares. South of Pearland, land uses are similar to that of Brookside Village, with rural-style residential land/small ranch uses interspersed with larger industrial sites and large tracts of undeveloped land. This pattern is fairly consistent throughout the rest of the study area with the exception of the City of Alvin. Alvin has a traditional small-town pattern of land use, with a discernible commercial core, low-medium density residences interspersed with commercial industrial and other uses.

Map 2.10 Existing Land Uses in Sub-region



Map 2.11 Existing Land Uses in the City of Alvin and the City of Pearland





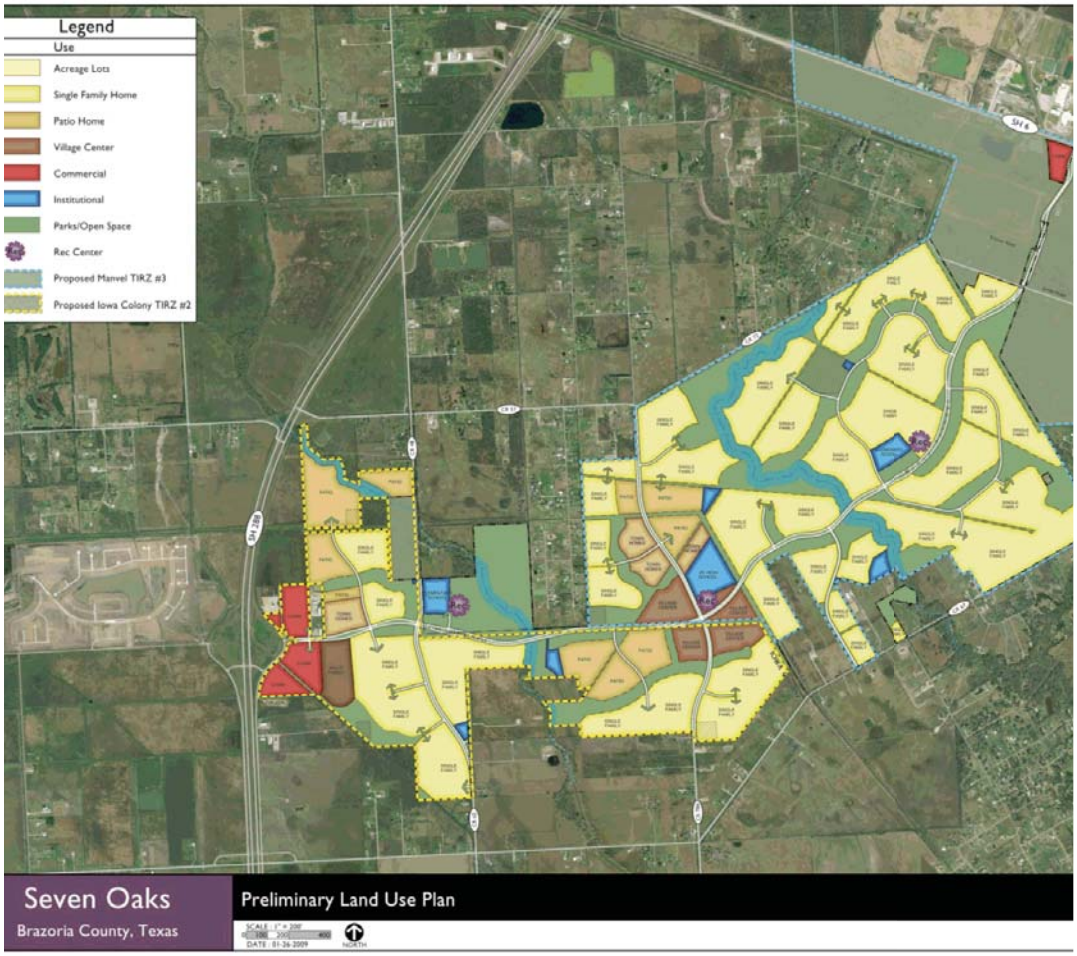
In recent years, a number of residential neighborhoods have been developed, such as Southfork just north of Manvel, Sedona Lakes off of Bailey Avenue, and Rodeo Palms west of SH 288. If these developments are an indication, the trend in the sub-region is for conversion of rural-residential and agricultural land into self-contained low-density, suburban residential neighborhoods.

The existing land use pattern, with its predominance of low-density residential/ranch and undeveloped sites is conducive to future development. This is particularly true for the areas near SH 288 and potentially between Pearland and Alvin on SH 35, where there are many single-owner lots of substantial size. Planned developments include:

- **Lower Kirby Urban Center.** 1,000 acres of mostly undeveloped land, located on the northern edge of Pearland on the way into Houston (on Beltway 8 and SH 288). Several plans have been developed for this site previously (Water Lights Development, Promenade Regional Development Plan) but have not moved forward. This plan calls for keeping the existing zoning west of Hooper Road, and east of Hooper road creating a matrix of mixed uses including urban neighborhood, commercial transition, a Research/Tech Campus, mixed use core, and some Highway Commercial.
- **Old Townsite Downtown Pearland Development District.** This plan was prompted by a desire to develop more defined core for Pearland through a centralized downtown area. Currently the site is oriented towards vehicles, and is not pedestrian-friendly or well-connected. The plan capitalizes on the existence of much of the original traditional grid, and outlines steps for infill development and re-connecting the area.
- **Seven Oaks.** Part of the Iowa Colony Tax Increment Reinvestment Zone (TIRZ), the TIRZ was essential in the creation of the master planned community that has a mix of commercial, single-family and mixed-use development that reaches into both Iowa Colony and Manvel. To realize the development, it will require extensive construction of new infrastructure. Map 2.12 illustrates the Seven Oaks development site.

An examination of land use in the sub-region reveals large tracts of vacant, developable land, particularly south of SH 6. Given the current single-family neighborhood character of many sub-region communities and anticipated population growth, these areas offer opportunities for future residential development. Appendix 1.6 contains additional information regarding future projects proposed within the sub-region.

Map 2.12 Seven Oaks Development Site



2.6 Previous Plans + Studies

There are a number of existing regional and local planning initiatives that will likely impact future transportation planning within the sub-region. Existing plans emphasize short and long-term strategies and recommended projects targeting increasing transit options, improving air quality, inter-modal infrastructure improvements, and managing demand and capacity on regional roadways. Appendix 1.7 contains an overview of existing plans and studies and examines how each relates to transportation in the sub-region. Major studies include the following:

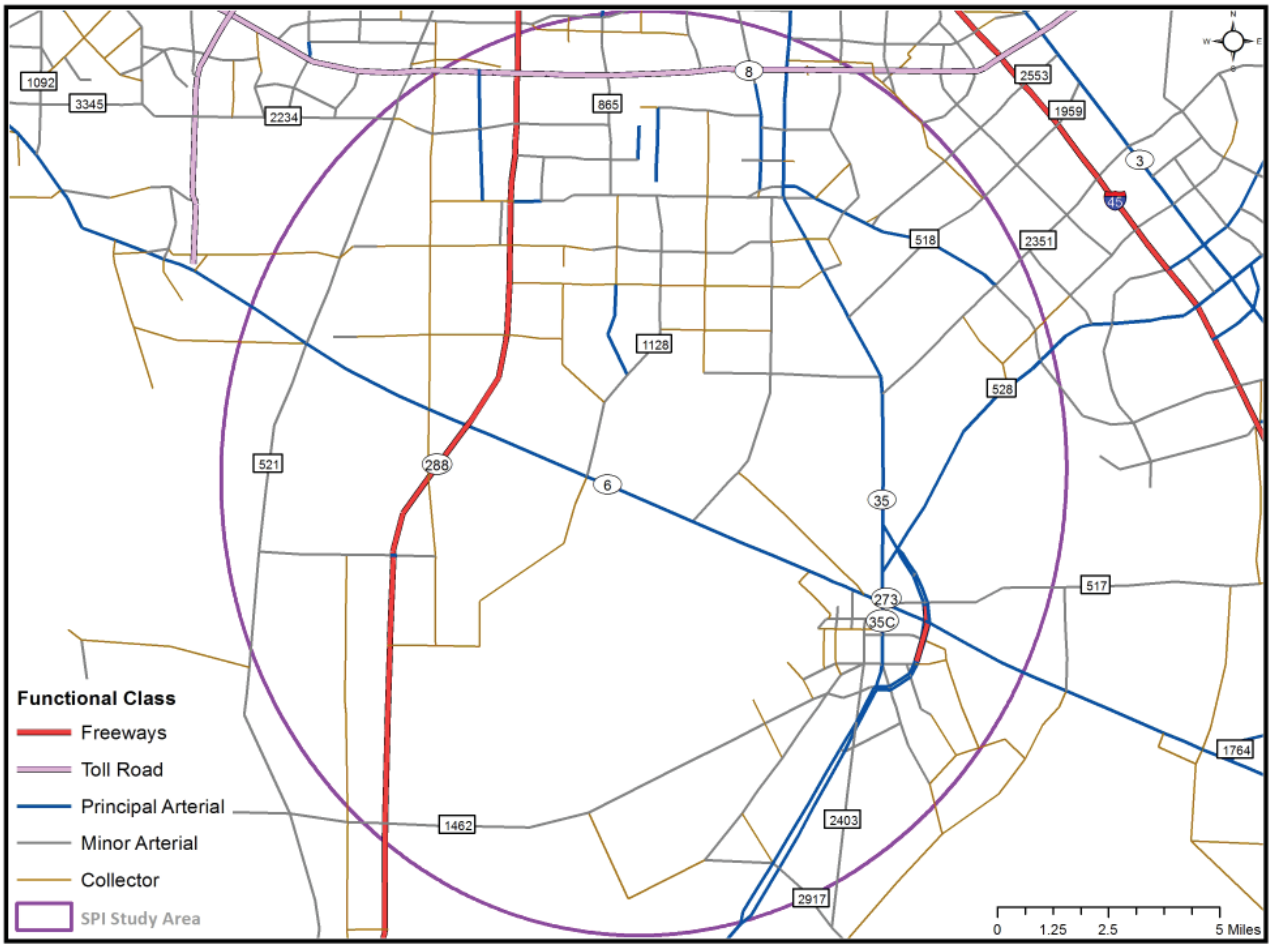
- Bridging Our Communities – The 2035 Houston-Galveston Regional Transportation Plan (RTP) Update
- H-GAC Regional Transit Framework Study
- H-GAC Regional Goods Movement Study
- City of Alvin Comprehensive Plan
- Manvel 2007 Comprehensive Plan – A Visionary Future
- City of Pearland 2004 Comprehensive Plan Update
- State Highway 35 Major Corridor Feasibility Study

- State Highway 6 South Corridor Access Management Plan
- Old Townsite Downtown Development District Plan
- Lower Kirby Urban Center Master Plan and Implementation Strategy

2.7 Roadway Assessment

The existing roadway network system provides area residents with the ability to travel for work, shopping, and other important purposes. However, the efficiency with which these trips can be made determines the effectiveness of the roadway network. A few major roadways that connect various communities dominate the travel demand in the sub-region. With most travel destinations to the north and a lack of major east-west roadways in the area; most travelers largely depend on SH 288 for their regional travel needs. This poses a challenge for various agencies, each of which must continue to manage their existing facilities while accommodating increased regional travel demand. The roadway system in the study area consists of major regional and local roadways that serve the diverse needs. The Texas Department of Transportation (TxDOT) maintains the state roadway system which mainly provides regional mobility, while cities and counties collectively maintain the rest which primarily provide access to the state system and also serve travel needs within the region. Map2.13 illustrates the major roadways within the sub-region. See Appendix 1.8 for a brief description of the major roadways within the sub-region.

Map 2.13 Existing Roadway Network



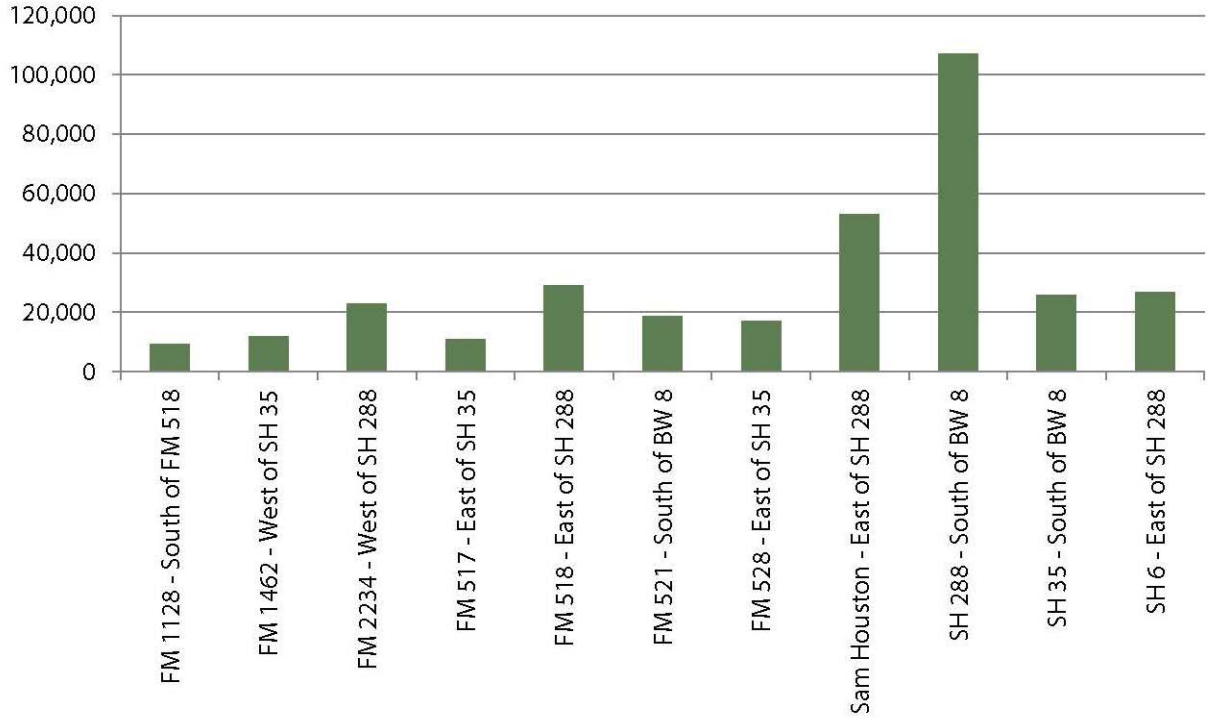
Source: H-GAC Regional Travel Demand Model

2.7.1 Existing Transportation Demand

In the past decade (2001–2011), the Houston metropolitan area has experienced some of the highest population growth in the nation. This has resulted in significant increase in demand for travel on roadways in the region which is directly related to population growth and land use development. SH 288 has experienced the highest increase in traffic volumes over the last decade with 21,000 more vehicles per day today compared to 2001.

The existing daily traffic volume along various roadways in the study area is illustrated in Figure 2.10. It is evident from the graph that traffic demand along SH 288 is more than double that of other major roadways in the study area and, creating enormous pressure on a single route. In addition to SH 288 and Sam Houston Tollway, the FM 518, SH 6 and SH 35 arterials serve the most travel needs in the area.

Figure 2.10 2011 Annual Average Daily Traffic



Source: Texas Department of Transportation, Traffic Maps, 2011.

2.7.2 Level of Mobility

The level of mobility (LOM) was developed by H-GAC to illustrate the degree of congestion on roadways within the region. LOM is the primary mobility measure used in H-GAC's 2035 Regional Transportation Plan to assess the effectiveness of the Houston area roadway system. The LOM is divided into four categories. Tolerable LOM represents acceptable traffic operating conditions. A moderate LOM is the point at which the volume of vehicles is approaching the capacity of the facility and the traffic flow is breaking down. Serious and severe LOMs relate to considerable delays and roadway system failure. The LOM is comparable to the standard engineering Level of Service (LOS) measure which is based on volume-to-capacity (V/C) ratios.

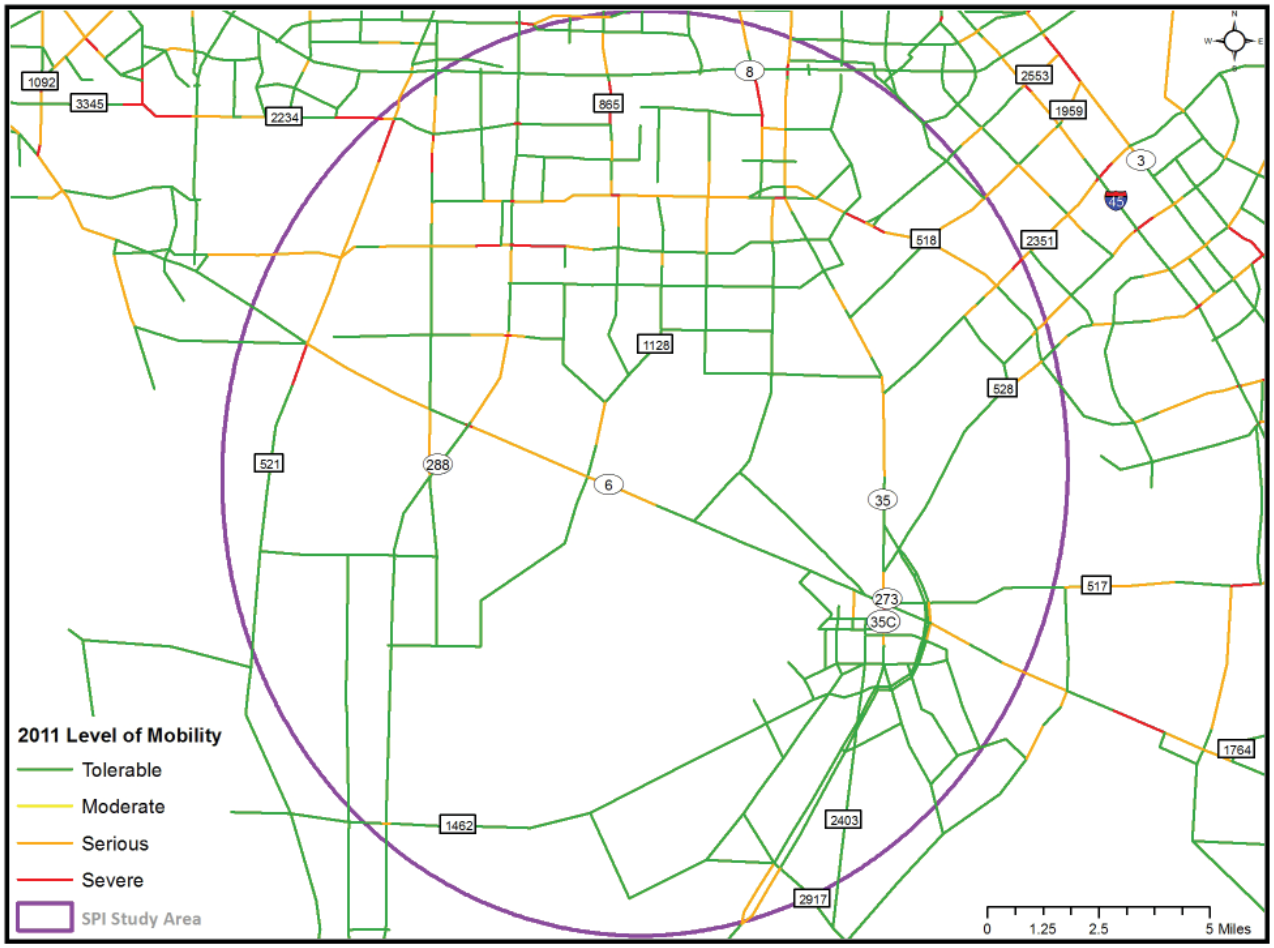
A planning-level capacity assessment of existing roadway system was conducted using the regional travel demand model. Map 2.14 illustrates the existing level of mobility for roadways in the study area. Based on the 2011 model results, current level of mobility is severe along SH 288, SH 35, FM 518, and FM 521.

Figure 2.11 Level of Mobility

Level of Mobility (LOM)	V/C Ratio
Tolerable	**Less than 0.85**
Moderate	Between 0.85 and 1.00
Serious	Between 1.00 and 1.25
Severe	Greater than 1.25

Source: Houston-Galveston Area Council

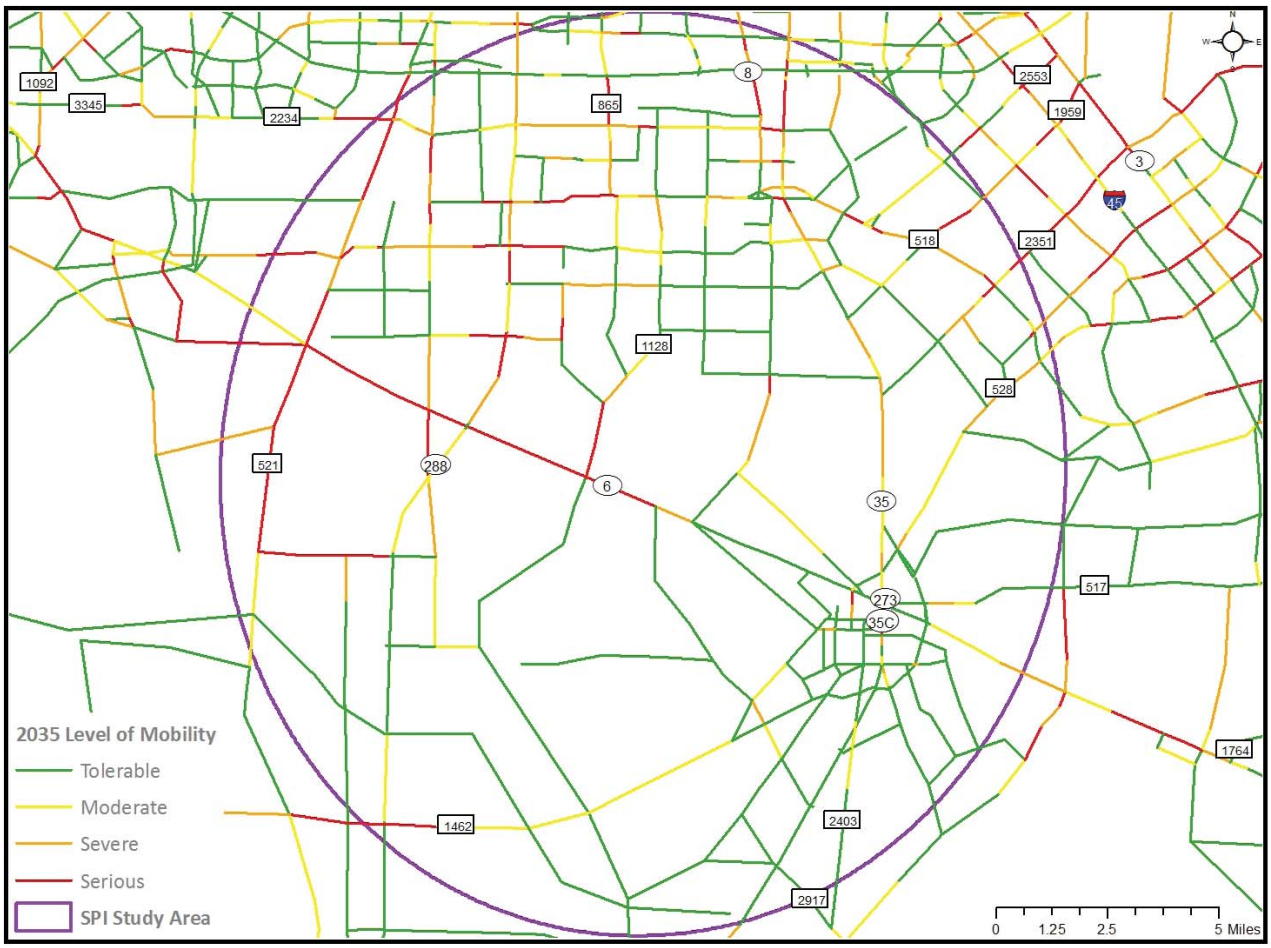
Map 2.14 2011 Existing Daily Level of Mobility



Source: H-GAC Regional Travel Demand Model

A future mobility assessment was conducted for the study area roadway network using the 2035 regional travel demand model. The model incorporates the forecasted 2035 population and employment and the 2035 planned/committed transportation projects in the region. As forecasted by H-GAC, the study area is expected to increase by 4 million people and 1.8 million jobs by 2035 which determines the demand for travel and the network determines the roadway capacity to accommodate this future demand. Map 2.15 illustrates the projected level of mobility in 2035 along the roadways in the study area. The distribution of new growth in the region will have a significant impact on the transportation system by 2035. This would result in increased congestion levels, especially along SH 288, SH 35, FM 518, FM 521, and FM 1462 in the study area.

Map 2.15 2035 Projected Daily Level of Mobility



Source: H-GAC Regional Travel Demand Model

2.7.3 Safety

Vehicular crash data received from H-GAC for the five-year period of 2007 – 2011 was collected and analyzed specifically for committed and unfunded[1] projects identified in H-GAC's 2035 Regional Transportation Plan located in Brazoria County. Crash data was used to determine roadways with potential safety deficiencies. Brazoria County experienced a total of 22,061 crashes during the five-year analysis period. 6,923 (31.38%) of those crashes were Non-Fatal Injured Crashes and 153 (0.69%) were Fatal Crashes. During the same analysis period, the State of Texas experienced a total of 2,098,222 crashes. 767,456 (36.57%) of those crashes where Non-Fatal Injured Crashes and 14,556 (0.69%) were Fatal Crashes. Simply comparing Brazoria County to the State's Non-Fatal Injured Crash and Fatal Crash averages illustrates that Brazoria County is slightly below the State's Non-Fatal Injured Crash average for the five-year analysis period while Fatal Crash averages are virtually the same.

1Committed transportation projects are those for which funding is earmarked for project construction. Unfunded projects are those identified but lack funding allocation.

Corridor crash rates for committed and unfunded projects identified in H-GAC's 2035 Regional Transportation Plan located in Brazoria County were also developed and analyzed for the three-year period of 2009 – 2011. Crash rates were expressed as crashes per 100 million vehicle miles traveled based on crash data received from H-GAC and Average Daily Traffic (ADT) and Statewide Crash Rate per Road Type obtained from TxDOT's Crash Records Information System (CRIS)®. CRIS incorporates both county and city crash data. A Crash Ratio of 100 Million VMT to Statewide Average was developed to calibrate findings. 7th Street and CR 59 have the highest corridor crash rates, followed by Oday Road, Harkey Road, Veterans Drive, CR 403, FM 2351, CR 181, and FM 518. Appendix 1 contains detailed corridor crash data.

In addition to the Crash Ratio of 100 Million VMT to Statewide Average, an area of focus and concern were the corridors with fatal crashes. Figure 2.12 lists corridors that experienced at least 1 or more fatal crashes during the three-year analysis period. SH 35 from FM 518 to south of SH 6 experienced the most fatalities within the three year period. SH 6 from SH 288 to Galveston County Line and FM 1462 from SH 288 to SH 99 experienced the second highest fatalities.

Figure 2.15 Corridors with Fatal Crashes

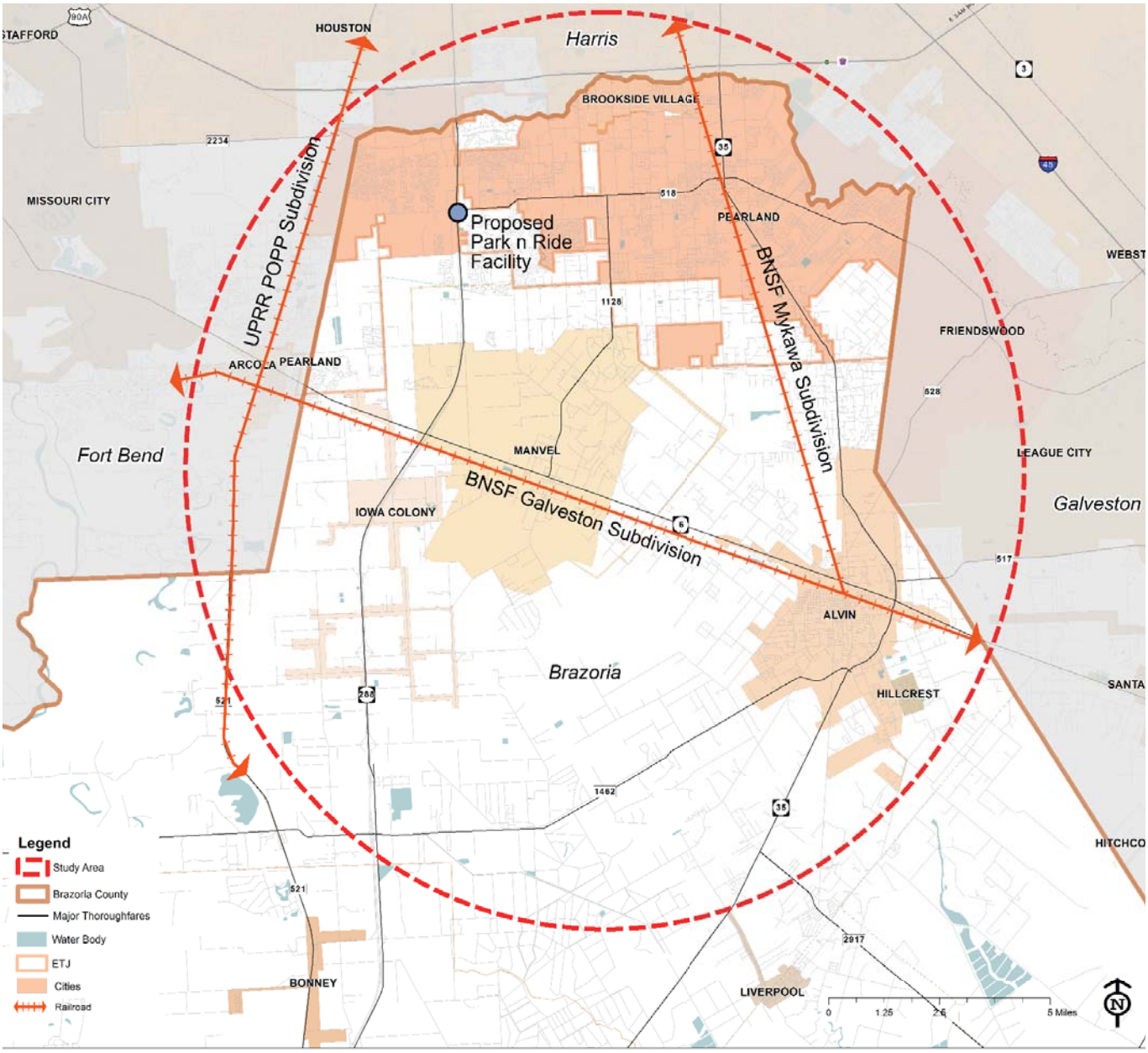
Street	From Limit	To Limit	Fatal Crashes
SH 35	**FM 518**	**S OF SH 6**	**5**
SH 6	SH 288	GALVESTON C/L	4
FM 1462	SH 288	SH 99	4
SH 35	FM 2403	FM 523	3
SH 288	SH 6	SH 99	3
FM 1128	BROADWAY	BAILEY RD	1
FM 521	BRAZORIA/FORT BEND C/L	FM 1462	1

2.7.4 Transit + Rail Assessment

Transit and rail facilities provide communities with an important mobility alternative to automobiles and trucks, allowing residents and goods to move more efficiently through an area. The following section describes the transit and rail facilities in the study area.

Map 2.16 illustrates existing transit and rail facilities within the sub-region.

Map 2.16 Transit + Rail Facilities



Transit

Currently, there is no transit service operating in the study area. However, on December 5th 2011, the Metropolitan Transit Authority of Harris County (METRO) purchased 15.26 acres of land near SH 288 and FM 518 in the Pearland area for a future "Park & Ride" facility. METRO currently operates 29 Park & Ride lots throughout neighboring Harris County and is planning to provide Brazoria County residents another option for traveling to the Texas Medical Center and other downtown-area destinations at some point in the future.

Rail

There are three freight rail lines that traverse the study area:

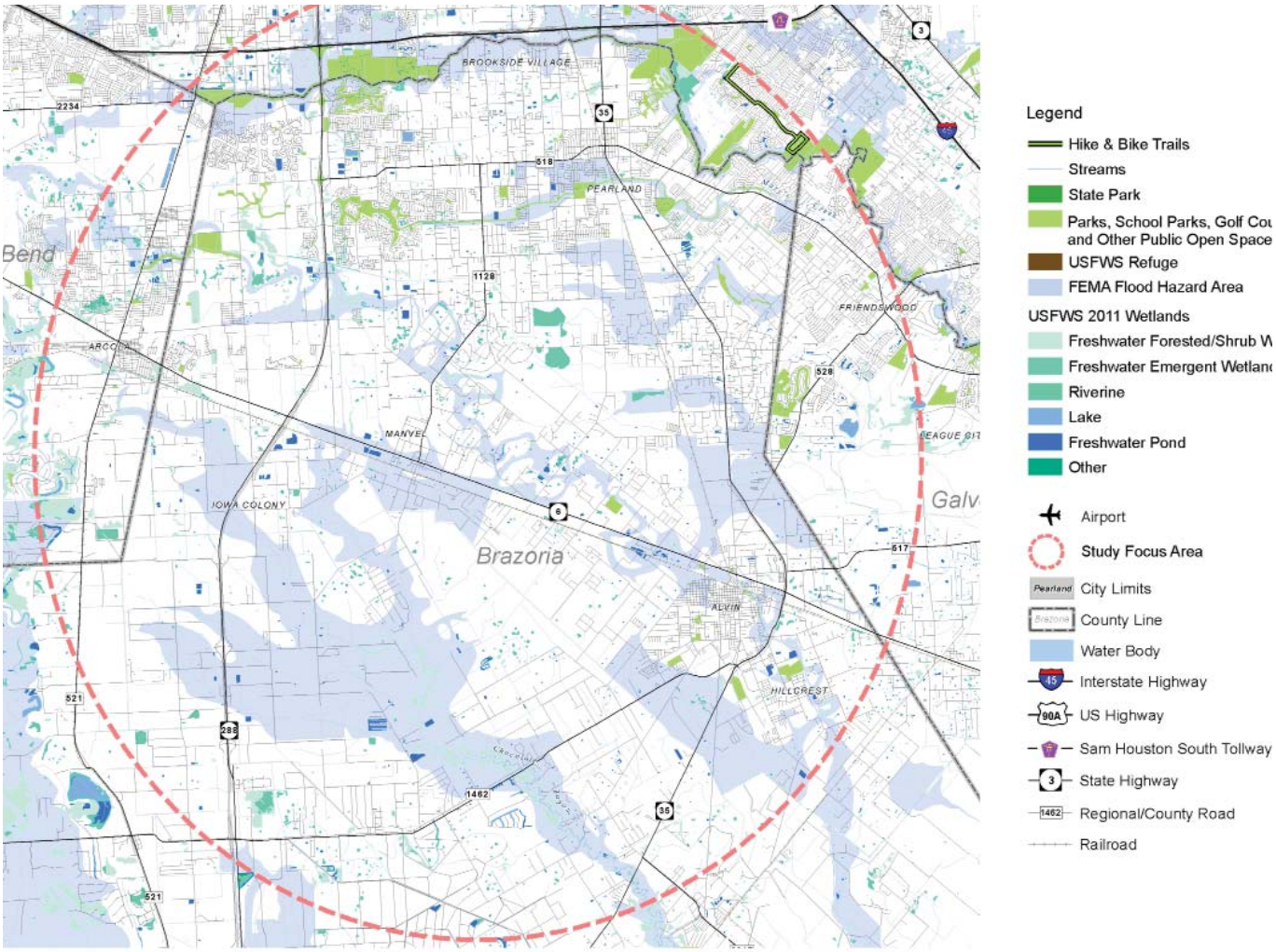
- The Burlington Northern Santa Fe railway (BNSF) Mykawa Subdivision that parallels the west side of SH 35 in a north-south direction.
- The Burlington North Santa Fe railway (BNSF) Galveston Subdivision that parallels the south side of SH 36 in an east-west direction.
- The Union pacific Railroad (UPRR) POPP Subdivision that parallels the west side of FM 521 in north-south direction.

The BNSF Mykawa Subdivision is predominantly a bidirectional single-track railroad with various sidings that permit for trains to pass each other. It averages 15-25 daily trains and connects to the BNSF Galveston Subdivision. The BNSF Galveston Subdivision is predominantly a single-track railroad with various sidings. The corridor however, includes a second main track west of where the BNSF Mykawa Subdivision connects to it. It averages 45 – 55 daily trains and ultimately connects to Galveston Island. The UPRR POPP Subdivision is a short Industry Track that provides rail service from a main line directly to multiple industries. While the UPRR POPP crosses the BNSF Galveston Subdivision rail line, it does not connect to it.

2.7.5 Environmental Profile

The sub-region is a mixture of urbanized, rural, and environmentally sensitive natural areas. Although many of the environmental communities have transitioned to other uses, the sub-region has significant pockets of Coastal Prairie and Bottomland Forest, particularly along its waterways--though there are no major conservation areas within the sub-region. Areas adjacent to the waterways are designated FEMA Flood hazard zones; these areas are particularly prevalent south of SH 6.

Map 2.17 Environmental Profile



Bayous, Creeks, and Wetlands

The major environmental systems in the sub-region are related to its bayous. The most significant bayous are Mustang Bayou and Chocolate Bayou. From Fort Bend County, Mustang Bayou flows through the sub-region and eventually runs into New Bayou. It is almost completely channelized into an earthen ditch, and retains few of its natural characteristics. Despite this, wildlife still uses the corridor, such as coyotes, deer, and alligators. In Alvin, Chocolate Bayou is not channelized and has more natural conditions intact. It stretches from the western

edge of the sub-region to the southeast, and eventually flows into Chocolate Bay. Because of land conversions along the Bayou, there are some bacteria issues in the bayou's water.

Another significant water body is Clear Creek, which forms the border between Harris County and Brazoria County. The creek is considered polluted because of its high levels of chemicals from coolants and other sources that have runoff into the water. Other water bodies of note include Mary's Creek in Pearland, and the Brazos River Authority Canal.

Parks and Open Spaces

There are no national or state parks within the sub-region. At a regional level, Brazoria County operates the 80-acre Resoft County Park, just north of Alvin. The rest of the sub-region's parks and open spaces are provided by the municipalities. The City of Pearland has three community parks, eight neighborhood parks, and two dog parks. Many smaller, private open spaces exist within Pearland's residential neighborhoods. The City of Alvin has 13 parks, including the site of the Historic Depot. Immediately outside of the sub-region is Tom Bass Regional Park in Harris County and the Clear Creek Golf Course. Just over the county line is Tom Bass Regional Park and Clear Creek Golf Course.

2.7.6 Bicycle + Pedestrian Facilities

Existing bicycle facilities in the study area include:

- Pearland: One mile of multi-purpose trail between CR 109 and Oday Rd, between Broadway Street and Magnolia Street.
- Shadow Creek Ranch Trails: This development's trail network includes 1.5 miles of multi-purpose trail along an old utility corridor, a 2-mile trail on its northern edge, and a 1.9 mile trail on its southern edge.
- East of Pearland: 0.7 miles along Clear Creek (primarily a recreation trail)
- Alvin: 1.25 miles along Mustang Bayou.

There are a number of future trails proposed throughout the study area. Both the City of Pearland and the City of Manvel have identified new trail corridors within their city limits, but many of these are still in the conceptual phase.

There is a vast sidewalk network in Pearland's newer residential areas, but there is a need for interconnectivity between neighborhoods. Sidewalks also exist in most of the older neighborhoods west of Main Street in Pearland. Alvin has a network of sidewalks within its commercial core. There are very few sidewalks outside of either Pearland or Manvel due to the rural character of the rest of the sub-region.

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03 PLANNING PROCESS

3.1 Planning Process Description

Community engagement is crucial to understanding transportation issues, opportunities, and needs as perceived by citizens and key stakeholders. This process helps inform many of the issues, opportunities, and needs identified through technical analysis and ultimately, helps establish the overall transportation and land use vision and goals for the area. This vision and goals are important because they will drive the analysis and evaluation of transportation and land use scenarios developed for the study as well as the evaluation and prioritization of individual transportation projects.

A two-tiered approach to community engagement was established for the Northern Brazoria County – Pearland Sub-regional Planning Initiative (SPI) Transportation and Land Use Plan. The first tier included a Stakeholder Advisory Committee (SAC) comprised of staff and representatives from the local sponsoring jurisdictions and partner agencies. These included H-GAC, City of Pearland, City of Alvin, Bay Area Transportation Partnership (BayTran), Brazoria County, Texas Medical Center, and the 288 Partnership. The second tier of public engagement focused on garnering public input through a variety of engagement techniques and methods. These included Sponsoring Agency Staff Interviews; Elected Official Meetings, Public Workshops; and a Web-based Online Survey. Figure 3.1 lists all the meetings conducted for the study, their date, time, and locations. This section provides a brief description of each of the methods used in the two-tier public engagement approach. The section concludes with a summary of findings from these methods.

Figure 3.1 Public Engagement Meetings

Public Engagement Meeting	Date	Location
Stakeholder Advisory Committee (SAC) Meeting		
SAC Meeting # 1	05.10.12	H-GAC Offices
SAC Meeting # 2	09.13.12	H-GAC Offices
SAC Meeting # 3	12.05.12	Pearland City Hall
SAC Meeting # 4	02.03.13	Alvin City Hall
Sponsoring Agency Staff Meetings		
City of Alvin	05.11.12	Alvin City Hall
Brazoria County	05.11.12	Alvin City Hall
City of Pearland	05.11.12	Pearland City Hall
Greater 288 Partnership	05.11.12	Pearland City Hall
Texas Medical Center	05.23.12	Texas Medical Center
Brazoria County Engineer	05.23.12	Brazoria County Engineering Office
Workshops		
Elected Officials Workshop	07.12.12	Pearland City Hall
Public Workshop #1	07.12.12	Pearland City Hall
Public Workshop #2	09.27.12	Alvin Senior Center

3.2 Stakeholder Advisory Committee

The Stakeholder Advisory Committee (SAC) directed the SPI process. Ultimately, the implementation of the SPI recommendation will depend on local agency support. The SAC met regularly during the project process and provided input, direction, and feedback regarding the major phases and findings from the SPI process. The Stakeholder Advisory Committee was comprised of the following agencies and members:

Agency	Name + Title
H-GAC	Hans-Michael Ruthe – Project Manager
City of Pearland	Jon Branson – Assistant City Manger
City of Alvin	Larry Buehler – Economic Development Director
Brazoria County	Matt Sabesta – County Commissioner
Greater 288 Partnership	Kevin Cole – Chairman
BayTran	Barbara Koslov – President/Executive Director
Texas Medical Center	Reid K Mrsny, PE – VP Facilities Engineering

3.3 Sponsoring Agency Staff Meetings

The team interviewed agency staff early in the project process to candidly discuss the issues, challenges, opportunities, desires, and vision for their community. These meetings helped identify and confirm the major issues and challenges within each community and the entire sub-region. Findings from these meetings also helped inform the vision and goals that the study should establish. Agencies and staff interviewed included:

Agency	Name + Title
City of Pearland	Jon Branson – Assistant City Manager Trent Epperson- City of Pearland Director of Engineering & Capital Projects
City of Alvin	Larry Buehler – Economic Development Director
Brazoria County	Matt Sabesta – County Commissioner
Gerald Roberts, PE, County Engineer	Matt Sabesta – County Commissioner Gerald Roberts, PE, County Engineer
Greater 288 Partnership	Kevin Cole – Chairman

3.4 Elected Officials Workshop

Prior to the first public workshop, an elected officials meeting was held to present findings to date and receive input and direction regarding next steps. Specifically, the consultant team presented the project purpose, process, technical analysis findings, and a draft vision statement and goals for the project. Additionally, preliminary alternative transportation and land use scenarios were presented.

3.5 Public Workshops

Two Public Workshops were held during the SPI process to garner public input from interested citizens. These open forums provided citizens with an opportunity to voice their opinions, concerns, and ideas related to transportation issues. Comments received at the public workshops were considered for the development of the vision and goals of the SPI. Each public workshop encouraged interaction between local citizens, H-GAC representatives, and sponsoring agency staff.

Each workshop was conducted in an open house format that provided the opportunity for the informal review of display materials with the public. Brief presentations to educate attendees on the purpose of the study and the SPI process, as well as question and answer sessions, were held during public workshops. Materials presented at each meeting included maps and graphics designed to convey technical information to non-technical audiences. Representatives from the study team were available for one-on-one discussion at all of the workshops. Figure 3.1 outlines the dates of workshops and public engagement meetings. Additionally, workshop materials can found in Appendix 2.

3.6 Web-based On-Line Survey

A web-based, on-line survey was developed for the project to provide an easy and efficient opportunity for citizens to provide feedback and input. Questions in the survey centered upon understanding citizen perceptions related to transportation issues, commute patterns, and feedback regarding the proposed vision statement and goals for the SPI study. A copy of the survey is included in Appendix 2.

3.7 Public Engagement Findings

Below is a summary of the general themes expressed by citizens and stakeholders related to transportation and land use issues, opportunities, and needs in the study area. In conjunction with technical analysis, the themes and suggestions garnered through the public engagement process guided the identification of potential transportation strategies intended to address future needs in the study. Additionally, these public engagement findings helped shape the vision statement and goals for the study.

3.8 Vision Statement and Goals Framework

The vision and goals are the foundation of a long-range SPI process. They guide the development of the process by providing a basis for evaluating transportation and land use improvements. For North Brazoria County and the City of Pearland, the goals represent the general themes and overall direction that stakeholders and citizens envision for the future of the sub-region.

Informed by the technical analysis and citizen and stakeholder interviews, the following is the vision statement and goals developed for the Northern Brazoria County/Pearland SPI Project.

Vision Statement

The residents of the region will have a high quality of life built on livable transportation and land use solutions that promote economic development; cultural diversity; community health and safety; preservation of natural resources, and fiscal prudence.

Goals

- Engage the public in the decision making process
- Provide a wide range of transportation choices
- Promote economic development throughout the sub-region
- Maintain fiscal prudence
- Strengthen community well being and safety
- Preserve and enhance natural resources

It is important to note that developing a vision and goals that capture all the priorities of every citizen and stakeholder in the study area is a difficult if not impossible task. The established vision and goals however, were developed to achieve a high level of consensus between stakeholders and citizens. This consensus is important because the vision statement and goals will guide the analysis and evaluation of the alternative transportation and land use scenarios developed for the project as well as the evaluation and prioritization of individual transportation and transit projects. Overall, consensus on the vision statement and goals was achieved.

04 SCENARIO DEVELOPMENT + TESTING

4.1Introduction

Scenario planning is a tool applied to test a series of "What if?" alternative futures during the planning process. For purposes of this analysis, scenarios were developed to facilitate the comparison of a variety of transportation investments and land use patterns, allowing for a comparison of overall impacts to the 2035 sub-region transportation network. The results of each scenario were then compared to one another to inform project identification and assessment based on overall study goals and objectives. Scenarios are not generally intended as wholesale solutions, but are rather used for comparative purposes to facilitate an understanding of trade-offs. For example, a land use policy change in one scenario may have a higher impact on the transportation network then an expensive capital transportation investment in another. However, based on local conditions and priorities, there may be outside forces that determine which type of solution is the best fit for an area's needs. The results of scenario planning are used to inform the development of recommendations based on technical performance as well as stakeholder input. They also help identify potential projects that are the best fit for strategic investments consistent with sub-regional goals and objectives.

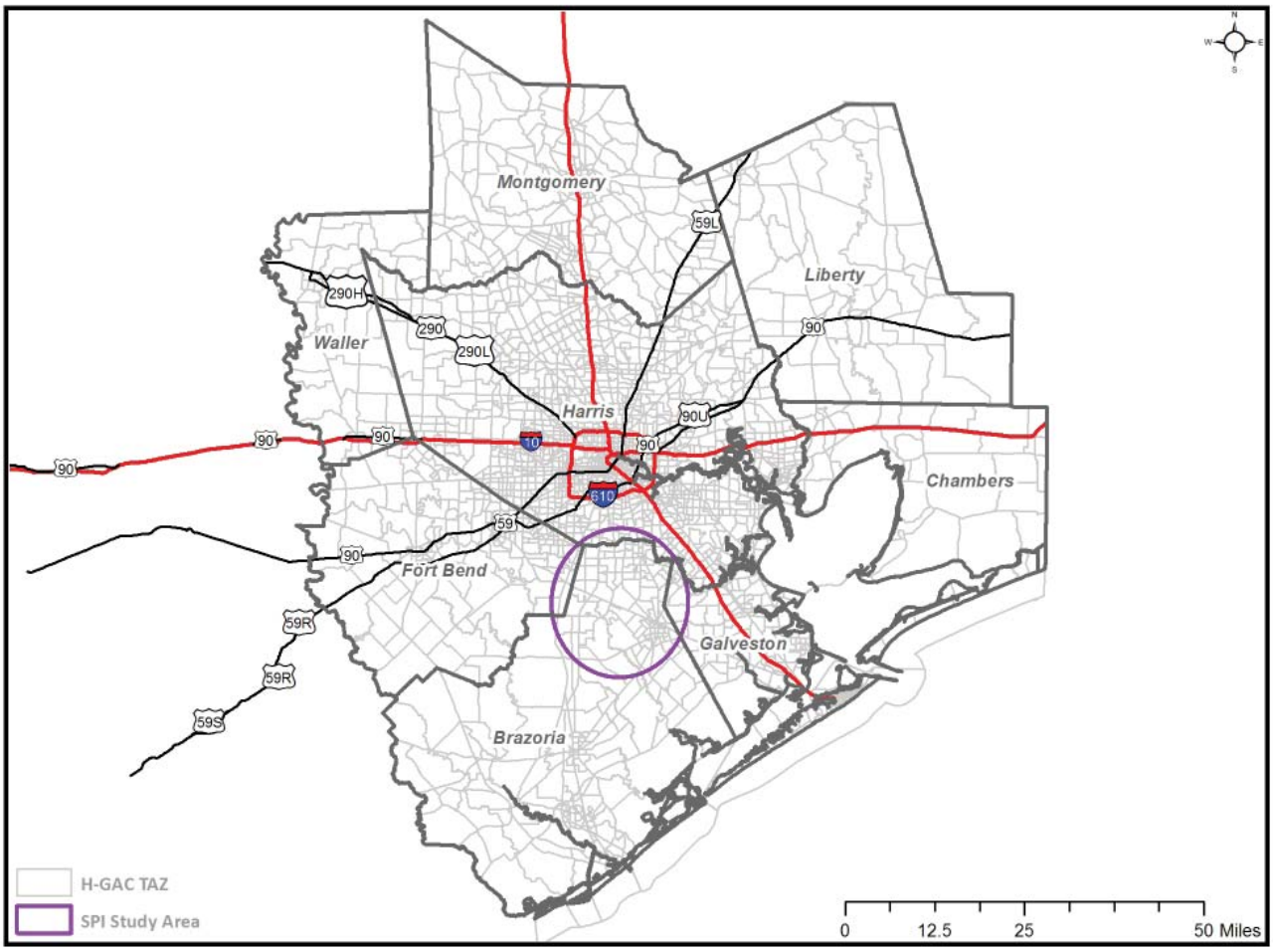
Four different land use and transportation scenarios were developed. They included a mix of transportation and transit projects proposed by previous studies, findings from the technical analysis, public engagement, and consultation with the SAC. The roadway improvement projects included in the scenarios were identified in the 2035 RTP. The transit projects included in the scenarios were also suggested in recent planning studies. Additionally, these scenarios included projected population, employment, and land use data as forecasted by H-GAC, as well as an alternative land use scenario that conceptualized more population in three sub-regional activity centers. Appendix 3 contains a detailed explanation of the scenario development and testing methodology.

4.2 Regional Travel Demand Model

H-GAC's regional travel demand model was utilized in the scenario development and analysis. The model area extends over 7,800 square miles and includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. Traffic Analysis Zones (TAZs) define geographic areas utilized to relate travel demand with socioeconomic characteristics including population, number of households and employment. Appendix 3 section 3.3 contains a more detailed explanation of TAZs.

Map 5.1 illustrates the eight-county region and its relationship to the Pearland/Northern Brazoria County SPI study area. The study team reviewed the regional travel demand model, focusing primarily within the study area, and worked with H-GAC staff to develop a refined model with an enhanced TAZ structure, additional street coverages, future local transportation improvements, and updated socioeconomic data.

Map 4.1 Model Area and Study Network



Source: H-GAC Regional Travel Demand Model

4.3 Transportation and Land Use Scenarios Tested

Four alternative transportation and land use scenarios were developed for the plan and include the following:

1. Baseline

2. Baseline + 2035 RTP Unfunded Projects

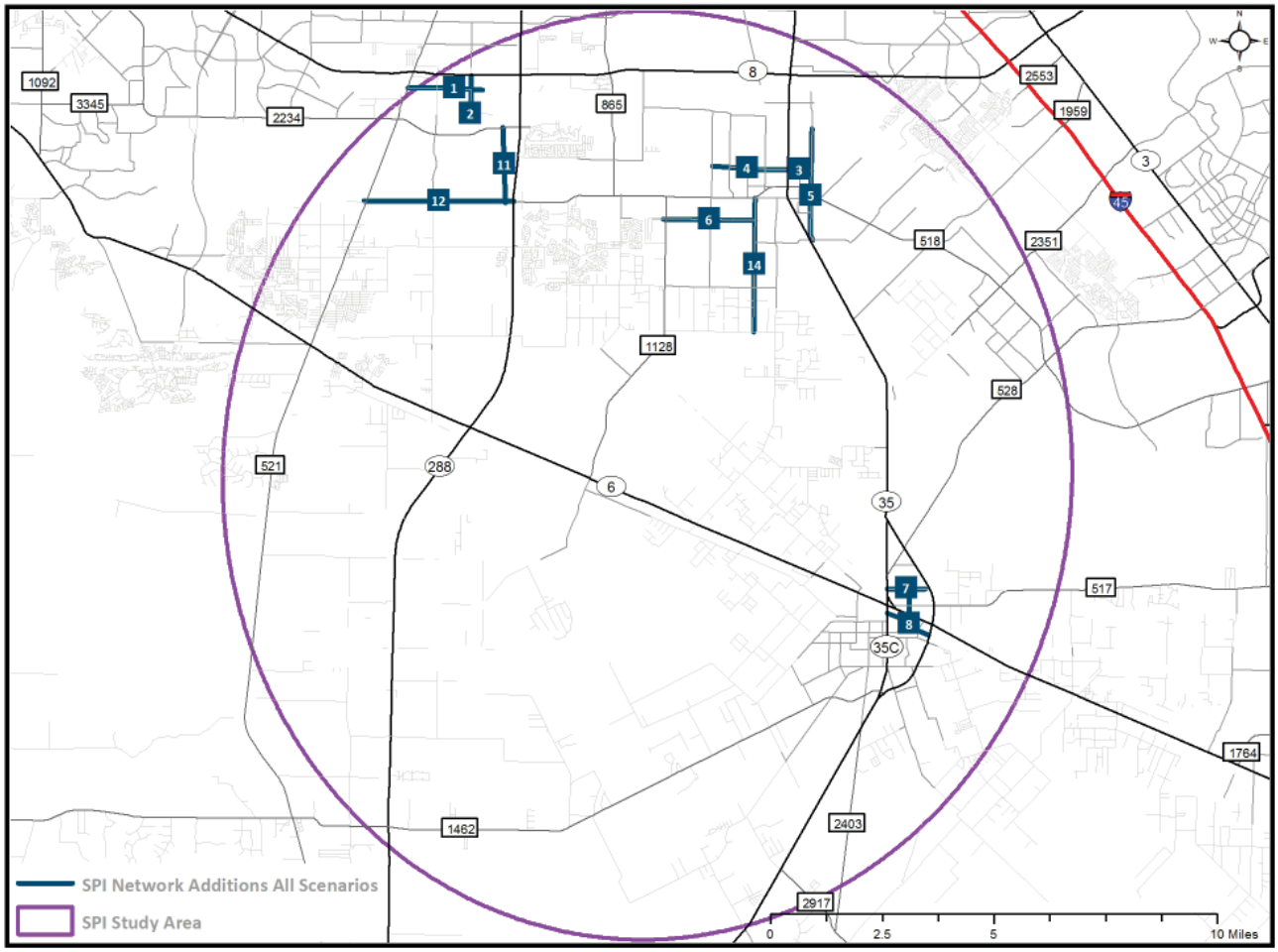
3. Transit Scenarios:

   - Version A – With baseline land use, H-GAC's regional socioeconomic forecasts
   - Version B – With alternative land use, modified socioeconomic forecasts

Scenario 1 | Baseline Scenario

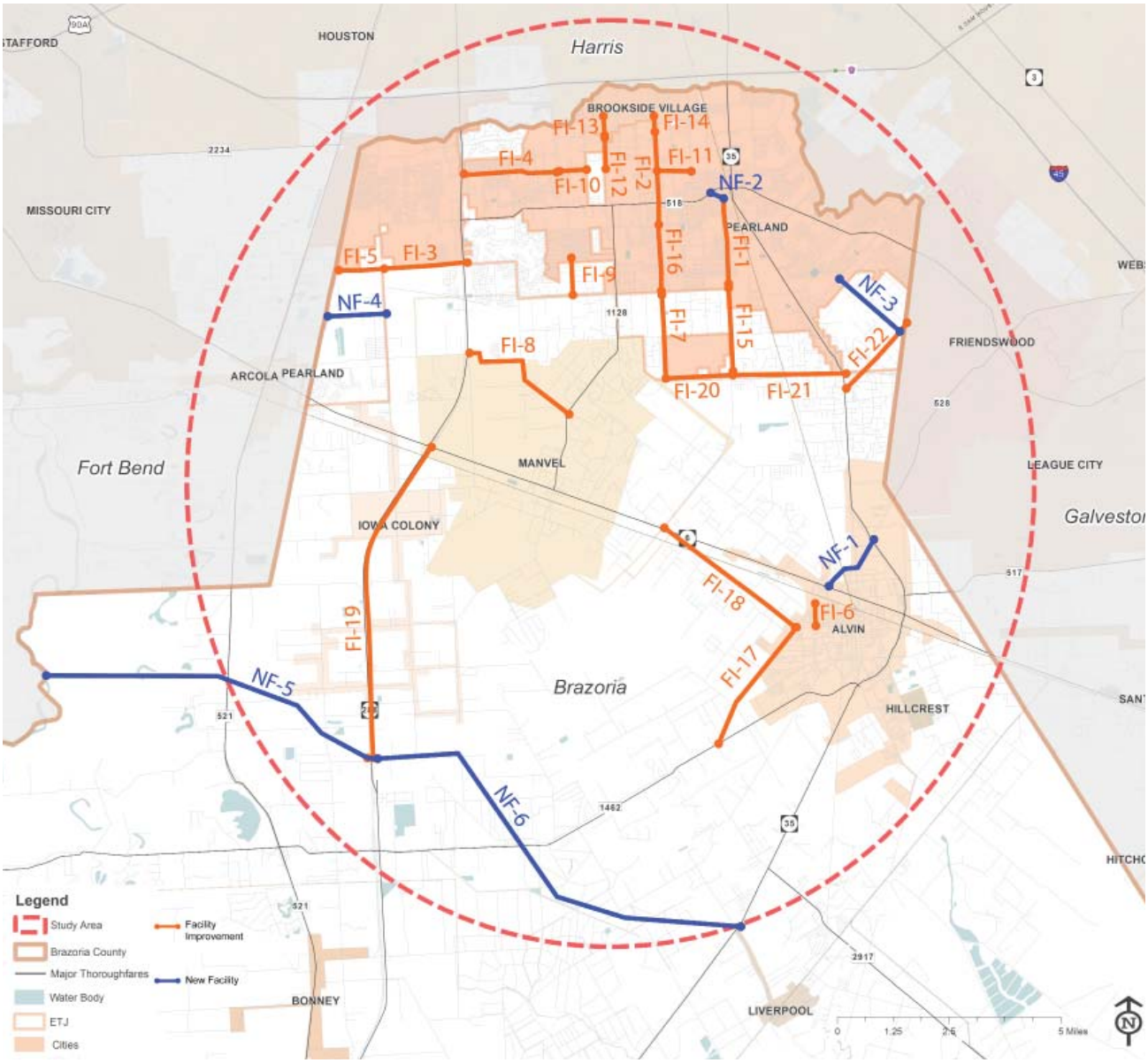
Scenario 1 is the "Baseline" scenario, and is the benchmark upon which the alternative scenarios are evaluated. The Baseline Scenario maintains the existing transportation system and includes the future programmed/committed transportation improvements that are identified in H-GAC's 2035 RTP Update. The Baseline Scenario was refined to include some existing roadways that were not originally coded in the regional model in order to adequately support the refined TAZ system proposed for this study. Map 4.2 illustrates the existing roadways added to the baseline scenario and Map 4.3 identifies the future programmed/committed transportation improvements identified in H-GAC's 2035 RTP Update, which are incorporated in Scenario 1. "FI" refers to Facility Improvements, or upgrades to existing transportation facilities and "NF" refers to New Facilities, or construction of new transportation facilities.

Map 4.2 Existing Roadways Added to Baseline Scenario



Source: H-GAC Regional Travel Demand Model

Map 4.3 Committed Transportation Improvements Included in Scenario 1

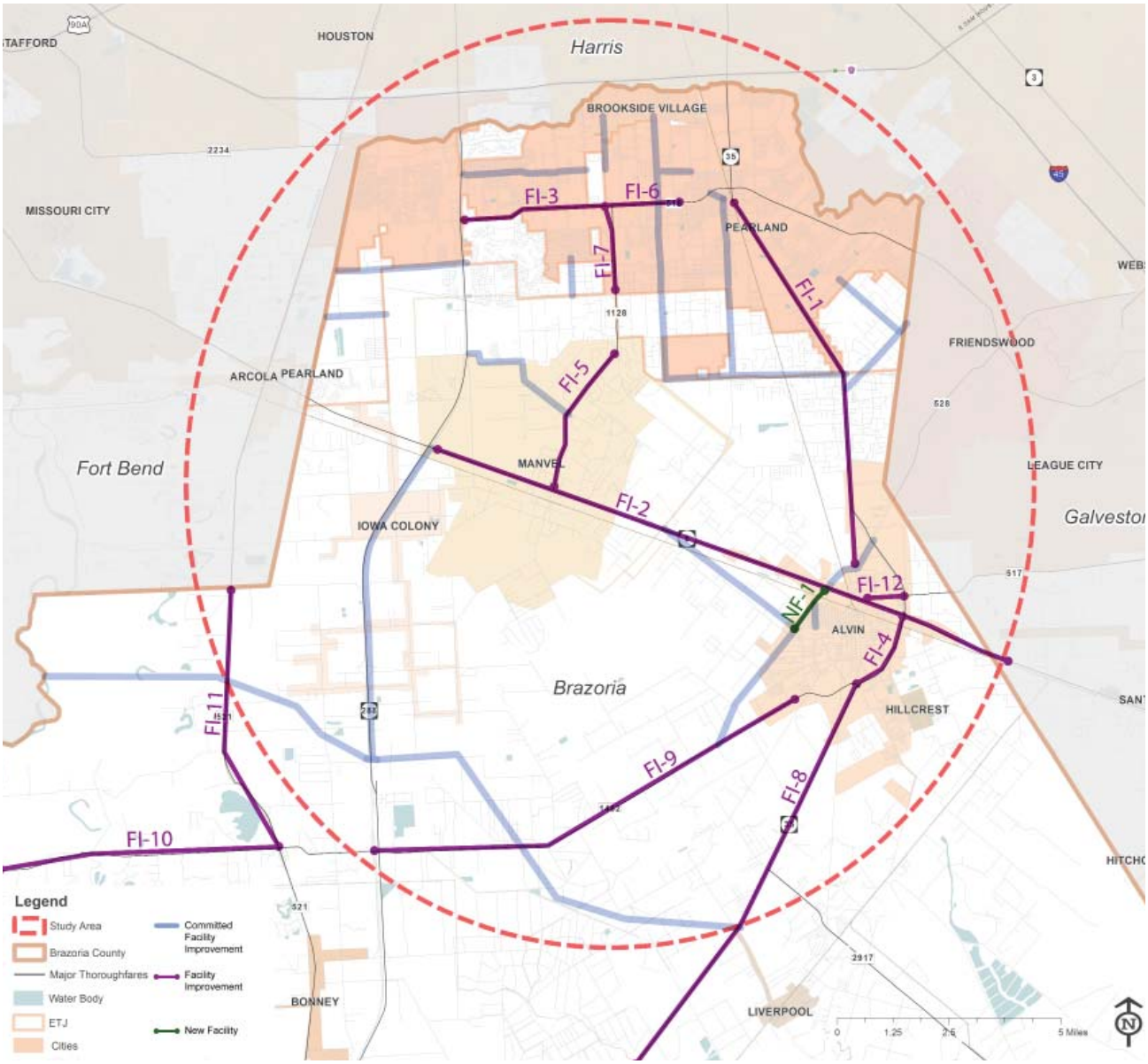


"FI" = Facility Improvements
"NF" = New Facilities

Scenario 2 | Unfunded Scenario

Scenario 2 is a baseline concept with the 2035 RTP unfunded projects included. "Unfunded projects" refers to those projects that were not able to be financed at this time based on the 2035 RTP fiscal constraint requirement. All of the network refinements identified in the Baseline Scenario are also included in Scenario 2. Map 4.4 shows the unfunded roadway improvement projects that were included in this alternative scenario.

Map 4.4 Projects included in the Baseline + Unfunded Project Scenario



"FI" = Facility Improvements
"NF" = New Facilities

Scenario 3 | Transit Scenarios

The Transit Scenarios conceptualize the introduction of high capacity transit into the study area, as well as the improvements modeled in Scenario 1. It includes two high-capacity transit corridors: Kirby Drive and the SH 35 corridor. Additionally, this scenario includes some specific roadway improvements mainly to facilitate improved connectivity and access to the proposed transit stations. As illustrated in Map 4.5, these two transit options include:

1.Transit Option A - Bus Rapid Transit along the SH 35 Corridor

2.Transit Option B - Commuter Rail along the BNSF track paralleling SH 35

Additionally, Scenario 3 includes specific roadway improvements intended to facilitate improved connectivity and access to the proposed transit stations. These improvements are illustrated in Maps 4.2 and 4.3.

In order to understand the impact of alternative land use policies on the transportation system, the transit scenario was evaluated with the following two versions. The two versions are intended to evaluate two separate future land use patterns:

Option 1 – With H-GAC's future land use projections included.

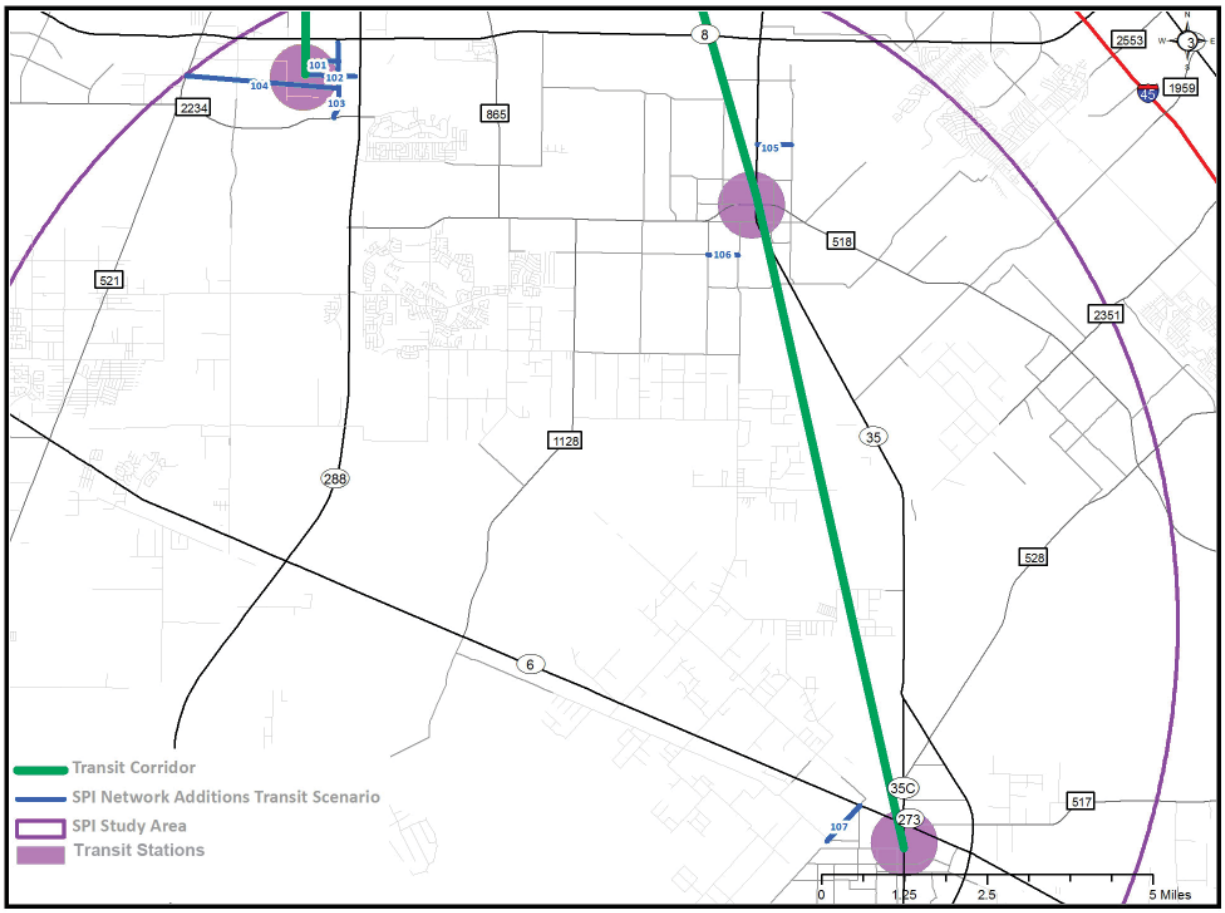
Option 2 – With alternative land use and modified socioeconomic forecasts. This scenario migrates portions of the forecasted population and employment growth from existing undeveloped and flood plain areas into the locally identified activity centers.

Activity centers are conceived here as walkable, mixed-use environments that provide multi-modal transportation options, improve environmental quality, and promote economic development. These places are designed to be safe, convenient, and attractive areas where people can live, work, and play with less reliance on their vehicles. These areas have the potential to serve as future transit stations that link residents regionally to employment centers and destinations.

These potential activity centers include the proposed Lower Kirby Urban Center, Old Townsite Downtown Pearland, and Downtown Alvin. In the model, enough population and employment was migrated to these areas to simulate transit supportive densities within a ½ mile of the proposed activity centers. For the Lower Kirby Urban Center, this equated to a population density of 20 people/acre and an employment density of 50 people/acre in order to support the proposed transit envisioned for this corridor. For Old Townsite Downtown Pearland and Downtown Alvin, this equated to a population density of 16 people/acre in order to support commuter rail service.[1]

1Population and employment transit supportive density calculations were informed by research conducted by Jeffrey Zupan and Boris Pushkarev in "Public Transportation and Land Use Policy" as well as the consultants experience.

Map 4.5 Network Refinements for the Transit Scenarios



Source: H-GAC Regional Travel Demand Model

4.4 Performance Criteria

Performance criteria were established to assess improved traffic and mobility and quality of life. These performance criteria were derived from the vision and goals established for the project, which states:

Vision

The residents of the region will have a high quality of life built on livable transportation and land use solutions that promote economic development; cultural diversity; community health and safety; preservation of natural resources, and fiscal prudence.

Goals

- Engage the public in the decision making process
- Provide a wide range of transportation choices
- Promote economic development throughout the sub-region
- Maintain fiscal prudence
- Strengthen community well being and safety
- Preserve and enhance natural resources

These goals were linked to the following performance criteria in order to track their use in the remainder of the planning process:

- Consistency with Goals and Objectives from previous plans
- Consistency with needs and desires from public engagement
- Provides multi-modal transportation options: Measures the number of transportation options provided in each scenario including vehicular mobility, walking, and transit
- Walk to transit: Measures the population that lives within ½ of a transit station
- Drive to transit: Measures the population that can drive to transit
- Vehicle Miles Traveled (VMT) and VMT in congestion (LOS E/F)
- Vehicle Hours Traveled (VHT) in the study area and in the HGAC region
- System-wide speeds within the study area (VMT/VHT)
- Capital Costs: Quantifies the individual project construction costs in 2010 dollars.
- Operations and Maintenance Costs: Quantifies the cost inquired for the long term operation and maintenance of each transportation project within each scenario.
- Level of Environmental Impact: Measures the amount of Farm Ranch Land Use acreage that is developed into Residential Land Use and the amount of Vacant Land Use acreage that is developed.

4.5 Scenario Evaluation

In order to assess the ability of the alternative scenarios to improve traffic, mobility, and the quality of life in the study area, the results of each performance criteria were combined and analyzed within each scenario. As shown in Figure 4.1, performance criteria within each scenario were assigned points based on their effectiveness. Additionally, each scenario was evaluated against the baseline scenario and their effectiveness compared against each other to determine which scenario performed the best. Figure 4.2 outlines the results of the scenario performance analysis. The first three performance criteria are primarily qualitative and, therefore, are not included in Figure 4.2. Appendix 3 includes an evaluation of both qualitative and quantitative performance criteria results for each scenario.

Figure 4.1 Performance Categories and Measures

Figure 4.2 Scenario Performance Analysis

			Scenario 3A		Scenario 3B	
	Baseline Scenario 1	Scenario 2	Bus Rapid Transit	Commuter Rail	Bus Rapid Transit	Commuter Rail
Performance Criteria	Qty	% Change	% Change	% Change	% Change	% Change
Walk to transit	200	0%	200%	200%	700%	700%
Drive to transit	8,400	-1.20%	26.20%	26.20%	3.60%	3.60%
Vehicle Miles Traveled (VMT)	6,607,700	2%	0%	0%	-1.40%	-1.40%
Vehicle Hours Traveled (VHT)	152,200	-0.10%	-0.30%	-0.30%	-1.70%	-1.70%
VMT in congestion	1,971,900	-11.80%	-5.20%	-5.20%	-13.20%	-13.20%
Percent VMT in congestion	30%	-13.30%	-6.70%	-6.70%	-13.30%	-13.30%
System wide speed in study area	43.41	2.10%	0.29%	0.29%	0.32%	0.32%
Capital costs	$1,126,503,637	175.30%	73.90%	31.60%	73.90%	31.60%
Operations and maintenance costs	$61,776,000	144.20%	264.40%	309.20%	264.40%	309.20%
Environmental impact (acres)	25,914	0%	0%	0%	-10%	-10%
Total Points		**25**	**23.7**	**23.3**	**34.3**	**34.3**

4.6 Scenario Evaluation Results

As demonstrated in Figure 4.2, Scenario 3B had the overall highest score and best performance. This is predominantly due to the increased multi-modal transportation options and the transportation modal shift that is achieved by better linking land use to transit. Scenario 3B yields a 13.2 percent decrease in vehicles miles traveled in congestion, a 1.7 percent decrease in total vehicle hours traveled, and a 1.4 percent decrease in total vehicle miles traveled. Additionally, Scenario 3B yields a 700 percent increase in population within walking distance, or within ½, mile of transit. The increased population and employment density within the three proposed activity centers proposed in Scenario 3B allows residents transportation options, resulting in less reliance on automobiles. Within Scenario 3B, High Capacity Transit 1 and 2 yielded the same results, with the exception of capital costs and operations and maintenance costs. While High Capacity Transit 1 has higher capital costs then High Capacity Transit 2, High Capacity Transit 1 has lower operations and maintenance costs. Scenario 3B also had the least environmental impact due to reduced population growth and development in flood plain areas. By guiding development towards already developed areas, floodplains and other environmentally sensitive areas are preserved.

Scenario 2, which includes RTP planned improvements and unfunded projects, performed second best—slightly better than Scenario 3A but lower than Scenario 3B. The increased roadway capacity provided in Scenario 2 reduced the percent VMT in congestion by 13.3 percent and improved system wide speed by 2.1 percent. The long term operations and maintenance of this scenario was also the least costly. VMT in congestion performed second best in the scenario with an 11.8 percent reduction from the Baseline Scenario 1. However, this scenario fell short of Scenario 3B due to the limited multi-modal transportation options it offered, lower relative impact on VMT, VHT, increased capital costs, and environmental impact.

Scenario 3A performed the worst relative to the other scenarios, demonstrating a poor link between land use and transportation. Scenario 3A yielded a decrease in

the population living within driving distance of transit and did not positively impact total VMT in congestion, percent VMT in congestion, the level of environmental impact. Scenario 3A also incurred the high transit operations and maintenance costs, but without the benefits in other performance criteria has exemplified in Transit Option B.

4.7 Scenario Evaluation Summary

It's important to note that these scenarios are representative and are intended to provide a "what if" analysis of the potential impacts, benefits, and implications of alternative futures. The scenario findings inform project identification and prioritization based on the SPI goals and objectives and serve to establish a dialogue to drive the overall project recommendations. They do not indicate a locally preferred future arrangement of people and destinations. Rather, they are used here as a backdrop against which to isolate the most effective future transportation investments.

In summary, the scenario results suggest that better linkage of transportation and land use decisions can positively impact the mobility of residents within the sub-region. By coordinating transportation investment options and land and use decision-making, northern Brazoria County stakeholders can encourage transit supportive densities, reduce environmental impacts, and make a measurable dent in commute time.

05 FUNDING PROFILE

5.1Introduction

The Northern Brazoria County/Pearland SPI covers a dynamic sub-region administered by municipal governments, a county government, a regional council of governments (H-GAC), the State of Texas, and federal agencies. Each level of governance employs particular tools to accomplish the shared goal of most effectively serving the local population. This funding profile will outline activity and current and potential tools at each level in order to better understand the resources available for implementing SPI recommendations. a mix of transportation and transit projects proposed by previous studies, findings from the technical analysis, public engagement, and consultation with the SAC. The roadway improvement projects included in the scenarios were identified in the 2035 RTP. The transit projects included in the scenarios were also suggested in recent planning studies. Additionally, these scenarios included projected population, employment, and land use data as forecasted by H-GAC, as well as an alternative land use scenario that conceptualized more population in three sub-regional activity centers. Appendix 3 contains a detailed explanation of the scenario development and testing methodology.

5.2 Federal and State Funding

Federal funding is available to the sub-region's partners for implementation of eligible projects. The funds can be used to reimburse expenses incurred by local planning agencies in the planning, development, and construction of approved eligible projects. The transportation project and plan recommendations in this study fall within the regulatory domain of the US Department of Transportation (USDOT) through the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The USDOT governs federal-aid funding based on Congress' direction and DOT's resulting regulations.

The recent passage of a new surface transportation bill in summer 2012, known as Moving Ahead for Progress in the 21st Century (or "MAP-21"), set the stage for an adjustment of federal programs and regulations. This, in turn, is expected to affect transportation plans and programs in the sub-region.

Depending on the type of project being considered for approval, different federal-aid funding programs will apply. The process of applying for, complying with, and securing federal funding is managed through the federally mandated metropolitan planning process, directed by the Houston-Galveston Area Council as the eight-county Metropolitan Planning Organization (MPO).

For the SPI, the most basic matter in successfully securing federal funding for transportation is to maintain active and open lines of communication with TxDOT area engineers, local elected officials, and H-GAC. An active TxDOT relationship secures technical and practical support for project advancement and robust communication with H-GAC advances the local agency's projects in complying with the three basic requirements for federal funding assistance: conformity with other regional long-range plans, regional air quality/emissions budget, and projections of future available revenue.

The Texas Department of Transportation secures funds at the state level as well, chiefly through the state highway fund, also known as "Fund 06." This fund is mainly fed by the state motor fuels tax, as of 2013 at $0.20/gallon when purchased by the consumer. The state highway fund provides important support the sub-region's infrastructure mobility and maintenance—at times directly to the sub-region.

5.3 Local Funding

Locally, the sub-region benefits greatly from dedicated, professional government agencies. Brazoria County, the City of Pearland, and the City of Alvin actively work to plan and construct significant transportation and land use improvements to advance their residents' quality of life.

The County government is governed by the Texas State Legislature and the relevant Texas Administrative Code sections. Counties in Texas, in comparison to municipalities, are constricted in their capacity to raise funds. County governments must be explicitly allowed to raise additional funds by an act of the legislature. For example, the establishment by the state legislature of a regional mobility authority for raising toll revenue in a certain Texas county does not entitle all Texas counties to establish regional mobility authorities. This is in contrast to Texas municipalities, which are entitled to enact any local ordinances they see fit, as long as it has not been expressly forbidden previously by the state legislature.

Therefore, in funding matters, many times the most immediate level of governance is municipal.[1] The SPI study area includes the cities of Pearland, Alvin, Manvel, the Village of Iowa Colony and the Village of Hillcrest. Pearland and Alvin, as funding members of the SPI, are the focus cities of this profile. Both Pearland and Alvin are "home rule" cities, which in Texas includes all medium or larger cities and empowers them to establish charters—whose power is limited only by what the Texas legislature has explicitly outlawed.[2] As "home rule" cities, Pearland and Alvin enjoy funding capacity unavailable to smaller cities, H-GAC, and county governments. This includes tools such as levies, assessable fees, and favorable rates for bonded funding sources.

It bears noting that, in general, the state of Texas has recognized the large importance of transportation needs; and has made it legal for Texas cities to spend economic development funds in the development and/or expansion of transportation projects.[3] Additionally, the state legislature has afforded municipalities, counties, and governmental coalitions the right to organize "transportation reinvestment zones", or a TRIZ, for the sake of critical and needed projects. These zones serve as a tool to secure development funding for the construction of locally supported improvements to the highway system.

While relevant staff at the agencies are the premier source for innovation and execution in the matter of local funding, this profile notes there are different methods a local government may fund the SPI recommendations. The most direct method is through cash financing—using on-hand funds. Additionally, northern Brazoria County benefits from the ability to use bond proceeds. Public agencies borrow money at favorable rates using projected tax and fee revenue as collateral. While useful in certain circumstances, bonded amounts do not account for the increased future costs to maintain and operate the facilities constructed. This may unintentionally ignore the future need to repair/maintain and bond-funded transportation facility. Also, bonds carry with them the requirement of voter approval, which is not always a simple variable to account for.

Pearland

The City of Pearland collects sales tax, property (ad valoream) tax, charges for service and fees. Pearland voters approved the formation of the Pearland Economic Development Council (a 4B Development Corporation) in 1995,[4] which operates mainly off of a half-cent sales tax revenue collected within the city. Legally, the Economic Development Council is allowed to allocate this to the construction or repair of numerous types of infrastructure, including roadways and streets.

In 2005 Pearland voters agreed to pay a half-cent sales tax in an area of the city considered ripe for development, the Lower Kirby Urban Center. The revenue from this act funds a management district dedicated to improving infrastructure and investing in the growth of the area around the intersection of SH 288 and Beltway 8.[5] This area notably is the only sector of the city of Pearland that lies in Harris County. Were the Lower Kirby Urban Center in Brazoria County, this half-cent sales tax would be not be possible, given that Brazoria County has reach the state-allowed maximum sales tax rate.

As of December 2012, City Council recommended the 83rd State Legislature create an additional Management District in the city in the Southgate Subdivision area[6].

Pearland also operates a Tax Increment Reinvestment Zone known as both "Shadow Creek Ranch" and "TIRZ No. 2"[7] for the purpose of maintaining and advancing quality of life in one of the most successful residential subdivisions in the region.

1 Source: Texas Municipal League Home Rule Charters—Second Edition (2010)
2 Texas Local Government Code Title 2 §9.001
3 McIntyre, Jeanene Basics Regarding Statutory Economic Development Tools for Municipal Attorneys 2004. Accessed online 2013 via http://www.tml.org
4 Source: Pearland Economic Development Council
5 Texas Special District Local Laws Code Title 4 §3838.001
6 City of Pearland Council Resolution r-2012 188; Texas House Bill 1276—83rd Regular Session
7 Source: Agenda of June 11, 2012 Regular Meeting of TIRZ 2. Accessed online in 2013 via www.cityofpearland.com

Alvin

The City of Alvin collects sales tax, property tax, charges for service and certain fees. The sales tax levied in Alvin is currently at the maximum-allowed rate of 8.25% of the price of purchase. Of the total sales tax amount levied, 6.25% goes to the state of Texas, 1.5% to the city, and .5% to the County. Alvin sales tax revenue is used to fund operation of streets, drainage projects, and sidewalk improvements and extensions.

There are four Tax Increment Reinvestment Zones in Alvin. Two operate in the Kendall Lakes area, one in Savannah Plantation, and one in Star State. Proceeds from these zones are deposited into the General Fund. According to Texas law, the proceeds from these funds are available for quality of life and transportation projects within the boundaries of the collecting zone.

Brazoria County

Brazoria County is governed by an elected court of commissioners—four precinct-specific Commissioners and one county-wide elected Judge. The precinct most involved with the SPI effort is Precinct 2, administered by Commissioner Matt Sebesta.

Brazoria County collects fees and levies a property tax based on assessment by the Brazoria County Appraisal District. And based on projected property tax and fee revenue the County also operates bond proceeds, passed by voters for specific purposes and set periods of time. In 2012, the Commissioners' Court authorized the release of a series of voter-approved bonds to take care of transportation needs in its jurisdiction.[8] None of the SPI recommendations are covered in the current bond series from this vote. Also Brazoria County partners with area municipalities in the operation of the Seven Oaks Ranch TIRZ,[9] as well as participates in economic development initiatives through its permitting authority.

8 Source: Agenda of June 26, 2012 Special Meeting of the Commissioner's Court of Brazoria County. Accessed online in 2013 via http://www.brazoria-county.com

9 Source: Agenda of December 8, 2009 Regular Meeting of the Commissioner's Court of Brazoria County. Accessed online in 2013 via http://www.brazoria-county.com

5.4 Funding Tools

Local elected officials, private sector consultants, and national-level stakeholders have acknowledged the impending transportation needs Brazoria County must address. Currently, local and federal funding does not appear to be sufficient to meet those needs. While the future cannot be predicted, general concerns are easy to isolate. The projected population and employment growth highlight the need for cooperative and comprehensive transportation planning in order to maximize the affect of each local dollar.

The SPI process has achieved the long-term benefit of interjurisdictional collaboration in transportation planning. Local elected officials throughout the process have cited this aspect of the SPI as the most immediately rewarding and encouraging. Additionally, the SPI has preliminarily investigated potential future revenue sources. They are organized in this profile by type.

Bond Proceeds

Bond proceeds benefit local agencies by making funds available for important near-term needs. Historically, agencies in the study area have used bonded proceeds for the more expensive infrastructure investments, and currently employ this tool as well. The potential drawbacks of bond proceeds funding transportation investments include maintenance costs in the future, voter referenda, and bond capacity limitation. While bonds can fund the construction of projects, they do not provide for the long-term, often under-projected costs of facility maintenance, preservation, and rehabilitation in the future. Furthermore, bonds, by nature, do not account for the payroll and overhead needs of the professionals needed to manage the facility after construction. Some transportation authorities around the country have begun planning based on the "life-cycle costs" of a facility to account for this shortfall. Requirement to request voter approval is another potential drawback of using bond proceeds. Politically, the need to campaign for the construction of transportation infrastructure can be costly and unpredictable. The referenda could cost important political capital, or easily be misunderstood by the voting public. Lastly, many local planning agencies guard their bond rating as an indication of their professional integrity. Since the recession began in 2008, some public entities have suffered the downgrading of their bond rating. As such, local agencies have

commented that bond proceeds must be conservatively planned and thoroughly supported by professionally projected revenue. Agencies are not practically able to bond as much as they desire, or even as much as they need, if the program would endanger their future bonding capacity or rating.

Levies

While politically untenable at the local and state level, increases in property tax, sales tax, and similar tools are grim reminders of the desperate situation in transportation funding. Local governments across Texas have recently been forced to raise both property and sales taxes—essentially testing their political future for their communities' optimal future.

Sales tax increases are not an option for Alvin, Pearland or Brazoria County, given the state-imposed cap at 8.25% of purchase. Brazoria County currently collects .5% of the 8.25% cap.

Property tax increases have not been considered as a component of this funding profile. Should such a tool be considered in the future, the most effective method of execution or planning for such a change would be the staff of the local government.

Alternatively, the SPI recommends local stakeholders investigate tax increment financing for future project/program revenue. Tax increment financing is currently active in the study area, and could potentially account for revenue increases in the future. Drawbacks of the expansion of tax increment financing are the geographic limitation of funds' use, the chance that a district does not develop as quickly or comprehensively as anticipated, and the lost opportunity of the general use of the garnished funds.

Fees

Management districts are a related recommendation for additional future revenue. Currently, in use in Pearland, management districts capture sales taxes in geographically limited areas and, in many cases, dedicate them to the same area. Management districts operate on fixed rates, and share the potential drawbacks of tax increment financing mentioned above. Additional management districts in targeted sites in the study area could induce infrastructure investment and complementary development in a way not currently available. Management districts can also collect a prescribed fee rather than a portion of the sales sax. The terms are set by appointed boards or administrators. Any changes to the district's operation or creation of new districts are accomplished through the state legislature.

Additional fee-related options include increases. Facility use, vehicle registration and fees for services provided are a few of the collected fees in the study area. Depending on the level of government (city or county), the legal requirements may differ to increase fee or create new fees. For county governments, all changes must be explicitly approved by the state legislature. Nowhere in the study area does it appear that fees determine a budget's cycles or the successful provision of services.

Legislation

Local government lawmakers and elected officials across Texas sometimes turn to their colleagues in the state legislature to address infrastructure funding, which meets for 140 days every two years. The 83rd regular session began in January 2013. County governments have no choice when seeking additional funds, and city governments go through the legislative process when seeking the formation of tax increment financing zones or management districts. Some economic development efforts must be explicitly permitted by the Texas Legislature.

Past sessions have chosen not to pass bills calling for "local option sales tax" adoption. These bills allow for local government agencies to put sales tax increase referenda before voters. This could be at a regional level or County level. If passed, the increase would exist for a specific amount of time at the stated rate, often with the proceeds being pre-programmed. A similar measure was in 2012 considered in Georgia for the purpose of improving regional transportation.

The legislature has also recently considered bills to increase the state gas tax. Political strategists, journalists, and academics across the state widely agree these proposals have little chance of advancement. However, it bears mentioning that certain elected officials in a politically conservative state are willing to stake their reelections to the idea of a tax increase. This extraordinary activity on the part of a small but vocal number of legislators may indicate a growing willingness

to speak about transportation revenue and long-term funding. However, TxDOT leadership has indicated before the 83rd Texas regular session's Senate Finance Committee a preference for long-term dedicated funding increases over one-time solutions[10].

Examples of current transportation-related bills being considered in are elimination of non-transportation diversions from the state highway fund (Fund 06). Diversions from dedicated funds are common in legislative budgeting, notable given that Fund 06 contributes the majority of TxDOT's operating budget. The legislature is also considering phasing over from the general revenue fund to Fund 06 the proceeds from the motor vehicle sales tax and, in separate bills, sales tax on motor vehicle parts and certain diesel fuels. Other bills propose various one-time funding infusions into the State Highway fund.

SPI coordination with the Stakeholder Advisory Committee in northern Brazoria County isolated a few general recommendations regarding the legislative path for transportation planning and local programming. Any action resulting from these suggestions would have to proceed from the authorized representative body at each jurisdictional level. A brief summary of the recommendations follows:

- Maintain professional regular contact with the local legislators and their staff.
- Understand the dynamics of the legislative cycle—specifically as it relates to bill filing and procedure.
- Identify common legislative principles that can represent the subregion collectively. It is widely understood that there can be "strength in numbers" at the state legislative level.
- Identify relevant legislation to these shared principle, track such legislation through the legislative procedure and volunteer for comment at related hearings.
- Recognize the most important committees related to the projects and plans the subregion is interested in. For example, the Finance Committee, Calendars Committee, Transportation Committee, and the more recently formed Special Districts Committee. The committees represent most of the up-front work and attention a bill receives, and can be an important gateway to a bill's passage.

Economic Development Initiatives

Economic development initiatives of different types are currently active in the subregion. Both cities and counties are legally able to leverage these tools, which include working with developers to enhance or advance certain projects, as well as coordinating potential impacts to the surrounding environment or businesses. Many privately owned developments such as shopping centers engage in contracts between their tenants to avoid destructive competition—these initiatives work in a similar way to benefit the business and those living nearby who will likely support it.

Texas allows for transportation investments as economic development, thus broadly expanding the potential of this tool. Local government corporations, economic development corporations, and special districts are able to invest directly or support local investment in infrastructure, landscape, and related capital improvements. Additionally, the state government manages some programs that are available for financial assistance in economic development, as evidence by a recent announcement of state support for natural gas processing in Alvin[11]. In some cases, there needs to be a documented connection between the investment and the potential for creating jobs locally. As such, the future utility of this tool is best left to the expertise of the local government's staff.

10 Source: Minutes of the Texas Senate Committee on Finance February 4, 2013. Accessed online in 2013 via www.capitol.state.tx.us

11 Source: Office of Governor Rick Perry Press Release dated February 26, 2013. Accessed online in 2013 via http://governor.state.tx.us

MPO Process and Federal Funds

Many transportation projects are eligible for federal funding, either at an 80/20 or 50/50 (transit projects) match rate, where local project sponsors provide the latter amount. In order to take advantage of these opportunities, project must be accepted into the Texas State Transportation Improvement Program (STIP), which is administrated by TxDOT. The gateway for this program is the long-range H-GAC Regional Transportation Plan (RTP), currently being updated out to 2040. H-GAC, as discussed previously, addresses three areas in assessing a project for inclusion to the RTP: regional planning, air quality impact, and fiscal constraint. "Regional planning" refers to whether or not a project has local support. Has the project been suggested in any subregional or regional planning study? In the case of SPI recommendations, the answer is an automatic "yes", given that the project came out of a collaborative long-range planning study focused at the local level. "Air quality impact" refers to whether or not the regional air quality emissions budget can sustain the additional likely related emissions. New roads or expanded roads are likely to increase the emissions from traveling vehicles, which are monitored and budgeted for each urbanized area in the United States. The proposed project must meet air quality conformity analysis, which models the likely future emissions associated with most new projects and makes an estimate of the amount of negative affect to regional air quality. Transit projects, rail, pedestrian/bicycle projects, and some traffic engineering projects are considered to be of no negative affect in the air quality conformity process, and alleviate the pressure on roadway projects to conform to the air quality budgets. "Fiscal Constraint" refers to the reasonable expectation that future federal funds will be available to reimburse the state after construction of the project has begun. As a steward of public money, H-GAC and TxDOT will not allow for a project to be constructed without documented confidence that reimbursement for the non-local share of the project's cost will be available. For more information regarding the schedule and process for funding through H-GAC, local staff may contact the long-range transportation planning group at H-GAC at any time, as well as visit the H-GAC website.

06 FUTURE RECOMMENDATIONS

6.1 Relationship to Vision and Goals

The vision and goals established for the plan inform the analysis and evaluation of transportation and land use scenarios, as well as the evaluation and assessment of individual transportation corridor improvement projects. The following section describes the specific individual corridor improvement projects, and the assessment methodology used to rank them.

6.2 Project Identification Process

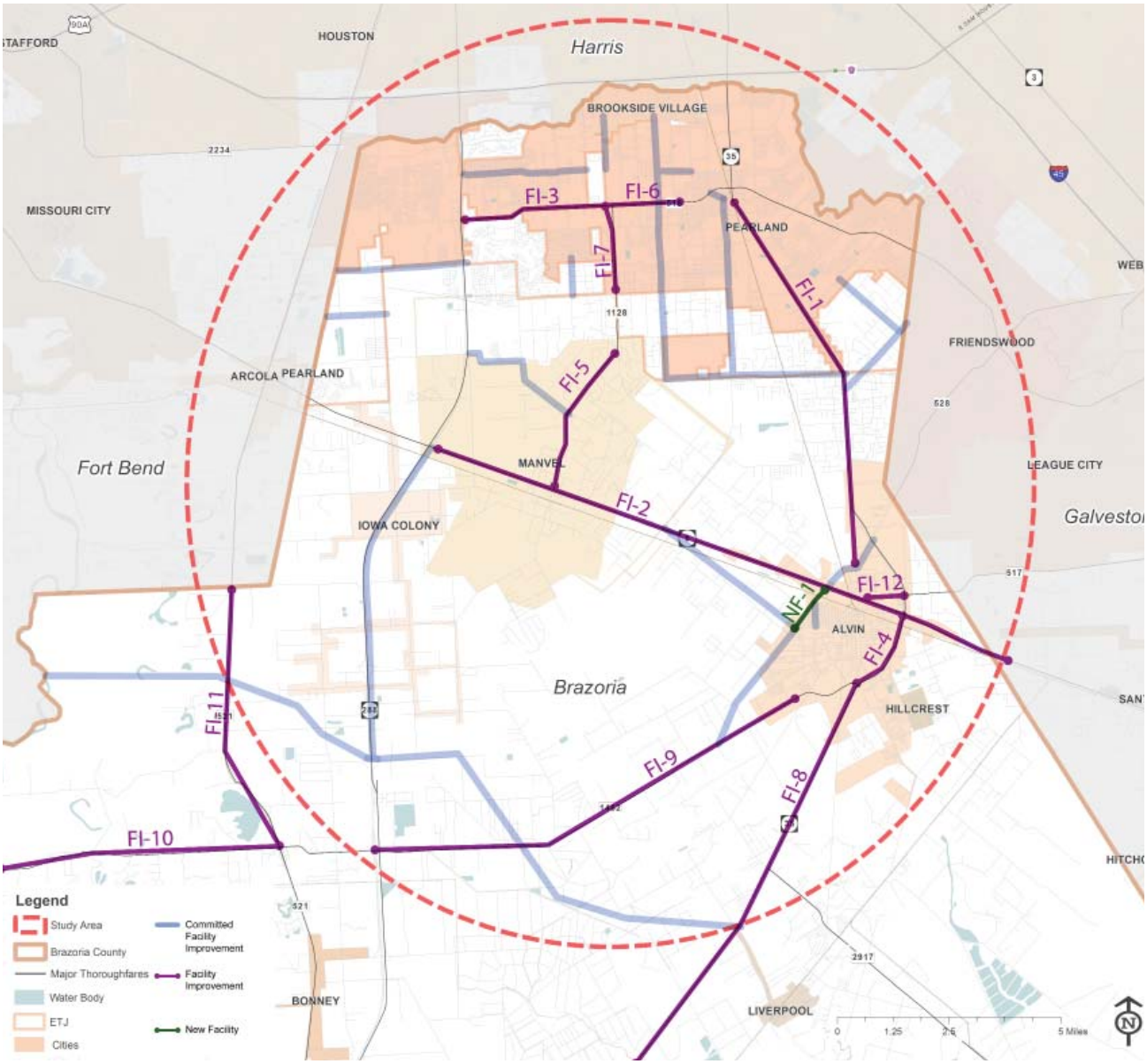
Potential corridor improvement projects identified by the consultant team were informed by previous studies, findings from the technical analysis and the public engagement process, and consultation with the SAC. All of the transportation corridor improvement projects evaluated were consistent with the region's 2035 Regional Transportation Plan. As described in the 2035 RTP, the unfunded project list was not scheduled for implementation due to updated financial assumptions. Figure 6.1 identifies the unfunded improvement projects evaluated in this process and Map 6.1 illustrates their locations. "FI" refers to Facility Improvements, or upgrades to existing transportation facilities and "NF" refers to New Facilities, or construction of new transportation facilities.

Figure 6.1 List of Proposed Individual Transportation Improvement Projects

Map ID	Roadway	From	To	Proposed Transportation Corridor Improvement Project
FI-1	SH 35	FM 518	S OF SH 6	Widen to 6-lane divided rural
FI-2	SH 6	SH 288	GALVESTON C/L	Widen to 6 & 8-lanes
FI-3	FM 518	SH 288	FM 865	Widen to 6-lane divided urban
FI-4	SH 35	SH 6	BS 35C SOUTH	4-lane tollway (most feasible toll alternative)
FI-5	FM 1128	CR 98	CR 100	Widen from 2 to 4 lanes w/bridges
FI-6	FM 518	FM 865	SH 35	Widen to 6-lane divided urban w/ flush median
FI-7	FM 1128	BROADWAY	BAILEY RD	Widen from 2 to 4-lanes divided curb and gutter
FI-8	SH 35	FM 2403	FM 523	Widen to 4-lane divided
FI-9	FM 1462	SH 288	SH 99	Widen from 2 to 4 lanes
FI-10	FM 1462	FORT BEND C/L	SUPER SPEEDWAY	Widen from 2 to 4-lanes
FI-11	FM 521	BRAZORIA/FORT BEND C/L	FM 1462	Widen 2 to 4-lanes
FI-12	FM 517	LP 409	SH 35	Widen to 4-lanes in sections
NF-1	FM 528	SH 35 BUSINESS	SH 6	Construct 2-lane urban undivided on new location with railroad grade separation (phase 1)

Source: H-GAC 2035 RTP Update, Appendix F

Map 6.1 Location of Individual Transportation Improvement Projects



"FI" = Facility Improvements
"NF" = New Facilities

6.3 Project Evaluation Process

The vision and goals for the SPI were linked to qualitative and quantitative corridor performance criteria established in consultation with the SAC, sponsoring agency staff, and based on the consultant team's experience with transportation and land use planning best practices. These performance criteria were assigned points and used to evaluate each individual transportation corridor improvement project's effectiveness in achieving specific performance criteria results. Points were then tallied to produce a score for each corridor, resulting in an assessment of transportation corridor improvement projects that have the potential to best meet the sub-region's transportation needs.

6.3.1 Qualitative Criteria

Qualitative criteria were established to evaluate the transportation corridor improvement projects based on various conditions/standards established through the study process and transportation planning best practices. These criteria were vetted through the SAC and sponsoring agency staff. The following list documents the qualitative criteria established for the evaluation of individual transportation corridor improvement projects:

- Continuation of Existing Road Widening Projects
- Municipality Development
- Connectivity
- Construction Design Process
- Parallel Relief
- Protection of Downtown
- Preservation of Community Character
- Environmental Impacts
- Transportation Land Use Linkage

Potential projects were evaluated and scored against the established assessment criteria. Figure 6.2 outlines qualitative scores and sub-totals.

Figure 6.2 Qualitative Criteria Scores & Sub-totals

Map ID	Roadway	From	To	Continuation of Existing Widening Projects	Municipality Development	Connectivity	Construction Design in Progress	Parallel Relief	Protection of Downtown	Preservation of Community Character	Environmental Impact	Transportation Land Use Linkage	Qualitative Criteria Sub-Total
				0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0-36
FI-1	SH 35	FM 518	S OF SH 6	0	4	4	0	4	0	4	4	4	**24**
NF-1	FM 528	SH 35 BUSINESS	SH 6	0	4	4	0	4	4	4	0	4	**24**
FI-2	SH 6	SH 288	GALVESTON C/L	0	4	4	0	4	0	4	4	4	**24**
FI-3	FM 518	SH 288	FM 865	4	4	4	0	4	0	4	4	4	**28**
FI-4	SH 35	SH 6	BS 35C SOUTH	0	4	4	0	4	4	4	4	4	**28**
FI-5	FM 1128	CR 98	CR 100	0	4	4	0	4	0	4	4	4	**24**
FI-6	FM 518	FM 865	SH 35	0	4	4	0	4	0	4	4	4	**24**
FI-7	FM 1128	BROADWAY	BAILEY RD	0	4	4	0	4	0	4	4	4	**24**
FI-8	SH 35	FM 2403	FM 523	0	0	4	0	4	0	4	4	4	**20**
FI-9	FM 1462	SH 288	SH 99	0	0	4	0	4	0	0	0	0	**8**
FI-10	FM 1462	FORT BEND C/L	SUPER SPEEDWAY	0	0	0	0	4	0	0	0	0	**4**
FI-11	FM 521	BRAZORIA/FORT BEND C/L	FM 1462	0	0	0	0	4	0	0	0	0	**4**
FI-12	FM 517	LP 409	SH 35	0	4	4	0	4	0	4	0	0	**16**

6.3.2 Quantitative Criteria

Quantitative criteria were identified to evaluate transportation corridor improvement projects based on various measurable conditions. Each measure was vetted through the SAC and sponsoring agency staff. The following list documents the quantitative criteria established for the evaluation of individual transportation corridor improvement projects:

- Level of Service (LOS) Assessment Score
- Fatal Crash Score
- Total Crash Score | Ratio of 100 Million VMT to Statewide Average

Figure 6.3 outlines quantitative scores and sub-totals and Figure 6.4 outlines the recommended assessed corridor improvement projects. Pages 70 and 71 of this report contain a table and map respectively which provide additional information for these assessed corridor improvement projects.

Figure 6.4 Recommended Projects

Map ID	Roadway	From	To
FI-1	SH 35	FM 518	S OF SH 6
NF-1	FM 528	SH 35 BUSINESS	SH 6
FI-2	SH 6	SH 288	GALVESTON C/L
FI-3	FM 518	SH 288	FM 865
FI-4	SH 35	SH 6	BS 35C SOUTH
FI-5	FM 1128	CR 98	CR 100
FI-6	FM 518	FM 865	SH 35
FI-7	FM 1128	BROADWAY	BAILEY RD
FI-8	SH 35	FM 2403	FM 523
FI-9	FM 1462	SH 288	SH 99
FI-10	FM 1462	FORT BEND C/L	SUPER SPEED-WAY
FI-11	FM 521	BRAZORIA/FORT BEND C/L	FM 1462
FI-12	FM 517	LP 409	SH 35

Figure 6.3 Quantitative Criteria Scoring & Sub-totals

Map ID	Roadway	From	To	LOS Assessment Score	Fatal Crash Score	Total Crash Score	Qualitative Criteria Sub-Total
				1-6	0,4	1-4	0-14
FI-1	SH 35	FM 518	S OF SH 6	4	4	3	**11**
NF-1	FM 528	SH 35 BUSINESS	SH 6	n/a	n/a	n/a	**n/a**
FI-2	SH 6	SH 288	GALVESTON C/L	3	4	2	**9**
FI-3	FM 518	SH 288	FM 865	6	0	4	**10**
FI-4	SH 35	SH 6	BS 35C SOUTH	1	0	1	**2**
FI-5	FM 1128	CR 98	CR 100	4	0	2	**6**
FI-6	FM 518	FM 865	SH 35	2	0	3	**5**
FI-7	FM 1128	BROADWAY	BAILEY RD	1	0	3	**4**
FI-8	SH 35	FM 2403	FM 523	1	4	2	**7**
FI-9	FM 1462	SH 288	SH 99	1	4	2	**7**
FI-10	FM 1462	FORT BEND C/L	SUPER SPEEDWAY	4	0	1	**5**
FI-11	FM 521	BRAZORIA/FORT BEND C/L	FM 1462	1	0	2	**3**
FI-12	FM 517	LP 409	SH 35	1	0	0	**n/a**

6.4 Evaluation Results

While the recommendations for the sub-region cannot be ranked, we can recommended an assessment structure within different groups (ex: current facilities, proposed facilities, safety-included, safety-not included) and with further modifications. The 'assessed process' referenced in Chapter 6 is not intended to rank the projects against each other, but to assess each project according to the priorities set forth in the SPI.

The total points that a facility can receive for both the qualitative and quantitative criteria is 50. The total points for new roadway improvement project, such as NF-1, cannot be tallied because the quantitative data for LOS Assessment, Fatal Crash, and Total Crash scores does not exist for these corridors and therefore cannot be evaluated. Figure 6.5 outlines quantitative and qualitative scores and sub-totals.

A detailed summary of the qualitative and quantitative evaluation and scoring results can be found in Appendix 3.

Figure 6.5 Quantitative & Qualitative Criteria Scoring & Sub-totals

Map ID	Roadway	From	To	LOS Assessment Score	Fatal Crash Score	Total Crash Score	Quantitative Criteria Sub-Total	Continuation of Existing Widening Projects	Municipality Development	Connectivity	Construction Design in Progress	Parallel Relief	Protection of Downtown	Preservation of Community Character	Environmental Impact	Transportation Land Use Linkage	Qualitative Criteria Sub-Total	Total
				1-6	**0,4**	**1-4**	**0-14**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0,4**	**0-36**	**0-50**
FI-1	SH 35	FM 518	S OF SH 6	4	4	3	**11**	0	4	4	0	4	0	4	4	4	**24**	**35**
NF-1	FM 528	SH 35 BUSINESS	SH 6	n/a	n/a	n/a	**n/a**	0	4	4	0	4	4	4	0	4	**24**	**N/A**
FI-2	SH 6	SH 288	GALVESTON C/L	3	4	2	**9**	0	4	4	0	4	0	4	4	4	**24**	**33**
FI-3	FM 518	SH 288	FM 865	6	0	4	**10**	4	4	4	0	4	0	4	4	4	**28**	**38**
FI-4	SH 35	SH 6	BS 35C SOUTH	1	0	1	**2**	0	4	4	0	4	4	4	4	4	**28**	**30**
FI-5	FM 1128	CR 98	CR 100	4	0	2	**6**	0	4	4	0	4	0	4	4	4	**24**	**30**
FI-6	FM 518	FM 865	SH 35	2	0	3	**5**	0	4	4	0	4	0	4	4	4	**24**	**29**
FI-7	FM 1128	BROADWAY	BAILEY RD	1	0	3	**4**	0	4	4	0	4	0	4	4	4	**24**	**28**
FI-8	SH 35	FM 2403	FM 523	1	4	2	**7**	0	0	4	0	4	0	4	4	4	**20**	**27**
FI-9	FM 1462	SH 288	SH 99	1	4	2	**7**	0	0	4	0	4	0	0	0	0	**8**	**15**
FI-10	FM 1462	FORT BEND C/L	SUPER SPEEDWAY	4	0	1	**5**	0	0	0	0	4	0	0	0	0	**4**	**9**
FI-11	FM 521	BRAZORIA/ FORT BEND C/L	FM 1462	1	0	2	**3**	0	0	0	0	4	0	0	0	0	**4**	**7**
FI-12	FM 517	LP 409	SH 35	1	0	0	**n/a**	0	4	4	0	4	0	4	0	0	**16**	**N/A**

6.4 Programmatic Recommendations

Critical to addressing the transportation issues facing the sub-region is integrating these specific transportation corridor improvement projects with programmatic land use, transit, and bike/pedestrian improvements. The following sections discuss specific recommendations.

6.4.1 Land Use

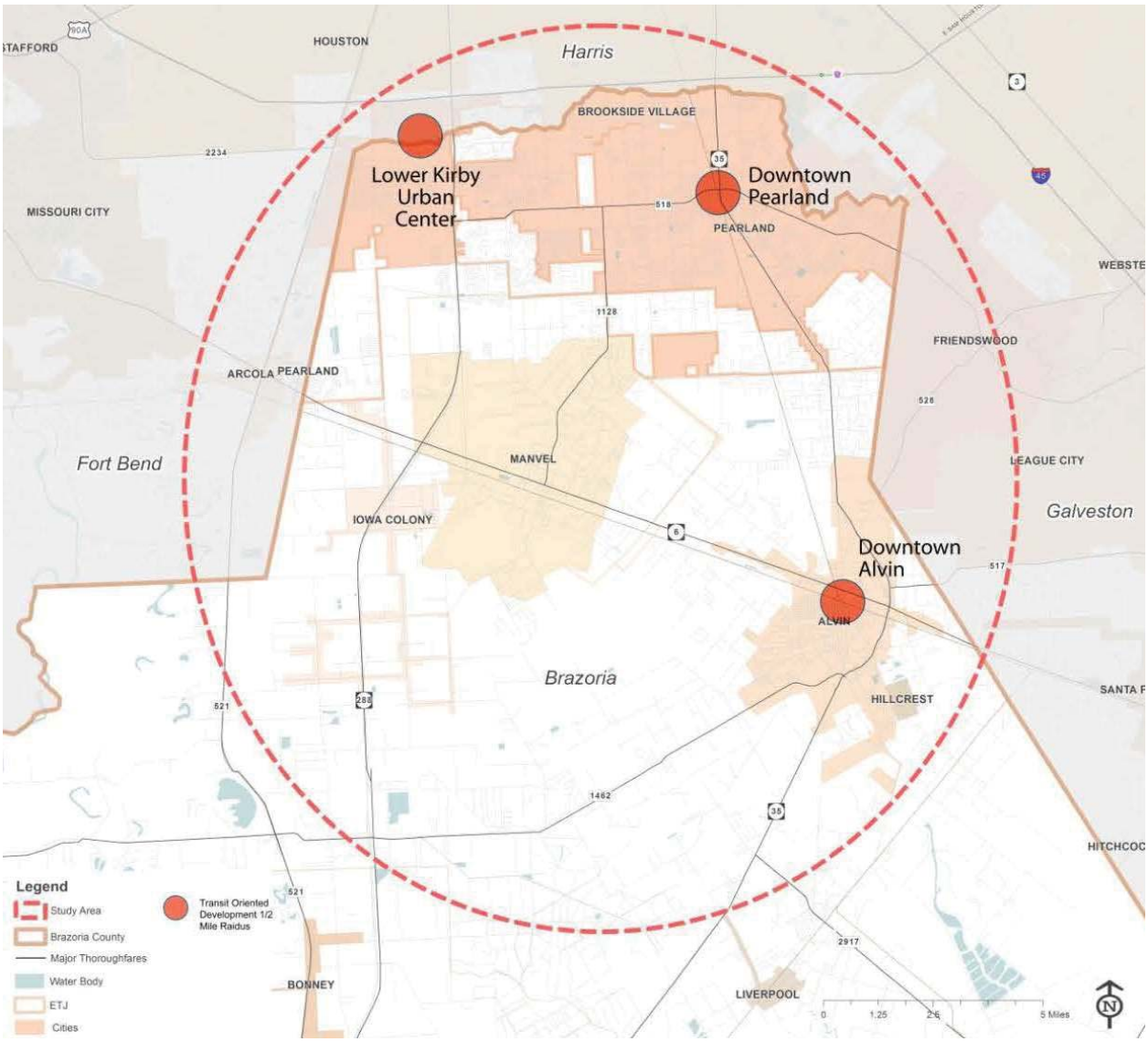
Transportation improvement projects must be coupled with appropriate land use policy decisions and programs in order to effectively address transportation challenges. Municipalities can spend millions of dollars on transportation improvement projects, but if these projects are not implemented within the context of transportation supportive land use decisions, benefits may be limited or may even worsen over time. This was apparent in the alternative land use transportation scenarios discussed in Section 4 – Scenario Development + Testing. For example, the alternative transportation scenarios that proposed transportation projects without land use modifications (Scenarios 1 and 2) did not lead to significant reductions in key metrics and were not the highest ranked scenarios. However, Scenario 3B, which proposed land use enhancements linked to strategic transportation improvements, specifically transit proved to be the best performing scenario.

As compared to the other scenarios tested, Scenario 3B:

- Reduced long term capital costs;
- Provided the most multi-modal transportation options;
- Reduced Vehicles Miles Traveled (VMT), Vehicles Hours Traveled (VHT), VMT in congestion, and Percent VMT in Congestion across the sub-region;
- Increased walk to transit opportunities; and
- Reduced level of environmental impact.

Achieving a more sustainable land use and transportation vision will require that local agencies incrementally move and strategically integrate with transportation decisions and land use policy modifications. Specifically, this may include modifications to existing city comprehensive plans, zoning codes, and policies. As discussed in Section 4 – Scenario Development + Testing, three key focus areas emerged through the SPI process as having the potential to serve as future activity centers. These three areas included the Lower Kirby Urban Center (formerly the Spectrum District), Old Townsite Downtown Pearland, and Downtown Alvin. Map 6.2 identifies these areas.

Map 6.2 Potential Future Activity Centers



Key to developing activity centers is ensuring that the appropriate policies are in place to enable the emergence of these centers incrementally through smart and strategic growth. Following are a series of land use policy recommendations that the City of Pearland and City of Alvin should consider in order to achieve a more sustainable land use and transportation vision. While the City of Manvel was not identified as a potential activity center, the City's polices were also reviewed to identify how these policies compared with those of the City of Pearland and the City of Alvin. The policy recommendations were proposed within the context of each municipality's desired community character and example tools and strategies include the following:

- Develop urban design guidelines to guide development and retain community character
- Adopt mixed-use zoning districts
- Adopt pedestrian and/or transit supportive zoning overlay districts

6.4.2 Comprehensive Plan

The Comprehensive Plan for each focus area was reviewed to identify if transit supportive principles were in place. Figure 6.6 outlines general findings and recommendations to position each area for future transit investment.

Figure 6.6 Study area Comprehensive Plan Analysis + Recommendations

City of Manvel	City of Alvin	Old Townsite Downtown Pearland	Pearland (Spectrum)
Community Character			
Rural residential community	Traditional small town	Suburban single family community, with historic urban core	Future higher density development
Existing Conditions			
•Desire to retain small town values and character while encouraging new more intense development along SH288 and SH6. •Identifies the need for form-based code along with an Intensity of Development Zoning to guide the form of the built environment. •Identifies Downtown as a "Special District" (SD).	•Reflects the community's concern about encroachment of non-residential and/or high-density residential uses in low-density residential areas. •Identifies the need for the revitalization and redevelopment of Downtown (Goal 3.3).	•Acknowledges recent growth and need for future growth framework. •Establishes the need for an attractive business park along SH288. •Identifies the need to reinvent the Old Townsite as a modern village with a mix of uses and an entertainment district.	Lower Kirby Urban Center (formally the Spectrum District) is a proposed 1,000 acre Greenfield development site. The Lower Kirby Master Plan serves as the framework for future development.
Recommendations			
•Refine Plan to increase allowable density in ID-Zone SD. •Create mixed-use land use category •Create urban design guidelines as suggested by Goal #2 in Comprehensive Plan.	•Define areas for future intensive development. •Develop vertically integrated mixed use land use category that builds on existing Urban Residential and Urban Commercial land uses.	•Expand Village District to include a vertical mixed use land use category. •Create design standards and zoning code that supports the Village District. •Update Old Townsite Development District Plan.	•Implement Lower Kirby Urban Center Regulatory Framework and Land Use Plan.

6.4.3 Zoning Code

Each focus area's existing zoning code was reviewed to identify if transit supportive language was currently in place. Transit supportive zoning can include vertically integrated mixed-use categories and overlay districts that identify: minimum design standards, density requirements, parking standards and circulation requirements. Figure 6.7 outlines general recommendations and changes that should be considered to supplement future transit investment.

Figure 6.7 Study area Zone Code Analysis + Recommendations

City of Manvel	City of Alvin	Old Townsite Downtown Pearland	Pearland (Spectrum)
Community Character			
Rural residential community	Traditional small town	Suburban single family community, with historic urban core	Future higher density development
Existing Conditions			
Separation of uses with the exception of Highway Mixed Use.	No mixed-use category; only Planned Unit Development (PUD).	Zoning in Old Townsite is broken down into 3 zoning categories including OT-MU (mixed use).	The Spectrum District allows for a variety of land uses within one overall district. It is comprised of five (5) sub districts: •S1-Beltway District •S2- Mixed Use District •S3- Mixed Use- High Density Residential District •S4- Light Industrial and Science and Technology District •S-5 District
Recommendations			
Create zoning code that reflects Comprehensive Plan objectives.	Develop mixed use zoning category that can be applied to areas indentified for future intensive development.	Refine existing OT-MU to provide for vertically integrated mixed-use.	No Change.

6.4.4 Overlay Districts

Overlay Districts are designed to grant additional use or development regulations upon underlying zoning districts. The focus areas within Brazoria County could benefit from two types of Overlay Districts: a Pedestrian Overlay District and a Transit Supportive Overlay District. The recommendations provided should be further refined by each municipality in accordance to their communities' vision, goals and proposed transit opportunities.

Pedestrian Overlay

A Pedestrian Overlay District is designed to establish a walkable urban framework. In general, the Pedestrian Overlay should:

- Promote a mix of uses in a pedestrian-oriented setting of moderate intensity;
- Support economic development in designated future transit areas;
- Encourage high-quality design; and
- Encourage the reuse of existing structures and allow new development that complements adjacent neighborhoods.

Appendix 4 contains Pedestrian Overlay recommendations for the City of Manvel, the City of Alvin, Old Townsite Downtown Pearland, and the Spectrum area in Pearland. Pedestrian overlay policy strategies, such as urban design, parking, and land use guidelines, are also included in Appendix 4.

Transit Supportive Overlay

A Transit Supportive District sets forth land use and zoning standards designed to accommodate existing uses while transitioning to a more compact, higher intensity, transit supportive mix of uses—but at a lesser intensity than traditional transit oriented developments. Areas where a Transit Supportive Overlay Districts are applicable include the three identified activity centers.

Transit Supportive Overlay Districts are designed to:

- Create transit support and pedestrian oriented development regulations and uses; and
- Encourage properties to transition to a more transit support development and uses up to one-half (1/2) mile walking distance from future transit node.

Appendix 4 contains Transit Supportive Overlay District recommendations for the City of Manvel, the City of Alvin, Old Townsite Downtown Pearland, and the Spectrum area in Pearland. Specific transit supportive overlay policy considerations., such as parking, density, and open space requirements, are also included in Appendix 4.

6.4.5 Transit Oriented Development

Transit Oriented Development recommendations are designed to create compact, high-intensity mixed-use developments that support the potential for enhanced transit and pedestrian activity within a one-half (1/2) mile walking distance from the potential future transit station location. The alternative transportation and land use scenarios discussed in Section 5.0 – Scenario Development + Testing, were designed to include transit oriented development in the three identified activity centers. Zoning districts that are typically included in transit oriented development areas include:

- Residentially Oriented (TOD-R) - designed to support high-density residential communities with limited non-residential uses in a pedestrian friendly area.
- Employment Oriented (TOD-E) - designed to accommodate high-intensity office uses or residential uses in a pedestrian friendly area.
- Mixed-Use Oriented (TOD-M) – established to support a mix of high destiny residential, employment, civic uses along with limited retail uses in a pedestrian supportive environment.

The following policies should be considered in a Transit Oriented Development area:

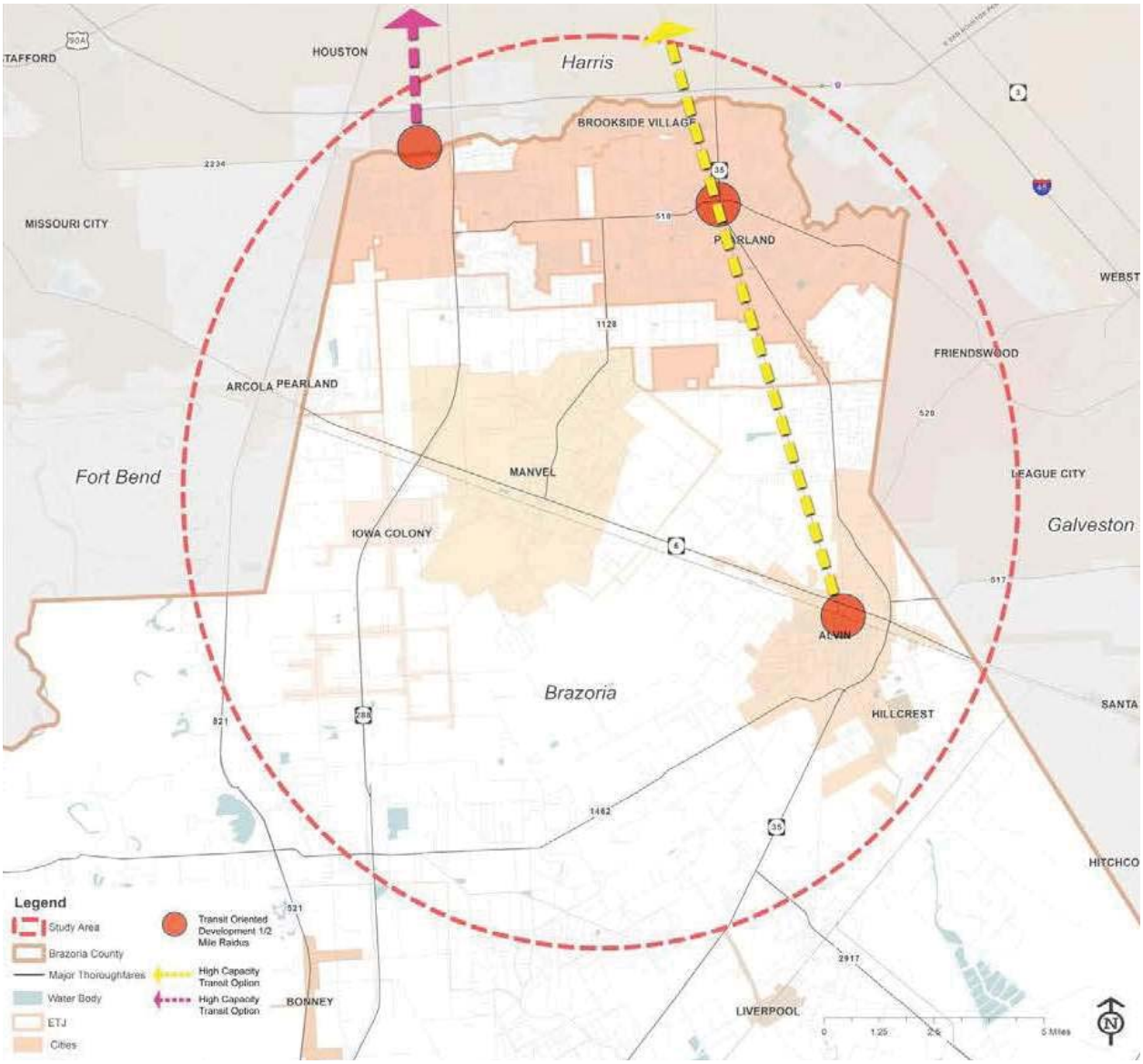
- Creation of urban design standards
- Development standards should include:
  - Setbacks (from existing curbs) should be determined by station area plan and not to exceed sixteen (16) feet.
  - Minimum floor area ration shall not be less than .75 FAR within ¼ mile, .50 FAR within ½ mile.
  - Parking maximums should be established and no surface parking shall be established within right-of-way.
  - Internal and external pedestrian connections
  - Open space requirements
- Buffer requirements between non-residential and residential uses.
- Develop urban design standards.

Appendix 4 contains specific zoning strategies for Transit Oriented Developments and recommendations for each sub-region focus area.

6.5 Transit Recommendations

As demonstrated in Section 4.0, the scenarios connecting the three focus areas locally and regionally with transit performed best relative to the baseline scenario. Based on the findings of the scenario analysis and the proposed corridors and transit options explored, additional transit studies are warranted to identify transit feasibility within the sub-area, specfically along the SH 35 corridor and the Kriby Drive corridor. Integrating these corridors within a larger regional transit framework will enhance the overall transportaion future of the sub-region. Additionally, incremental express bus service should be explored along the SH 35 corridor with the context of a strategy to expand and enhance transit options along the corridor.

Map 6.3 Sub-region Transit Framework



Based on the Census-designated urbanized area, the transit provider for northern Brazoria County is METRO, of which the City of Pearland and the City of Alvin are not members. METRO is currently constructing a Park and Ride facility in the area, with tentative plans to add more in the future. Sub-regional elected leaders should conduct a workshop soon for the purpose of identifying local attitudes regarding public transportation as a commute alternative. Further meetings, studies, or negotiations with current transit providers can advance based on the outcome of the workshop.

Map 6.3 illustrates the sub-region transit framework, including possible transit oriented development areas and high capacity transit routes.

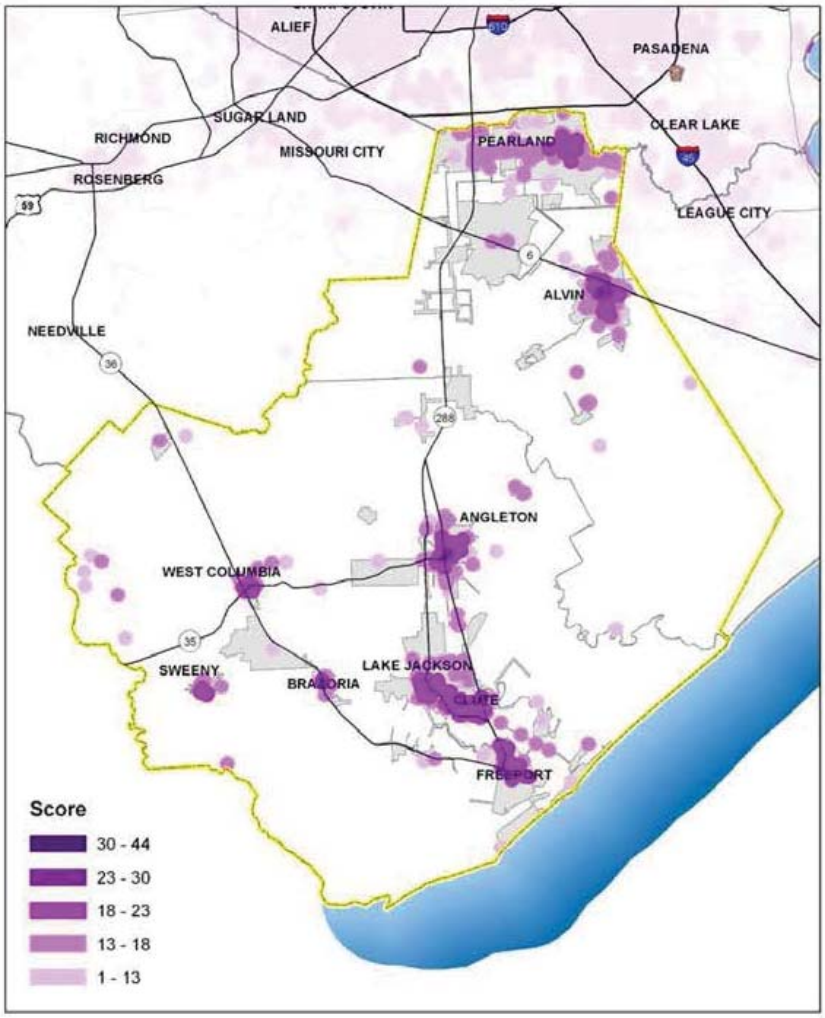
6.6 Bicyle and Pedestrian Recommendations

As discussed in Section 2.0 – Existing Conditions, the City of Pearland, Alvin, and Manvel have developed city-wide bicycle/pedestrian/trail master plans. Based on the vision and goals developed through the SPI public engagement process, it is recommended that the cities of Pearland, Alvin, and Manvel coordinate with H-GAC to develop a sub-regional bicycle/pedestrian plan. This could potentially connect the three cities' planned bicycle and pedestrian improvements in the future. Developing this plan will also enable the integration of key bicycle/pedestrian projects into the RTP implementation process.

H-GAC's Pedestrian and Bicyclist Special District Program provides guidance on strategic investments in pedestrian and bicycle infrastructure in areas of the region with the greatest bicycling and walking demand.

The program identified Old Townsite Downtown Pearland and Alvin as scoring high within Brazoria County—demonstrating an opportunity for bicycle and pedestrian investment. The Cities of Pearland, Alvin, and Manvel should partner with H-GAC to pursue additional planning studies to identify local and regional priorities for investments in pedestrian and bicycle infrastructure.

Map 6.4 Brazoria County Top Scoring Bicycle and Pedestrian Districts



Source: H-GAC Pedestrian and Bicyclist Special District Study Update, 2010

6.7 Summary of Recommendations

For successful implementation of the assessed projects discussed in this section, additional detailed engineering studies and environmental analysis are required to determine or confirm the most appropriate alignment, design, and cost. Additionally, successful implementation will require multi-jurisdictional collaboration, identification of appropriate funding mechanisms, political support, and public recognition of the project need and benefit. The SPI provides a basis for each of these achievements, but more work is necessary in order to advance and ultimately build each project. The Implementation workbooks in Section 06 provide additional direction on how to initiate the implementation process.

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07 IMPLEMENTATION WORKBOOKS

INTRODUCTION

The Northern Brazoria County / Pearland sub-regional Planning Initiative (SPI) documented a locally-driven vision and path to achieve this vision through the implementation of a series of project and policy recommendations in line with stakeholder goals and objectives.

The sub-regional plan serves as a guide for future investment decisions and actions that will be implemented both locally and through a partnership of sub-regional stakeholders in order to link communities, improve transportation service, encourage sustainable land development projects, and support the implementation of strategic investments to achieve the desired vision of the future for the Northern Brazoria County /Pearland sub-region.

As presented in the preceding chapters, the recommendations presented in these Implementation Workbooks were developed through an interactive planning process including review, coordination, and technical evaluation exercises guided by a group of Stakeholders vested in the future of the sub-region. Study recommendations include candidate projects and policy recommendations consistent with the overarching vision, goals, and objectives established for the jurisdictions within the study area. Each workbook should be considered a living document with the flexibility to respond to changing times, markets, and circumstances at the local level. This strategically positions the sub-region to take advantage of opportunities to move these projects forward quickly should they arise. Projects identified during the SPI process were subject to a prioritization process based on the goals and objectives of the study that is outlined in the SPI document; however, each project is equally important as part of the package of solutions identified to address the key tenants of the vision and goals for the study area:

Study Purpose/Vision

Northern Brazoria County is a rapidly developing area with dramatically expanding employment and housing opportunities. The sub-region, led by a partnership between Brazoria County, the City of Pearland, the City of Alvin, the Greater 288 Partnership, and BayTran is engaged in the betterment of local land use and transportation planning in support of a common vision.

Vision Statement

The residents of the region will have a high quality of life built on livable transportation and land use solutions that promote economic development; cultural diversity; community health and safety; preservation of natural resources, and fiscal prudence.

Goals

- Engage the public in the decision making process
- Provide a wide range of transportation choices
- Promote economic development throughout the sub-region
- Maintain fiscal prudence
- Strengthen community well-being and safety
- Preserve and enhance natural resources

Map 01 identifies the roadway transportation projects identified as priorities through the sub-regional planning process.

FUNDING

Each level of governance within the sub-region employs a variety tools and programs to effectively fund and implement short and long-term transportation improvement projects. Funding resources for implementing SPI projects and recommendations are available at multiple levels and will ultimately include a mix of leveraged funds from federal, state, and local sources. In addition to the funding profile contained in Section 05 of the SPI plan, the Implmentation Worksbooks contain a brief outline of funding opportunities for each jurisdiction within the sub-region.

TRANSPORTATION SYSTEM IMPROVEMENTS

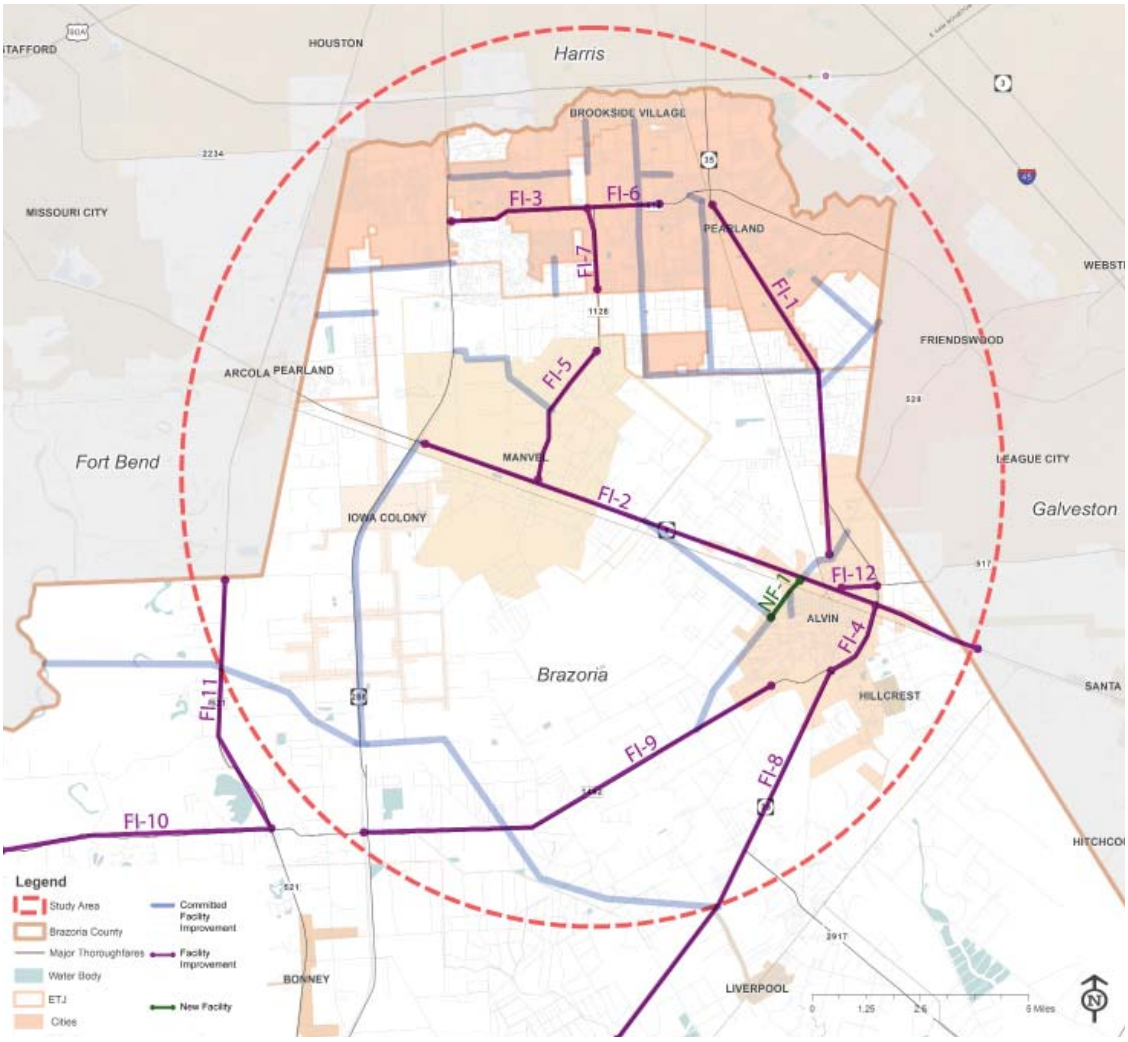
The following table describes the recommended roadway improvement projects. These projects were identified through the SPI process – including technical analysis, public engagement, and consultation with the Stakeholder Advisory Committee (SAC) – and informed by previous studies and the HGAC 2035 RTP Update. Map 01 illustrates these project locations. "FI" refers to Facility Improvements, or upgrades to existing transportation facilities and "NF" refers to New Facilities, or construction of new transportation facilities.

Recommended Roadway System Improvements

Map ID	Street	From	To	Description	Estimated Cost**
FI-3	FM 518	SH 288	FM 865	Widen to 6-lane divided urban	$54,953,265
FI-1	SH 35	FM 518	S of SH 6	Widen to 6-lane divided rural	$190,951,513
FI-2	SH 6	SH 288	Galveston C/L	Widen to 6 & 8-lanes	$104,601,301
FI-4	SH 35	SH 6	BS 35 C South	4-lane tollway (most feasible toll alternative)	$55,082,167
FI-5	FM 1128	CR 98	CR 100	Widen from 2 to 4 lanes w/bridges	$56,557,935
FI-6	FM 518	FM 865	SH 35	Widen to 6-lane divided urban w/ flush median	$104,343,984
FI-7	FM 1128	Broadway	Bailey Rd	Widen from 2 to 4-lanes divided curb and gutter	$19,624,896
FI-8	SH 35	FM 2043	FM 523	Widen to 4-lane divided	$195,244,221
FI-9	FM 1462	SH 288	SH 99	Widen from 2 to 4 lanes	$77,766,771
FI-10	FM 1462	Fort Bend C/L	Super Speedway	Widen from 2 to 4-lanes	$135,994,809
FI-11	FM 521	Brazoria / Fort Bend C/L	FM 1462	Widen 2 to 4-lanes	$71,342,115
NF-1	FM 528	SH 35 Business	SH 6	Construct 2-lane urban undivided on new location with railroad grade separation (phase 1)	$10,000,000
FI-12	FM 517	LP 409	SH 35	Widen to 4-lanes in sections	$11,646,135

***-As estimated in the H-GAC 2035 RTP Update Unfunded Project List*

01 Roadway System Improvements



"FI" = Facility Improvements
"NF" = New Facilities

TRANSIT SYSTEM IMPROVEMENTS

A long term strategy to achieving a more sustainable land use and transportation vision for Northern Brazoria County / Pearland sub-regional Planning Initiative includes the implementation of transit. Map 02 illustrates the two potential transit opportunities identified through the SPI process.

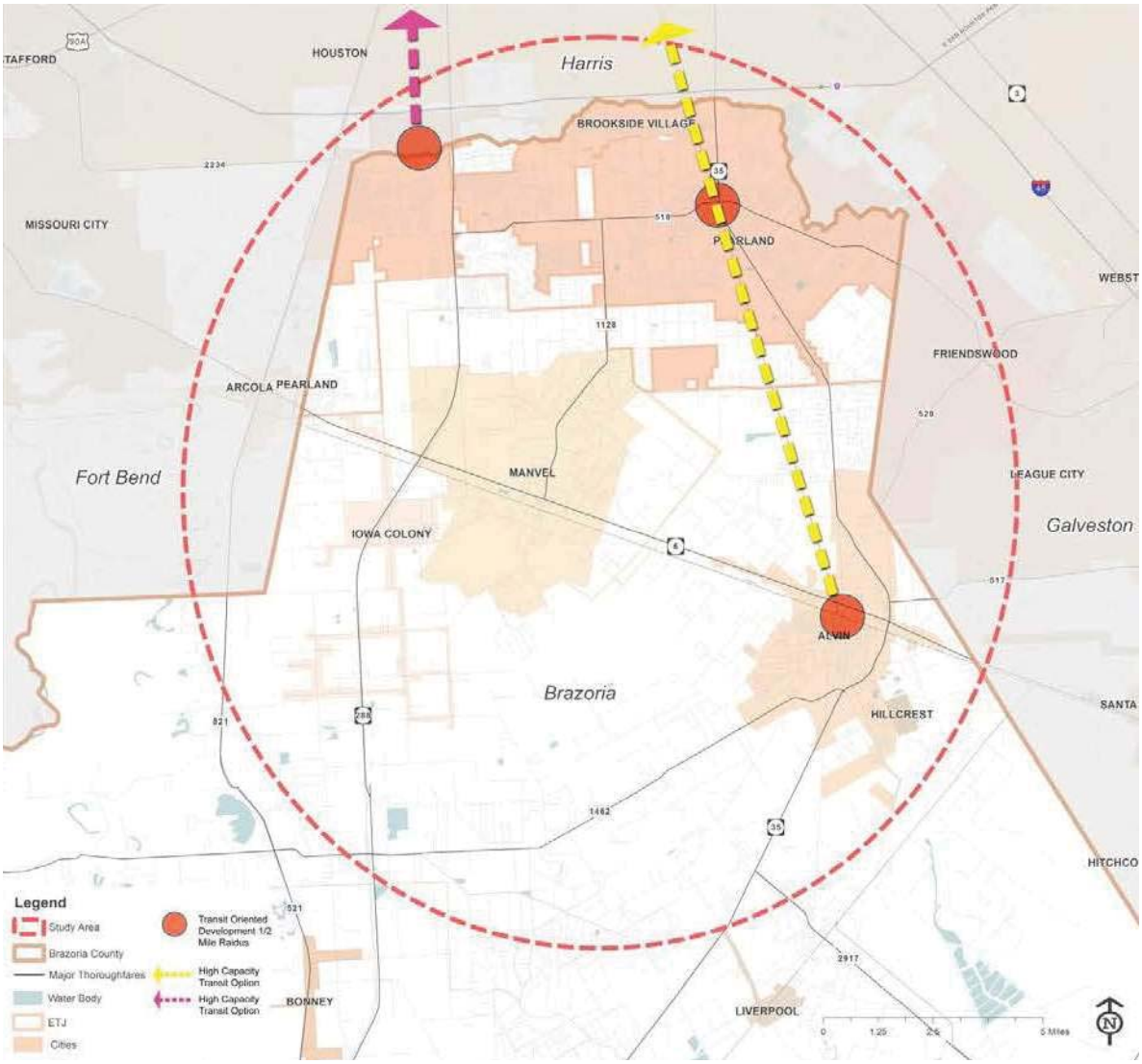
Benefits of transit solutions

- Relieve congestion and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the sub-region and to neighboring Counties
- Provide transportation choice
- Enhance future development potential
- Promote economic development
- Improve safety
- Reduce Vehicle Miles Traveled

Recommended Transit System Improvements

Location	From	To	Description
Kirby Drive	Lower Kirby Urban Center	Texas Medical Center	High-Capacity Transit along Kirby Drive
SH 35 / Railroad Right of Way	Downtown Alvin	Old Townsite Downtown Pearland, connecting to transit points north along Interstate 45.	High-Capacity Transit along SH 35 or within railroad right-of way from Downtown Alvin to Old Townsite Downtown Pearland.

02 TRANSIT SYSTEM IMPROVEMENTS



LAND USE

Achieving a more sustainable land use and transportation vision for the sub-region requires that land use policy modifications at the local level are strategically integrated with future transportation improvements. Specifically, this includes modifications to city comprehensive plans, zoning codes, and the development of overlay districts in key nodal/focus areas that address urban design, land use, and mobility policies.

As part of the SPI process, three key nodal/focus areas emerged has having the potential to serve as future Activity Centers. In addition to serving Activity Centers, these areas have the potential to house future transit stations that link residents regionally to employment centers and destinations.

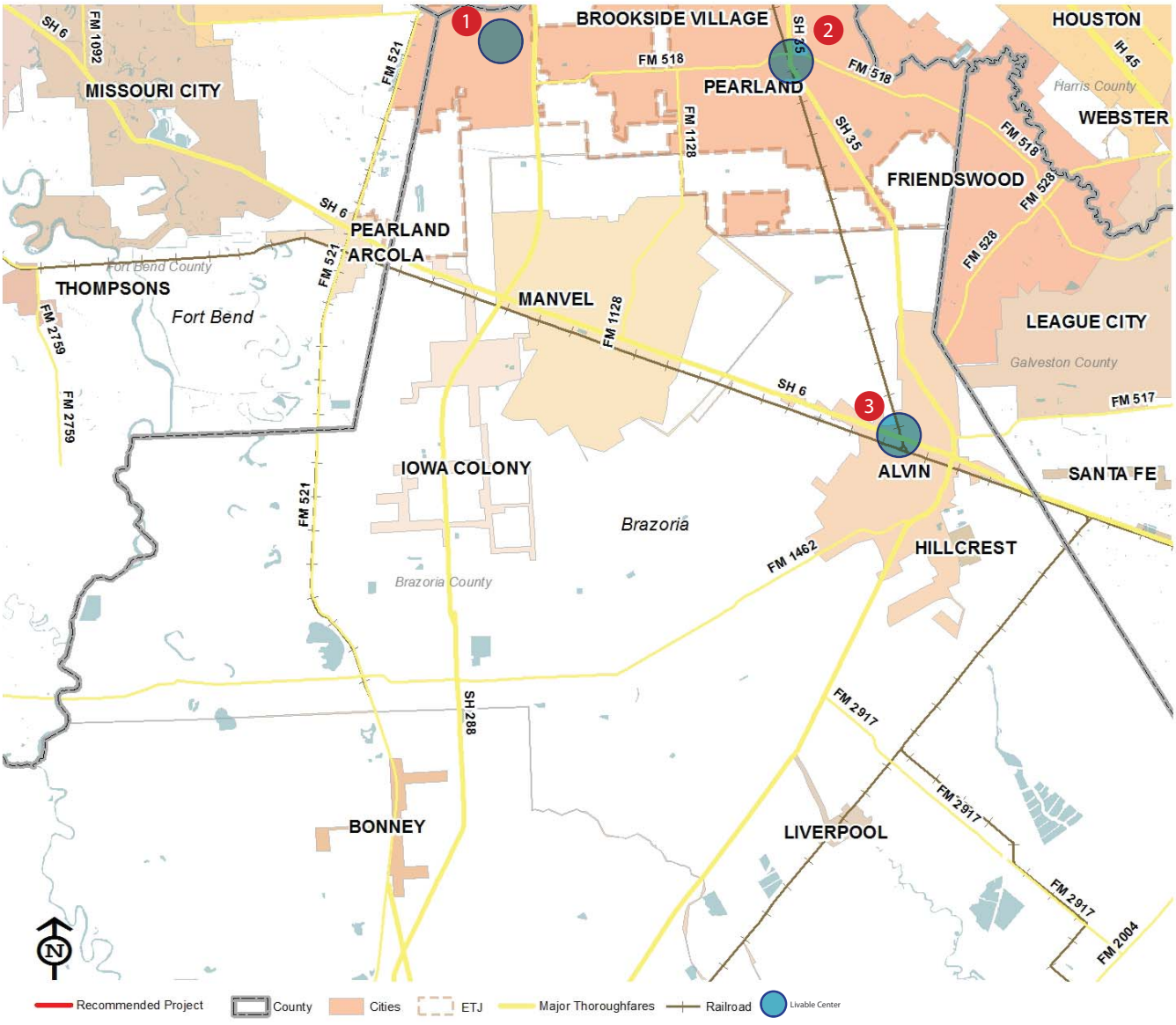
As illustrated in Map 03, these Activity Centers include:

1. Lower Kirby Urban Center (formally known as the Spectrum District)
2. Old Townsite Downtown Pearland
3. Downtown Alvin

Key to developing these centers is ensuring that the appropriate policies are in place to enable the emergence of these centers incrementally through smart and strategic growth. This workbook provides a series of land use policy modification implementation steps that the City of Pearland and the City of Alvin should consider in order to develop as Activity Centers that have the potential to support future transit opportunities. Additionally, implementation steps to support future sustainable land use policy recommendations are provided for the City of Manvel to consider. In addition to implementation steps, specific examples of typical land use policy frameworks were provided that serve as a starting point for each municipality to consider within the context of their desired community character.

The pages that follow include implementation workbooks for SPI funding partners: Brazoria County, the City of Pearland, and the City of Alvin, as well as the City of Manvel and a cross-jurisdictional project reference guide.

03 PROPOSED ACTIVITY CENTERS



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BRAZORIA COUNTY IMPLEMENTATION WORKBOOK

The Northern Brazoria County / Pearland sub-regional Planning Initiative (SPI) documented a locally-driven vision and path to achieve this vision through the implementation of a series of project and policy recommendations in line with stakeholder goals and objectives.

The sub-regional plan serves as a guide for future investment decisions and actions that will be implemented both locally and through a partnership of sub-regional stakeholders in order to link communities, improve transportation service, encourage sustainable land development projects, and support the implementation of strategic investments to achieve the desired vision of the future for the Northern Brazoria County /Pearland sub-region.

As presented in the preceding chapters, the recommendations presented in these Implementation Workbooks were developed through an interactive planning process including review, coordination, and technical evaluation exercises guided by a group of Stakeholders vested in the future of the sub-region. Study recommendations include candidate projects and policy recommendations consistent with the overarching vision, goals, and objectives established for the jurisdictions within the study area. Each workbook should be considered a living document with the flexibility to respond to changing times, markets, and circumstances at the local level. This strategically positions the sub-region to take advantage of opportunities to move these projects forward quickly should they arise. Projects identified during the SPI process were subject to a prioritization process based on the goals and objectives of the study that is outlined in the SPI document; however, each project is equally important as part of the package of solutions identified to address the key tenants of the vision and goals for the study area:

Study Purpose

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Vision Statement

The residents of the region will have a high quality of life built on livable transportation and land use solutions that promote economic development; cultural diversity; community health and safety; preservation of natural resources, and fiscal prudence.

Goals

- Engage the public in the decision making process
- Provide a wide range of transportation choices
- Promote economic development throughout the sub-region
- Maintain fiscal prudence
- Strengthen community well-being and safety
- Preserve and enhance natural resources

TRANSPORTATION SYSTEM IMPROVEMENTS

Transportation system improvements identified during the SPI process include the advancement of currently unfunded initiatives that will achieve the goals of Brazoria County, the Northern Brazoria County / Pearland sub-region, and the Houston-Galveston Area Council (H-GAC). Through the sub-regional planning process, the value of these initiatives was tested through technical analysis and vetted through stakeholder and public engagement activities. The resulting list of projects identified as priorities support achievement of the SPI vision and the goals and objectives within Brazoria County by providing the following benefits:

- Provide congestion relief and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the sub-region and to and from neighboring Counties
- Enhance future development potential
- Improve roadway safety
- Continue implementation activities in support of previous and ongoing study efforts/ and planning processes
- Address congestion, mobility, and coordination of transportation services consistent with the H-GAC Regional Transportation Plan through investment in System Capacity, Operations Management, and the development of Activity Centers
- Support enhancement of hurricane evacuation facilities

Map 01 illustrates recommended roadway improvement projects. Those falling within unincorporated Brazoria County fall within its jurisdiction and are listed below. "FI" refers to Facility Improvements, or upgrades to existing transportation facilities and "NF" refers to New Facilities, or construction of new transportation facilities.

Recommended Roadway System Improvements – Brazoria County

Map ID	Street	From	To	Description	Estimated Cost**
FI-1	SH 35	FM 518 (W. Broadway Street)	S of SH 6	Widen to 6-lane divided rural	$190,951,513
FI-2	SH 6	SH 288	Galveston C/L	Widen to 6 & 8-lanes	$104,601,301
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FI-8	SH 35	FM 2043	FM 523	Widen to 4-lane divided	$195,244,221
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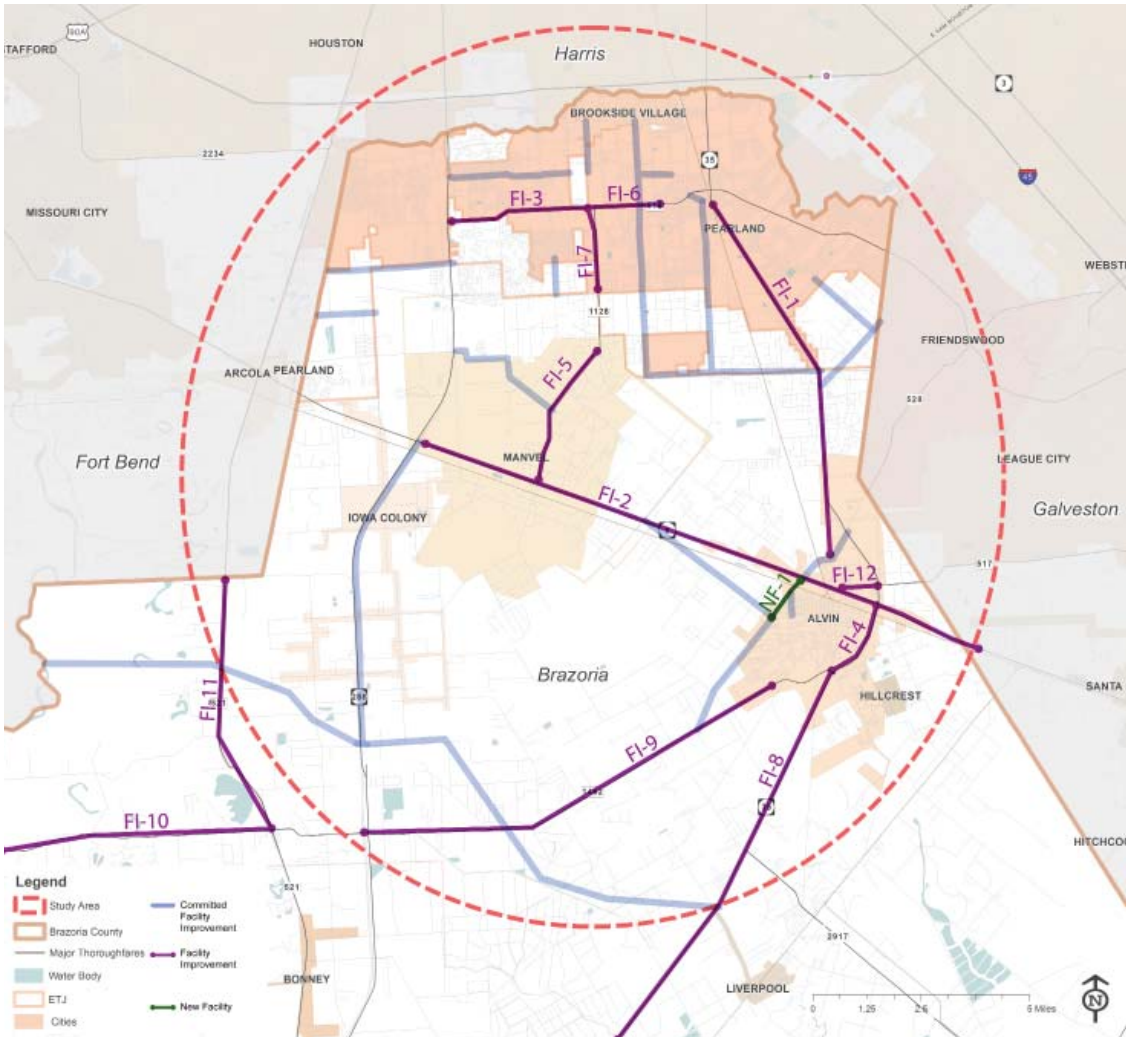
FI-10	FM 1462	Fort Bend C/L	Super Speedway	Widen from 2 to 4-lanes	$135,994,809
FI-11	FM 521	Brazoria / Fort Bend C/L	FM 1462	Widen 2 to 4-lanes	$71,342,115

01 Roadway System Improvements



"FI" = Facility Improvements
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TRANSIT SYSTEM IMPROVEMENTS

A long term strategy to achieving a more sustainable land use and transportation vision for Northern Brazoria County / Pearland sub-regional Planning Initiative includes the implementation of transit. Map 02 illustrates the two potential transit opportunities identified through the SPI process.

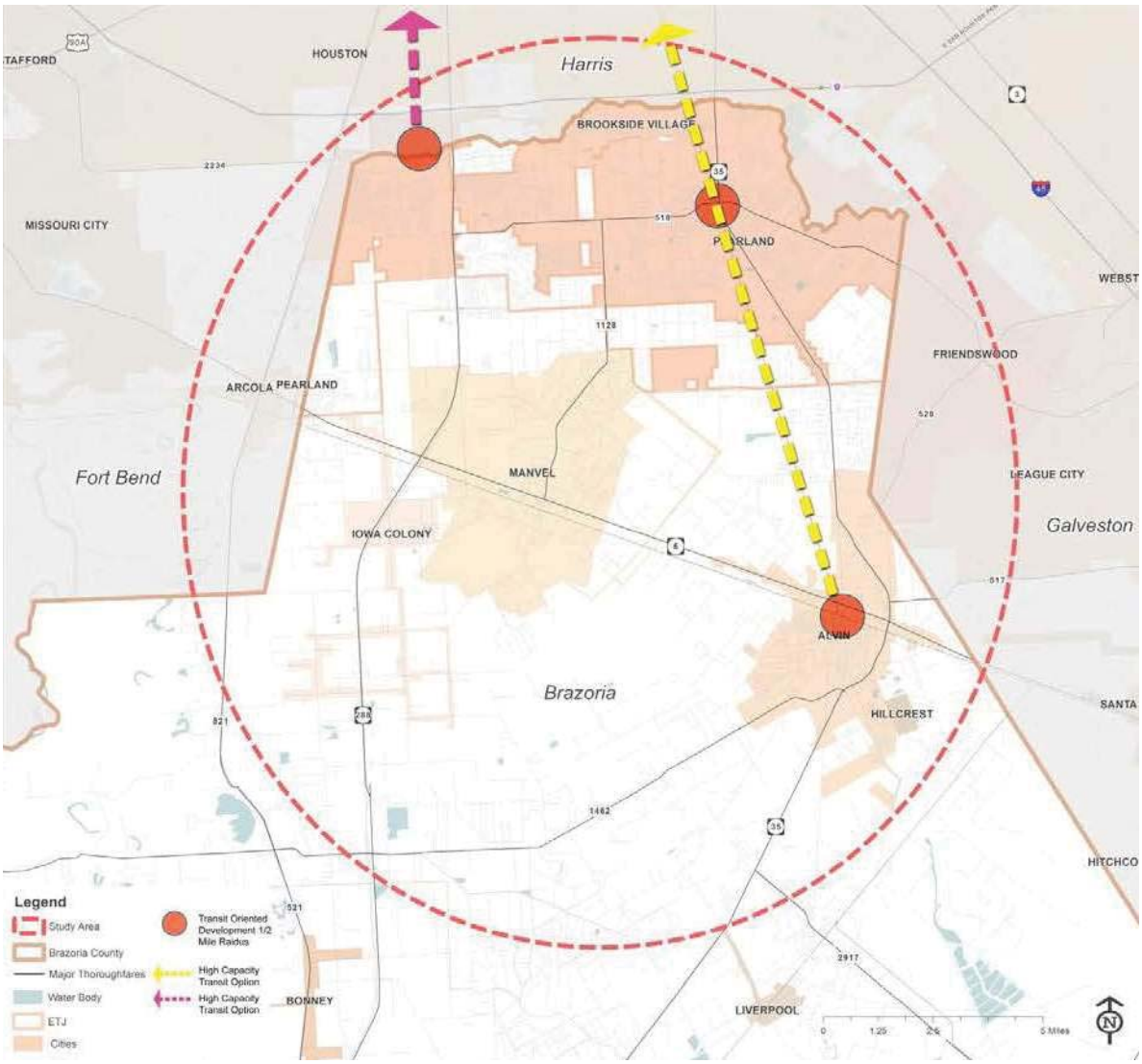
Benefits of transit solutions

- Relieve congestion and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the sub-region and to neighboring Counties
- Provide transportation choice
- Enhance future development potential
- Promote economic development
- Improve safety
- Reduce Vehicle Miles Traveled

Recommended Transit System Improvements

Location	From	To	Description
Kirby Drive	Lower Kirby Urban Center	Texas Medical Center	High-Capacity Transit along Kirby Drive
SH 35 / Railroad Right of Way	Downtown Alvin	Old Townsite Downtown Pearland, connecting to transit points north along Interstate 45.	High-Capacity Transit along SH 35 or within railroad right-of way from Downtown Alvin to Old Townsite Downtown Pearland

02 TRANSIT SYSTEM IMPROVEMENTS



BRAZORIA COUNTY NEXT STEPS

- Explore short-term operations and management improvements along corridors, including access management and ITS improvements, for interim implementation on facilities identified for system upgrades in the future.
- Identify local match funding and work with partners including H-GAC and TxDOT to incorporate SPI projects in the 2040 Regional Transportation Plan.
- Work with Harris County METRO, BayTran, and other regional partners to identify a potential future transit operator for the County.
- Work with H-GAC to add proposed transit projects to the region's transit framework.
- Request a formal debrief from TxDOT on the status of the SH 35 Corridor Study.

Funding Opportunities

Brazoria County has the ability to bond for specific transportation projects within its jurisdictions if approved by voters.

Other opportunities include:

- Tax Increment Financing
- MPO Process / Federal Funds
- Transportation funding through future Economic Development Initiatives
- Legislative appropriations
- Fees and Levies

CITY OF PEARLAND IMPLEMENTATION WORKBOOK

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As presented in the preceding chapters, the recommendations presented in these Implementation Workbooks were developed through an interactive planning process including review, coordination, and technical evaluation exercises guided by a group of Stakeholders vested in the future of the sub-region. Study recommendations include candidate projects and policy recommendations consistent with the overarching vision, goals, and objectives established for the jurisdictions within the study area. Each workbook should be considered a living document with the flexibility to respond to changing times, markets, and circumstances at the local level. This strategically positions the sub-region to take advantage of opportunities to move these projects forward quickly should they arise. Projects identified during the SPI process were subject to a prioritization process based on the goals and objectives of the study that is outlined in the SPI document; however, each project is equally important as part of the package of solutions identified to address the key tenants of the vision and goals for the study area:

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- Engage the public in the decision making process
- Provide a wide range of transportation choices
- Promote economic development throughout the sub-region
- Maintain fiscal prudence
- Strengthen community well-being and safety
- Preserve and enhance natural resources

TRANSPORTATION SYSTEM IMPROVEMENTS

Transportation system improvements identified during the SPI process include the advancement of currently unfunded initiatives that will achieve the goals of Brazoria County, the Northern Brazoria County / Pearland sub-region, and the Houston-Galveston Area Council (H-GAC). Through the sub-regional planning process, the value of these initiatives was tested through technical analysis and vetted through stakeholder and public engagement activities. The resulting list of projects identified as priorities support achievement of the SPI vision and the goals and objectives within Brazoria County:

- Provide congestion relief and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the sub-region and to and from neighboring Counties
- Enhance future development potential
- Improve roadway safety
- Continue implementation activities in support of previous and ongoing study efforts/ and planning processes
- Address congestion, mobility, and coordination of transportation services consistent with the H-GAC Regional Transportation Plan through investment in System Capacity, Operations Management, and the development of Activity Centers
- Support enhancement of hurricane evacuation facilities

Map 01 illustrates recommended roadway improvement projects. "FI" refers to Facility Improvements, or upgrades to existing transportation facilities and "NF" refers to New Facilities, or construction of new transportation facilities.

Recommended Roadway System Improvements – City of Pearland

Map ID	Street	From	To	Description	Estimated Cost**
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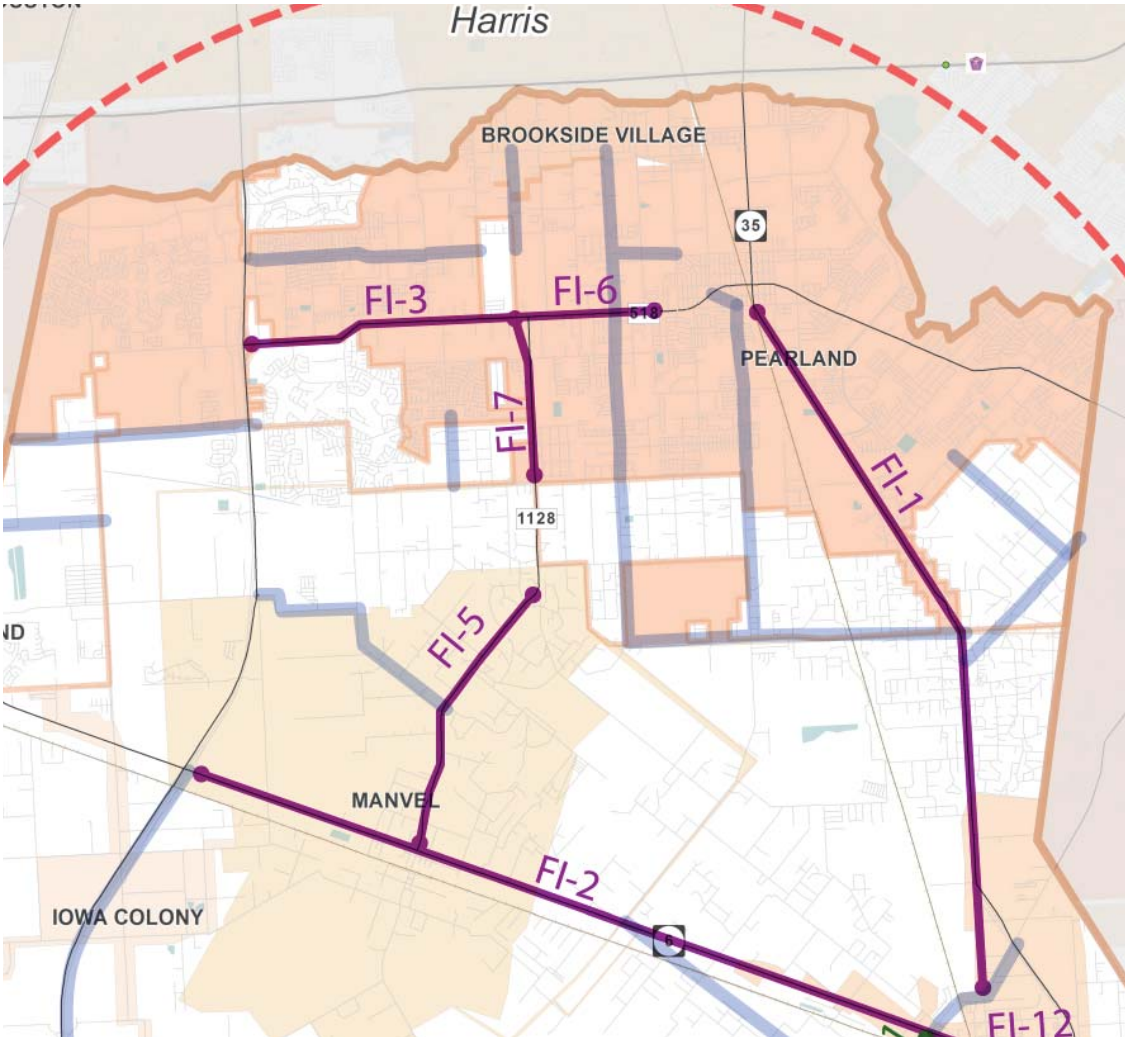
FI-6	FM 518	FM 865	SH 35	Widen to 6-lane divided urban w/ flush median	$104,343,984
FI-7	FM 1128	Broadway	Bailey Rd	Widen from 2 to 4-lanes divided curb and gutter	$19,624,896

01 TRANSPORTATION SYSTEM IMPROVEMENTS



"FI" = Facility Improvements
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TRANSIT SYSTEM IMPROVEMENTS

A long term strategy to achieving a more sustainable land use and transportation vision for Northern Brazoria County / Pearland sub-regional Planning Initiative includes the implementation of transit. Map 02 illustrates the two potential transit opportunities identified through the SPI process.

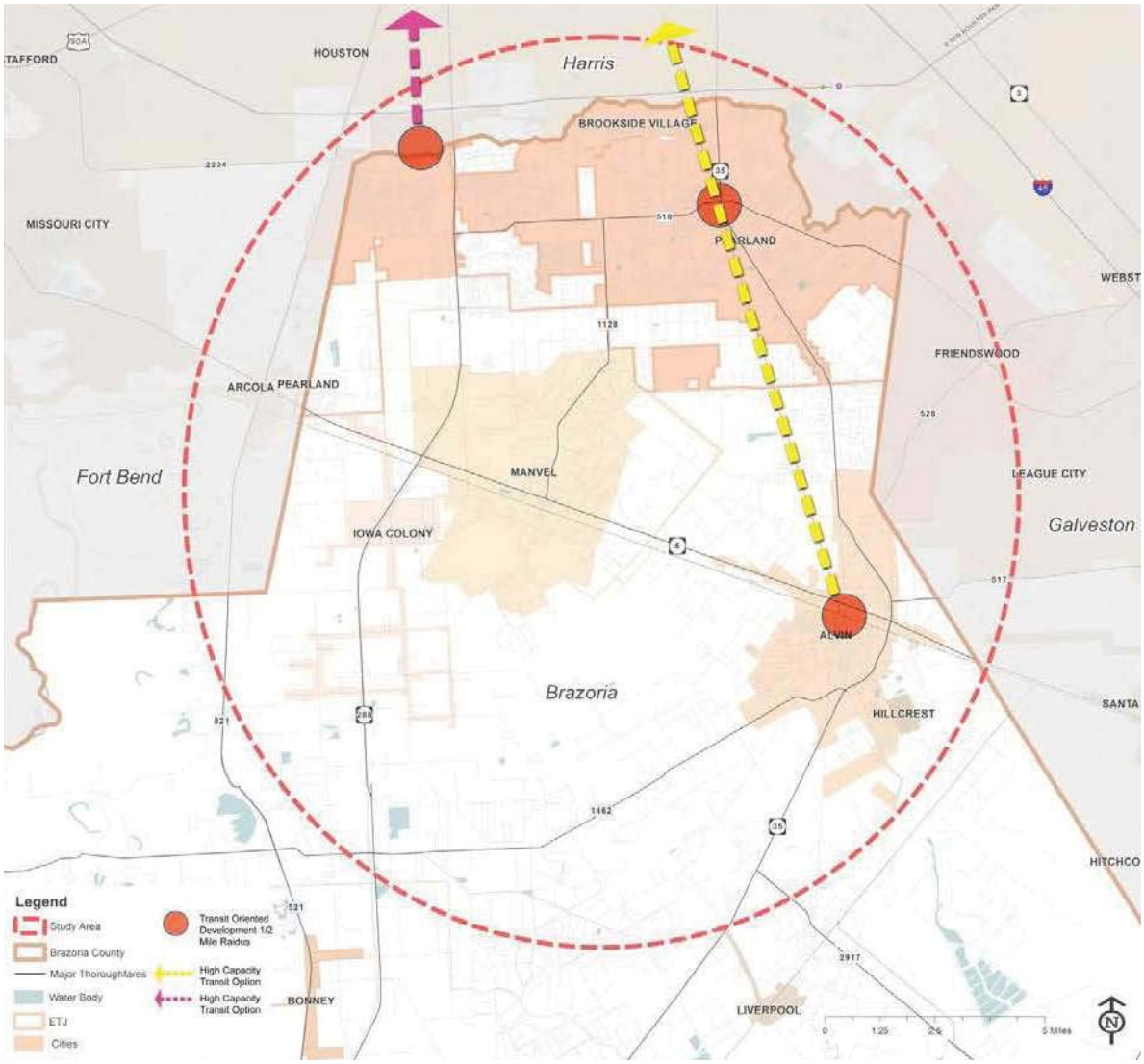
Benefits of transit solutions

- Relieve congestion and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the sub-region and to neighboring Counties
- Provide transportation choice
- Enhance future development potential
- Promote economic development
- Improve safety
- Reduce Vehicle Miles Traveled

Recommended Transit System Improvements

Location	From	To	Description
Kirby Drive	Lower Kirby Urban Center	Texas Medical Center	High-Capacity Transit along Kirby Drive
SH 35 / Railroad Right of Way	Downtown Alvin	Old Townsite Downtown Pearland, connecting to transit points north along Interstate 45.	High-Capacity Transit along SH 35 or within railroad right-of way from Downtown Alvin to Old Townsite Downtown Pearland

02 TRANSIT SYSTEM IMPROVEMENTS



LAND USE

Achieving a more sustainable land use and transportation vision for the sub-region requires that land use policy modifications at the local level are strategically integrated with future transportation improvements. Specifically, this includes modifications to city comprehensive plans, zoning codes, and the development of overlay districts in key nodal/focus areas that address urban design, land use, and mobility policies.

As part of the SPI process, three key nodal/focus areas emerged has having the potential to serve as future Activity Centers. In addition to serving Activity Centers, these areas have the potential to house future transit stations that link residents regionally to employment centers and destinations.

Key to developing these centers is ensuring that the appropriate policies are in place to enable the emergence of these centers incrementally through smart and strategic growth. This workbook provides a series of land use policy modification implementation steps that the City of Pearland should consider in order to develop as Activity Centers that have the potential to support future transit opportunities.

In addition to implementation steps, specific examples of typical land use policy frameworks were provided that serve as a starting point for each municipality to consider within the context of their desired community character.

These changes support the following benefits consistent with sub-regional goals and objectives:

- Facilitates sustainable development patterns;
- Advances smart growth principles;
- Facilitates future implementation of high-capacity transit;
- Provides transportation options;
- Support a variety of housing and employment options; and
- Contributes to a reduction in congestion, capital infrastructure costs, and environmental across the sub-region.

Recommended land use policy changes for Activity Centers in the City of Pearland apply to the:

- Lower Kirby Urban Center (formally known as the Spectrum District)
- Old Townsite Downtown Pearland

City of Pearland Lower Kirby Urban Center

The implementation of the Lower Kirby Urban Center Regulatory Framework and Land Use Plan will enable the development of a policy framework that allows for the future development of a transit station at this location. This transit station would connect the Lower Kirby Urban Center to the Texas Medical Center via high-capacity transit in the future, and contribute to a transit-supportive environment to support ridership and future development patterns.

<table>
<tr><th colspan="5">City of Pearland Lower Kirby Urban Center (Spectrum) Land Use Modification Recommendations</th></tr>
<tr><td rowspan="4">Short-Term Policy Modifications</td><td rowspan="2">Comprehensive Plan</td><td>Existing</td><td colspan="3">The Pearland Lower Kirby Urban Center (formally the Spectrum District) is a proposed 1,000 acre greenfield development site. The Lower Kirby Master Plan serves as the framework for future development.</td></tr>
<tr><td>Recommendation</td><td colspan="3">Implement Lower Kirby Urban Center Regulatory Framework and Land Use Plan.</td></tr>
<tr><td rowspan="2">Existing Zoning Code</td><td>Existing</td><td colspan="3">The Spectrum District allows for a variety of land uses within one overall district. It is comprised of five (5) sub districts:
• S1-Beltway District
• S2- Mixed Use District
• S3- Mixed Use- High Density Residential District
• S4- Light Industrial and Science and Technology District
• S-5 District</td></tr>
<tr><td>Recommendation</td><td colspan="3">No change</td></tr>
<tr><td rowspan="3">Long Term Policy Modifications</td><td rowspan="3">Transit Oriented Development Framework</td><td>Typical Framework</td><td colspan="3">• Creation of urban design standards
• Development standards should include:
- Setbacks (from existing curbs) should be determined by station area plan and not to exceed sixteen (16) feet.
- Minimum floor area ration shall not be less than .75 FAR within ¼ mile, .50 FAR within ½ mile.
- Parking maximums should be established and no surface parking shall be established within right-of-way.
- Internal and external pedestrian connections
- Open space requirements
• Buffer requirements between non-residential and residential uses.</td></tr>
<tr><td></td><td>TOD-R (Residentially Oriented)
• Minimum density of twenty (20) units per acre within ¼ mile distance from station.
• Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station.
• Retail, institutional, civic, and office uses are permitted at a ratio of 1 dwelling unit to 2,000 square feet of development.</td><td>TOD-E (Employment/Office Oriented)
• Minimum .75 FAR within ¼ mile from station and .5 FAR between ¼ mile and ½ mile of station.
• Office should comprise a minimum of 60% of uses, of which only 20% of retail, institution or civic uses should be used to meet minimum FAR standards.
• Up to 20% of total development gross square footage should be residential uses.
- Minimum density of twenty (20) units per acre within ¼ mile distance from station.
- Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station.</td><td>TOD-M (Mixed-Use Oriented)
• Minimum .75 FAR within ¼ mile from station and .5 FAR between ¼ mile and ½ mile of station.
• Up to 20% of total gross square footage that is composed of retail uses may be credited toward meeting minimum FAR standards.
• Residential uses shall meet the below standards.
- Minimum density of twenty (20) units per acre within ¼ mile distance from station.
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<tr><td>Recommendation</td><td colspan="3">• Develop urban design standards that address the overall district as well as subareas.
• Further refine zoning regulations to set FAR minimums.
• Encourage structured parking, shared parking and/or reducing parking requirement within 800’ of transit or public parking.</td></tr>
</table>

Old Townsite Downtown Pearland Land Use Modifications

These proposed land use policy modifications provide a framework that allows for the incrementally and strategic maturation of Old Townsite Downtown Pearland as a mixed-use activity center. These policies are flexible enough to facilitate the long-term development of a potential transit station.

Old Townsite Downtown Pearland Land Use Modification Recommendations			
Short-Term Policy Modifications	Comprehensive Plan	Existing	• Acknowledges recent growth and need for future growth framework. • Establishes the need for an attractive business park along SH288. • Identifies the need to reinvent the Old Townsite as a modern village with a mix of uses and an entertainment district.
		Recommendation	• Expand Village District to include a vertical mixed use land use category. • Create design standards and zoning code that supports the Village District. • Update Old Townsite Development District Plan.
	Existing Zoning Code	Existing	• Zoning in Old Townsite is broken down into 3 zoning categories including OT-MU (mixed use).
		Recommendation	• Refine existing OT-MU to provide for vertically integrated mixed-use.
Long Term Policy Modifications	Pedestrian Overlay Framework	Typical Framework	• All uses, other than single-family detached units, must provide buffering along all edges abutting residential districts • Encourage base building height of 40 feet; max height to be determined from building to boundary of nearest single-family residential district. • Right-of-way line should be minimum front set back. - Minimum Side Yard- 5 feet - Minimum Rear Yard- 20 feet • Parking requirements may be met on-site or off-site at a distance up to 800 feet from permitted use. 25% parking reduction allowed if property is located within 400 feet of parking facility available to public. • No surface parking within street right-of-way. • All new development on lots one acre or more must provide urban open space: - Private open space is accessible to residents or tenants; includes balconies and courtyards. - Public open space should be visible from the street or public areas, located on ground floor and located behind the sidewalk. • Develop urban design standards that reflect community character.
		Recommendation	Suggested Pedestrian Overlay recommendations should be applied to areas along Broadway, Orange Street, and North Main Street. Focus should be on the built form and a walkable street framework

Old Townsite Downtown Pearland Land Use Modification Recommendations (Continued)

Long Term Policy Modifications	Transit Oriented Development Framework	Typical Framework	• Creation of urban design standards • Development standards should include: - Setbacks (from existing curbs) should be determined by station area plan and not to exceed sixteen (16) feet. - Minimum floor area ration shall not be less than .75 FAR within ¼ mile, .50 FAR within ½ mile. - Parking maximums should be established and no surface parking shall be established within right-of-way. - Internal and external pedestrian connections - Open space requirements • Buffer requirements between non-residential and residential uses.		
			TOD-R (Residentially Oriented) • Minimum density of twenty (20) units per acre within ¼ mile distance from station. • Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station. • Retail, institutional, civic, and office uses are permitted at a ratio of 1 dwelling unit to 2,000 square feet of development.	**TOD-E (Employment/Office Oriented)** • Minimum .75 FAR within ¼ mile from station and .5 FAR between ¼ mile and ½ mile of station. • Office should comprise a minimum of 60% of uses, of which only 20% of retail, institution or civic uses should be used to meet minimum FAR standards. • Up to 20% of total development gross square footage should be residential uses. - Minimum density of twenty (20) units per acre within ¼ mile distance from station. - Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station.	**TOD-M (Mixed-Use Oriented)** • Minimum .75 FAR within ¼ mile from station and .5 FAR between ¼ mile and ½ mile of station. • Up to 20% of total gross square footage that is composed of retail uses may be credited toward meeting minimum FAR standards. • Residential uses shall meet the below standards. - Minimum density of twenty (20) units per acre within ¼ mile distance from station. - Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station
		Recommendation	N/A	N/A	Old Townsite District should identify principles in TOD-M to refine and further develop based on the community vision. The intent of TOD-M should be to enhance the existing downtown framework that can support a variety of uses within the ½ mile commuter rail station area.

Old Townsite Downtown Pearland Land Use Modification Recommendations (Continued)

Long Term Policy Modifications	Transit Supportive Overlay Framework	Typical Framework	• Minimum residential density of twelve (12) dwelling units per acre within ½ mile walk. • Minimum FAR shall not be less than .50 within ½ mile walk. • Minimum setback (from existing curb) should be twenty-four (24) feet on major thoroughfares and sixteen (16) feet on all other streets. • No minimum side or rear yard required except if it abuts existing single family. • Minimum height shall be forty (40) feet. • Parking standards should include: - Residential maximum= 1.6 spaces/unit. - Office maximum= 1 space per 300 sf. - Restaurant maximum=1 space per 75sf. - Parking maximums can be exceeded if parking is structured, shared or within 800 feet of public parking facility. • Buffer standards apply between residential and non-residential uses. • Internal/external pedestrian circulation • Provision for open space • Develop urban design standards.
		Recommendation	Suggested Transit Supportive recommendations should be applied as a precursor to areas that will receive transportation investment. This can include local bus corridors and high-capacity transit initiatives like commuter rail. It is recommended that the ½ mile station area around the proposed commuter rail line be defined. The Transit Supportive overlay should be focused on encouraging properties to transition to a transit supportive development while supporting and enhancing existing uses. Areas that are recommended to receive this overlay include: • Historic Downtwon • Intersection of Pearland Parkway and Broadway. • Intersection of Broadway Street and Walnut Street.

CITY OF PEARLAND NEXT STEPS

Explore short-term operations management improvements along corridors, including access management and ITS improvements, for interim implementation on facilities identified for system upgrades in the future.

- Identify local match funding and work with partners including H-GAC and TxDOT to incorporate SPI projects in the 2040 Regional Transportation Plan.
- Work with Harris County METRO, BayTran, and other regional partners to identify a potential future transit operator.
- Work with H-GAC to add proposed transit projects to the region's transit framework.
- Work with local Elected Officials and the Planning and Zoning staff to implement land use policy changes.
- Request a formal debrief from TxDOT on the status of the SH 35 Corridor Study.

Funding Opportunities

The City of Pearland has the ability to bond for transportation improvements and also funds a Capital Improvement Program through the collection of a half-cent sales tax revenue collected through the Pearland Economic Development Council. A half-cent sales tax is also collected in the Lower Kirby Urban Center to improve infrastructure and facilitate investment in the growth of this area.

CITY OF MANVEL IMPLEMENTATION WORKBOOK

The Northern Brazoria County / Pearland sub-regional Planning Initiative (SPI) documented a locally-driven vision and path to achieve this vision through the implementation of a series of project and policy recommendations in line with stakeholder goals and objectives.

The sub-regional plan serves as a guide for future investment decisions and actions that will be implemented both locally and through a partnership of sub-regional stakeholders in order to link communities, improve transportation service, encourage sustainable land development projects, and support the implementation of strategic investments to achieve the desired vision of the future for the Northern Brazoria County /Pearland sub-region.

As presented in the preceding chapters, the recommendations presented in these Implementation Workbooks were developed through an interactive planning process including review, coordination, and technical evaluation exercises guided by a group of Stakeholders vested in the future of the sub-region. Study recommendations include candidate projects and policy recommendations consistent with the overarching vision, goals, and objectives established for the jurisdictions within the study area. Each workbook should be considered a living document with the flexibility to respond to changing times, markets, and circumstances at the local level. This strategically positions the sub-region to take advantage of opportunities to move these projects forward quickly should they arise. Projects identified during the SPI process were subject to a prioritization process based on the goals and objectives of the study that is outlined in the SPI document; however, each project is equally important as part of the package of solutions identified to address the key tenants of the vision and goals for the study area:

Study Purpose

Northern Brazoria County is a rapidly developing area with dramatically expanding employment and housing opportunities. The sub-region, led by a partnership between Brazoria County, the City of Pearland, the City of Alvin, the Greater 288 Partnership, and BayTran is engaged in the betterment of local land use and transportation planning in support of a common vision.

Vision Statement

The residents of the region will have a high quality of life built on livable transportation and land use solutions that promote economic development; cultural diversity; community health and safety; preservation of natural resources, and fiscal prudence.

Goals

- Engage the public in the decision making process
- Provide a wide range of transportation choices
- Promote economic development throughout the sub-region
- Maintain fiscal prudence
- Strengthen community well-being and safety
- Preserve and enhance natural resources

TRANSPORTATION SYSTEM IMPROVEMENTS

Transportation system improvements identified during the SPI process include the advancement of currently unfunded initiatives that will achieve the goals of Brazoria County, the Northern Brazoria County / Pearland sub-region, and the Houston-Galveston Area Council (H-GAC). Through the sub-regional planning process, the value of these initiatives was tested through technical analysis and vetted through stakeholder and public engagement activities. The resulting list of projects identified as priorities support achievement of the SPI vision and the goals and objectives within Brazoria County:

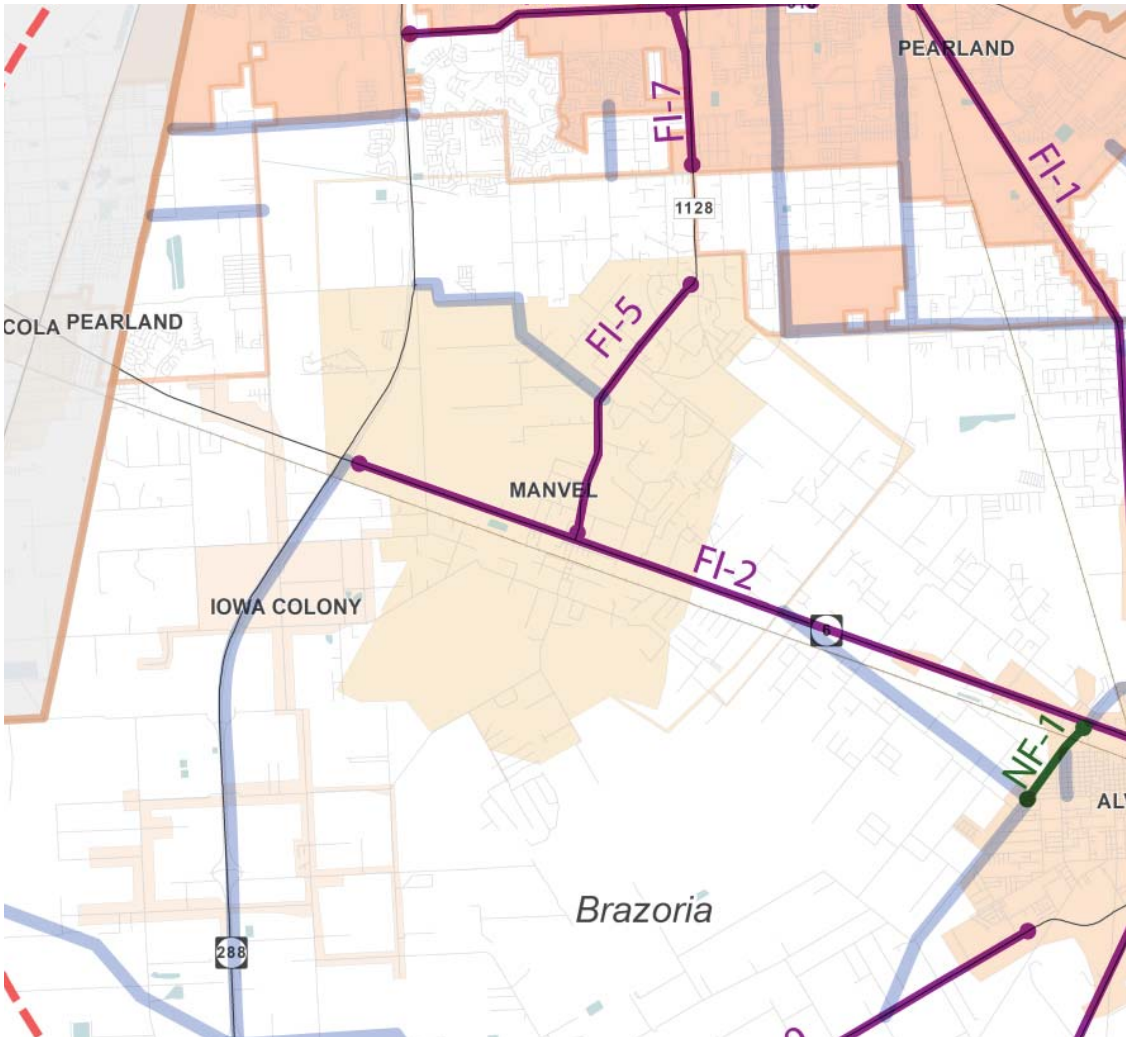
- Provide congestion relief and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the sub-region and to and from neighboring Counties
- Enhance future development potential
- Improve roadway safety
- Continue implementation activities in support of previous and ongoing study efforts/ and planning processes
- Address congestion, mobility, and coordination of transportation services consistent with the H-GAC Regional Transportation Plan through investment in System Capacity, Operations Management, and the development of Activity Centers
- Support enhancement of hurricane evacuation facilities

Map 01 illustrates recommended roadway improvement projects. "FI" refers to Facility Improvements, or upgrades to existing transportation facilities and "NF" refers to New Facilities, or construction of new transportation facilities.

Recommended Roadway System Improvements – City of Manvel

Map ID	Street	From	To	Description	Estimated Cost**
FI-2	SH 6	SH 288	Galveston C/L	Widen to 6 & 8-lanes	$104,601,301
FI-5	FM 1128	CR 98	CR 100	Widen from 2 to 4 lanes w/bridges	$56,557,935

01 TRANSPORTATION SYSTEM IMPROVEMENTS



"FI" = Facility Improvements
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TRANSIT SYSTEM IMPROVEMENTS

A long term strategy to achieving a more sustainable land use and transportation vision for Northern Brazoria County / Pearland sub-regional Planning Initiative includes the implementation of transit. Map 02 illustrates the two potential transit opportunities identified through the SPI process.

Benefits of transit solutions

- Relieve congestion and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the sub-region and to neighboring Counties
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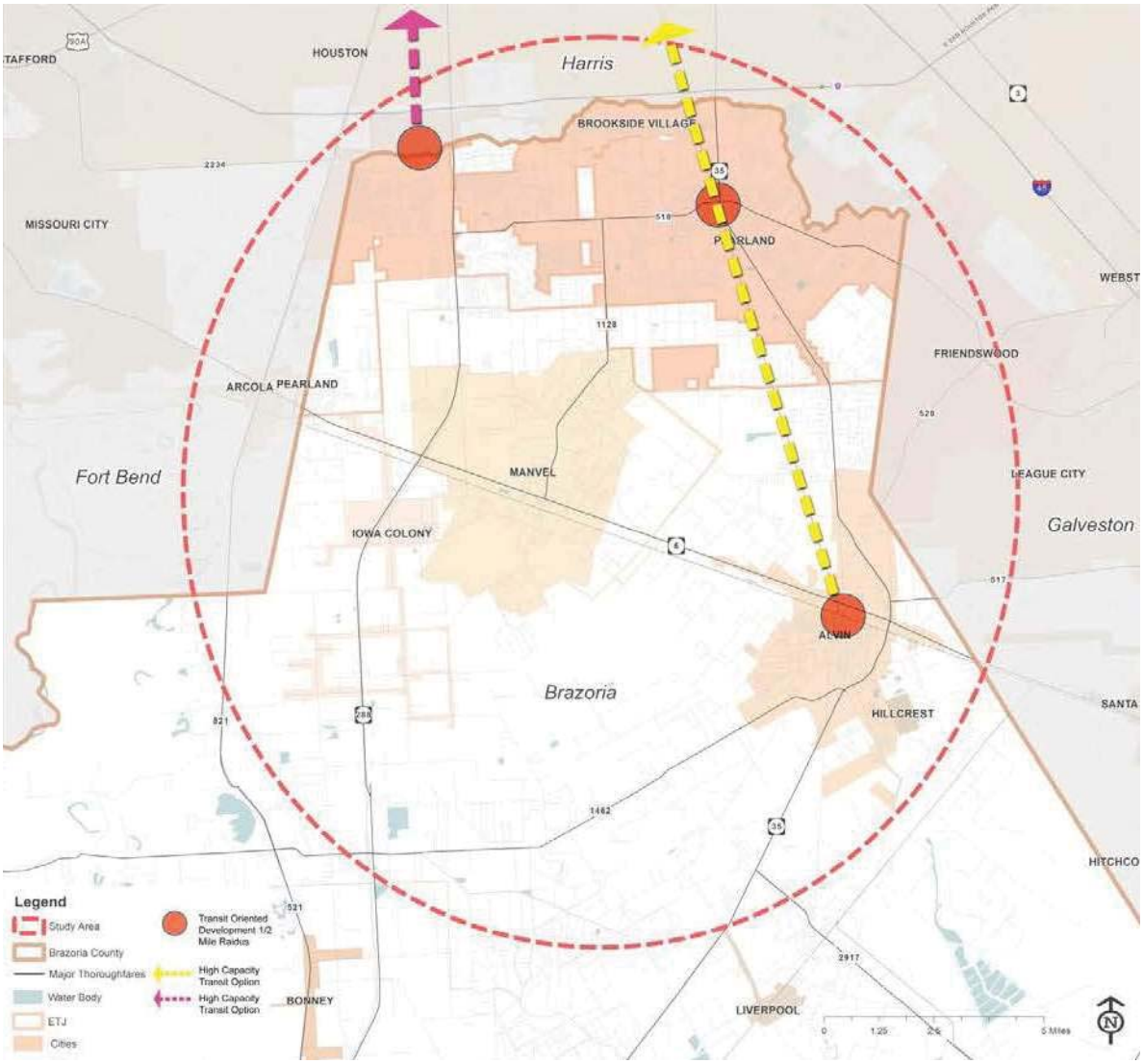
Recommended Transit System Improvements

Location	From	To	Description
Kirby Drive	Lower Kirby Urban Center	Texas Medical Center	High-Capacity Transit along Kirby Drive
SH 35 / Railroad Right of Way	Downtown Alvin	Old Townsite Downtown Pearland, connecting to transit points north along Interstate 45.	High-Capacity Transit along SH 35 or within railroad right-of way from Downtown Alvin to Old Townsite Downtown Pearland

02 TRANSIT SYSTEM IMPROVEMENTS



LAND USE

Achieving a more sustainable land use and transportation vision for the sub-region requires that land use policy modifications at the local level are strategically integrated with future transportation improvements. Specifically, this includes modifications to city comprehensive plans, zoning codes, and the development of overlay districts in key nodal/focus areas that address urban design, land use, and mobility policies.

As part of the SPI process, three key nodal/focus areas emerged has having the potential to serve as future Activity Centers. In addition to serving Activity Centers, these areas have the potential to house future transit stations that link residents regionally to employment centers and destinations.

Key to developing these centers is ensuring that the appropriate policies are in place to enable the emergence of these centers incrementally through smart and strategic growth. This workbook provides a series of land use policy modification implementation steps that the City of Manvel should consider in order to support future sub-regional transit opportunities.

In addition to implementation steps, specific examples of typical land use policy frameworks were provided that serve as a starting point for each municipality to consider within the context of their desired community character.

These changes support the following benefits consistent with sub-regional goals and objectives:

- Facilitates sustainable development patterns;
- Advances smart growth principles;
- Facilitates future implementation of high-capacity transit;
- Provides transportation options;
- Support a variety of housing and employment options; and
- Contributes to a reduction in congestion, capital infrastructure costs, and environmental across the sub-region.
- Facilitates sustainable development patterns;
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Manvel Land Use Modification Recommendations			
Short-Term Policy Modifications	Comprehensive Plan	Existing	• Desire to retain small town values and character while encouraging new more intense development along SH288 and SH6. • Identifies the need for form-based code along with an Intensity of Development Zoning to guide the form of the built environment. • Identifies Downtown as a "Special District" (SD).
		Recommendation	• Refine Plan to increase allowable density in ID-Zone SD. • Create mixed-use land use category is part of the Transit Oriented Development allocation of zones. • Create urban design guidelines as suggested by Goal #2 in Comprehensive Plan.
	Existing Zoning Code	Existing	• Separation of uses with the exception of Highway Mixed Use.
		Recommendation	• Create zoning code that reflects Comprehensive Plan objectives
Long Term Policy Modifications	Pedestrian Overlay Framework	Typical Framework	• All uses, other than single-family detached units, must provide buffering along all edges abutting residential districts • Encourage base building height of 40 feet; max height to be determined from building to boundary of nearest single-family residential district. • Right-of-way line should be minimum front set back. - Minimum Side Yard- 5 feet - Minimum Rear Yard- 20 feet • Parking requirements may be met on-site or off-site at a distance up to 800 feet from permitted use. 25% parking reduction allowed if property is located within 400 feet of parking facility available to public. • No surface parking within street right-of-way. • All new development on lots one acre or more must provide urban open space: - Private open space is accessible to residents or tenants; includes balconies and courtyards. - Public open space should be visible from the street or public areas, located on ground floor and located behind the sidewalk. • Develop urban design standards that reflect community character.
		Recommendation	• Develop urban design standards that: - Encourages active first floor retail - Limits blank walls - Relocates drive-through service at rear of buildings - Screens loading spaces • Identify and enhance pedestrian circulation routes and amenities. • Encourage new buildings to be built to the street with surface parking in rear of property. • Encourage shared parking and minimize curb cuts along SH6.

CITY OF MANVEL NEXT STEPS

- Implement short-, mid-, and long-term improvements including signal improvements, medians, and pedestrian improvements identified in the State Highway 6 South Corridor Access Management Plan.
- Identify local match funding and work with partners including H-GAC and TxDOT to incorporate SPI projects in the 2040 Regional Transportation Plan.
- Work with local Elected Officials and the Planning and Zoning staff to implement land use policy changes.
- Request a formal debrief from TxDOT on the status of the SH 35 Corridor Study.

CITY OF ALVIN IMPLEMENTATION WORKBOOK

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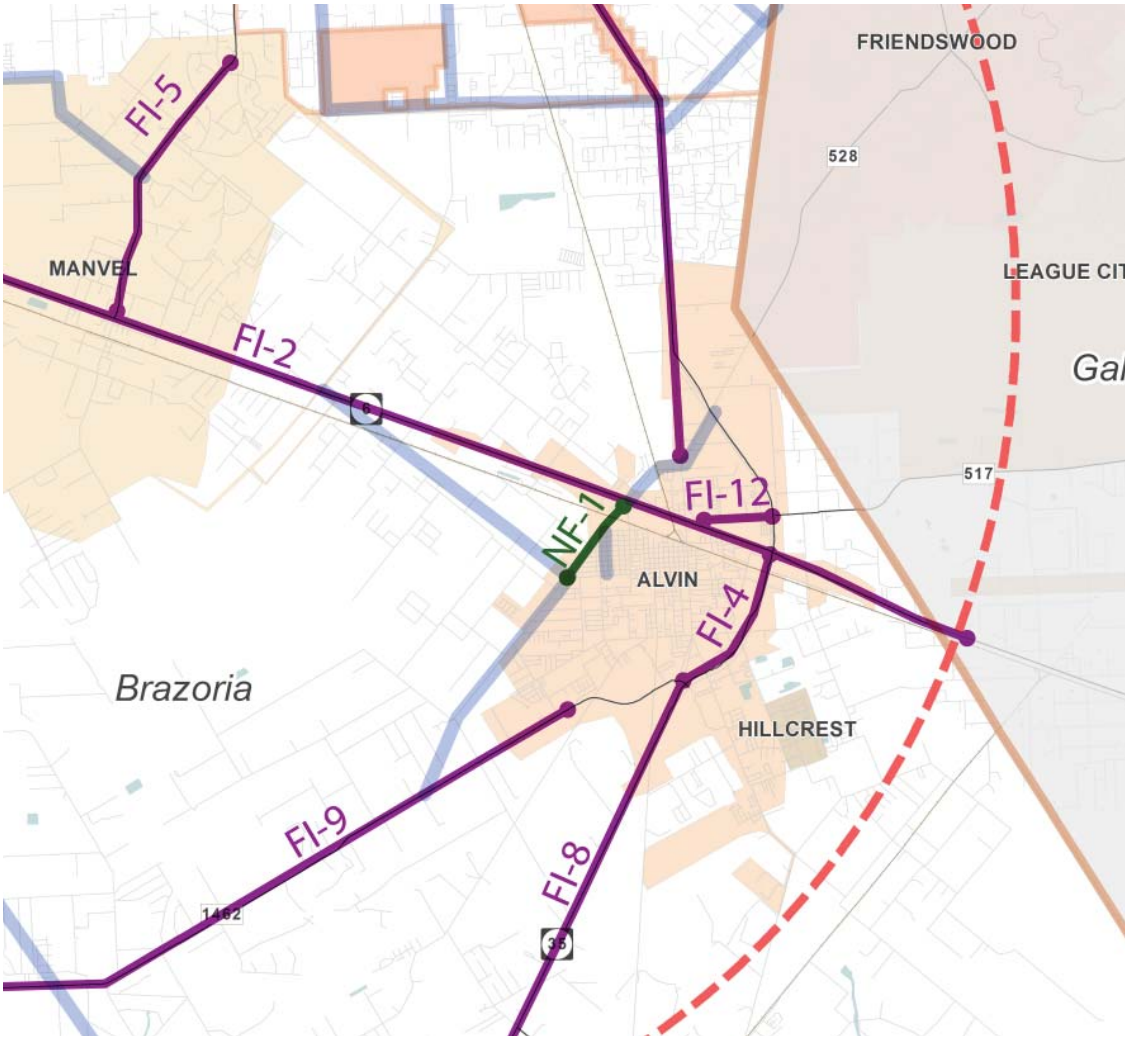
FI-1	SH 35	FM 518	S of SH 6	Widen to 6-lane divided rural	$190,951,513
FI-2	SH 6	SH 288	Galveston C/L	Widen to 6 & 8-lanes	$104,601,301
FI-4	SH 35	SH 6	BS 35 C South	4-lane tollway (most feasible toll alternative)	$55,082,167
FI-8	SH 35	FM 2043	FM 523	Widen to 4-lane divided	$195,244,221
FI-12	FM 517	LP 409	SH 35	Widen to 4-lanes in sections	$11,646,135
NF-1	FM 528	SH 35 Business	SH 6	Construct 2-lane urban undivided on new location with railroad grade separation (phase 1)	$10,000,000

01 TRANSPORTATION SYSTEM IMPROVEMENTS



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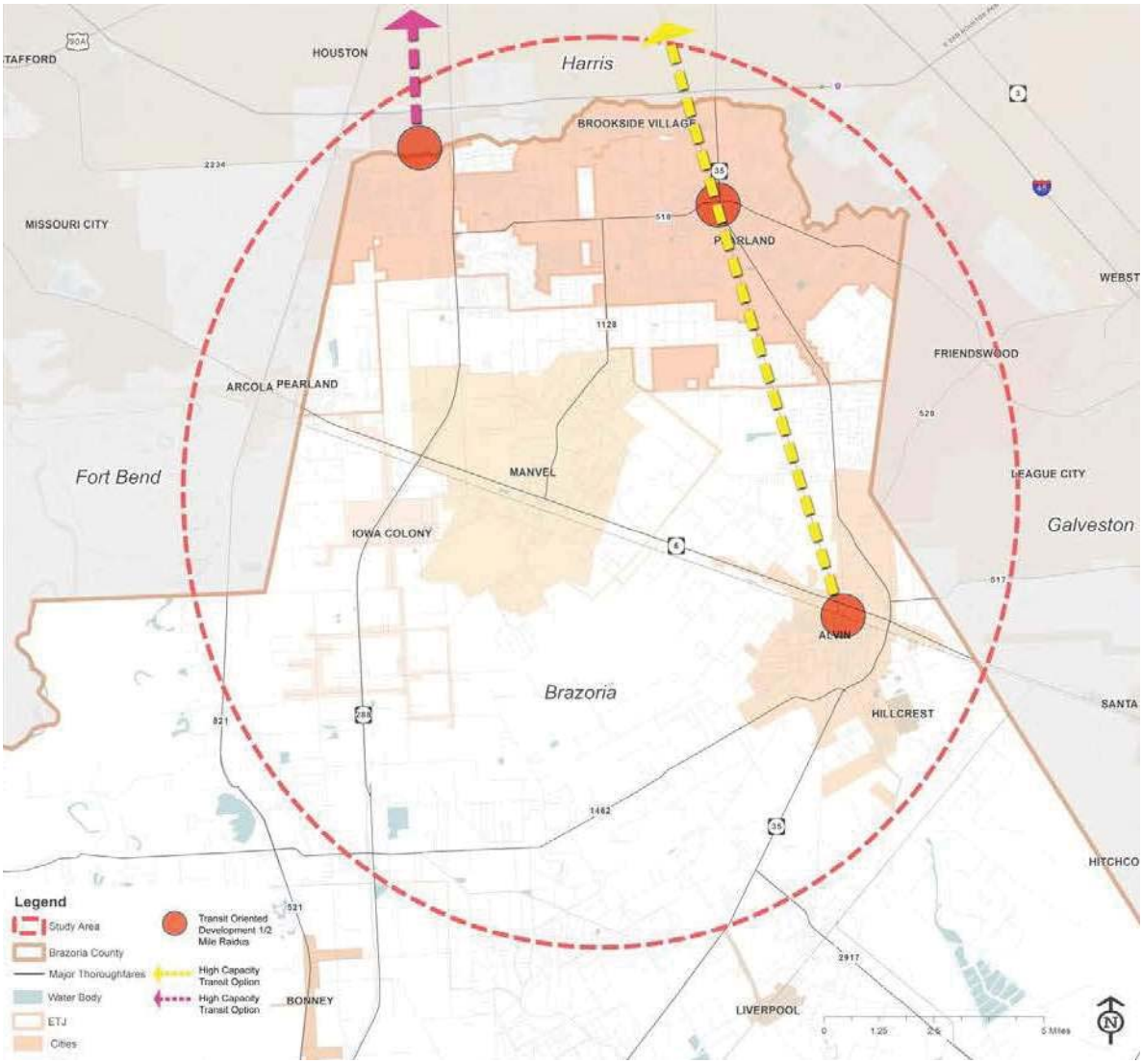

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- Provides transportation options;
- Support a variety of housing and employment options; and
- Contributes to a reduction in congestion, capital infrastructure costs, and environmental across the sub-region.

Recommended land use policy changes for Activity Centers in the City of Alvin apply to:

- Downtown Alvin

Downtown Alvin Land Use Modifications

Updates to existing City of Alvin regulatory policies will establish a policy framework that allows for the incrementally and strategic maturation of Downtown Alvin as a mixed-use activity center. These policies are flexible enough to facilitate the long-term development of a potential transit station. The proposed land use policy framework in Downtown Alvin supports SPI goals:

- Facilitate sustainable development patterns;
- Advance smart growth principles;
- Facilitates future implementation of high-capacity transit;
- Provide transportation options;
- Support a variety of housing and employment options;
- Contribute to a reduction in congestion, capital infrastructure costs, and environmental across the sub-region

Downtown Alvin Land Use Modification Recommendations

Short-Term Policy Modifications	Comprehensive Plan	Existing	• Reflects the community's concern about encroachment of non-residential and/or high-density residential uses in low-density residential areas. • Identifies the need for the revitalization and redevelopment of Downtown (Goal 3.3).
		Recommendation	• Define areas for future intensive development. • Develop vertically integrated mixed use land use category that builds on existing Urban Residential and Urban Commercial land uses.
	Existing Zoning Code	Existing	• No mixed-use category; only Planned Unit Development (PUD).
		Recommendation	• Develop mixed use zoning category that can be applied to areas indentified for future intensive development.
Long Term Policy Modifications	Pedestrian Overlay Framework	Typical Framework	• All uses, other than single-family detached units, must provide buffering along all edges abutting residential districts • Encourage base building height of 40 feet; max height to be determined from building to boundary of nearest single-family residential district. • Right-of-way line should be minimum front set back. - Minimum Side Yard- 5 feet - Minimum Rear Yard- 20 feet • Parking requirements may be met on-site or off-site at a distance up to 800 feet from permitted use. 25% parking reduction allowed if property is located within 400 feet of parking facility available to public. • No surface parking within street right-of-way. • All new development on lots one acre or more must provide urban open space: - Private open space is accessible to residents or tenants; includes balconies and courtyards. - Public open space should be visible from the street or public areas, located on ground floor and located behind the sidewalk. • Develop urban design standards that reflect community character.
		Recommendation	Suggested Pedestrian Overlay recommendations should be applied to areas along E. South Street and Gordon Street where pedestrian activity is encouraged. Focus should be on the built form and a walkable street framework.
Long Term Policy Modifications	Transit Supportive Overlay Framework	Typical Framework	• Minimum residential density of twelve (12) dwelling units per acre within ½ mile walk. • Minimum FAR shall not be less than .50 within ½ mile walk. • Minimum setback (from existing curb) should be twenty-four (24) feet on major thoroughfares and sixteen (16) feet on all other streets. • No minimum side or rear yard required except if it abuts existing single family. • Minimum height shall be forty (40) feet. • Parking standards should include: - Residential maximum= 1.6 spaces/unit. - Office maximum= 1 space per 300 sf. - Restaurant maximum=1 space per 75sf. - Parking maximums can be exceeded if parking is structured, shared or within 800 feet of public parking facility. • Buffer standards apply between residential and non-residential uses. • Internal/external pedestrian circulation • Provision for open space • Develop urban design standards.
		Recommendation	Suggested Transit Supportive recommendations should be applied as a precursor to areas that will receive transportation investment. This can include local bus corridors and high-capacity transit initiatives like commuter rail. It is recommended that the ½ mile station area around the proposed commuter rail line be defined. The Transit Supportive overlay should be focused on encouraging properties to transition to a transit supportive development while supporting and enhancing existing uses.

Downtown Alvin Land Use Modification Recommendations (Continued)

<table>
<tr><td rowspan="3">Long Term Policy Modifications</td><td rowspan="3">Transit Oriented Development Framework</td><td>Typical Framework</td><td colspan="3">• Creation of urban design standards
• Development standards should include:
- Setbacks (from existing curbs) should be determined by station area plan and not to exceed sixteen (16) feet.
- Minimum floor area ration shall not be less than .75 FAR within ¼ mile, .50 FAR within ½ mile.
- Parking maximums should be established and no surface parking shall be established within right-of-way.
- Internal and external pedestrian connections
- Open space requirements
• Buffer requirements between non-residential and residential uses.</td></tr>
<tr><td></td><td>TOD-R (Residentially Oriented)
• Minimum density of twenty (20) units per acre within ¼ mile distance from station.
• Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station.
• Retail, institutional, civic, and office uses are permitted at a ratio of 1 dwelling unit to 2,000 square feet of development.</td><td>TOD-E (Employment/Office Oriented)
• Minimum .75 FAR within ¼ mile from station and .5 FAR between ¼ mile and ½ mile of station.
• Office should comprise a minimum of 60% of uses, of which only 20% of retail, institution or civic uses should be used to meet minimum FAR standards.
• Up to 20% of total development gross square footage should be residential uses.
- Minimum density of twenty (20) units per acre within ¼ mile distance from station.
- Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station.</td><td>TOD-M (Mixed-Use Oriented)
• Minimum .75 FAR within ¼ mile from station and .5 FAR between ¼ mile and ½ mile of station.
• Up to 20% of total gross square footage that is composed of retail uses may be credited toward meeting minimum FAR standards.
• Residential uses shall meet the below standards.
- Minimum density of twenty (20) units per acre within ¼ mile distance from station.
- Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station</td></tr>
<tr><td>Recommendation</td><td>The City of Alvin should identify principles in TOD-R to refine and further develop based on the community's vision and goals. The intent of TOD-R should be to implement a walkable framework to increase overall residential density within the ½ mile commuter rail station area.</td><td>N/A</td><td>N/A</td></tr>
</table>

CITY OF ALVIN NEXT STEPS

- Explore short-term operations management improvements along corridors, including access management and ITS improvements, for interim implementation on facilities identified for system upgrades in the future.
- Identify local match funding and work with partners including H-GAC and TxDOT to incorporate SPI projects in the 2040 Regional Transportation Plan.
- Work with Harris County METRO, BayTran, and other regional partners to identify a potential future transit operator.
- Work with H-GAC to add proposed transit projects to the region's transit framework.
- Work with local Elected Officials and the Planning and Zoning staff to implement land use policy changes.
- Request a formal debrief from TxDOT on the status of the SH 35 Corridor Study.

Funding Opportunities

The City of Alvin currently has four Tax Increment Reinvestment Zones. Two operate in the Kendall Lakes area, one in Savannah Plantation, and one in Star State. Revenues generated from these zones could potentially be used for quality of life and transportation projects within the boundaries of the collecting zone.

Other opportunities include:

- Tax Increment Financing
- MPO Process / Federal Funds
- Legislative appropriations
- Fees and Levies

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SUB-REGIONAL PROJECTS

A number of the projects identified during the sub-regional planning process are best served by cross-jurisdictional coordination efforts with partners including H-GAC, TxDOT, METRO, and BayTran.

In addition to the transportation improvements identified in the tables below, coordination efforts are recommended to support non-motorized transportation investment through the implementation of bicycle and pedestrian improvement strategies.

TRANSPORTATION SYSTEM IMPROVEMENTS

Transportation system improvements identified during the SPI process include the advancement of currently unfunded initiatives that will achieve the goals of Brazoria County, the Northern Brazoria County / Pearland sub-region, and the Houston-Galveston Area Council (H-GAC). Through the sub-regional planning process, the value of these initiatives was tested through technical analysis and vetted through stakeholder and public engagement activities. The resulting list of projects identified as priorities support achievement of the SPI vision and the goals and objectives within Brazoria County:

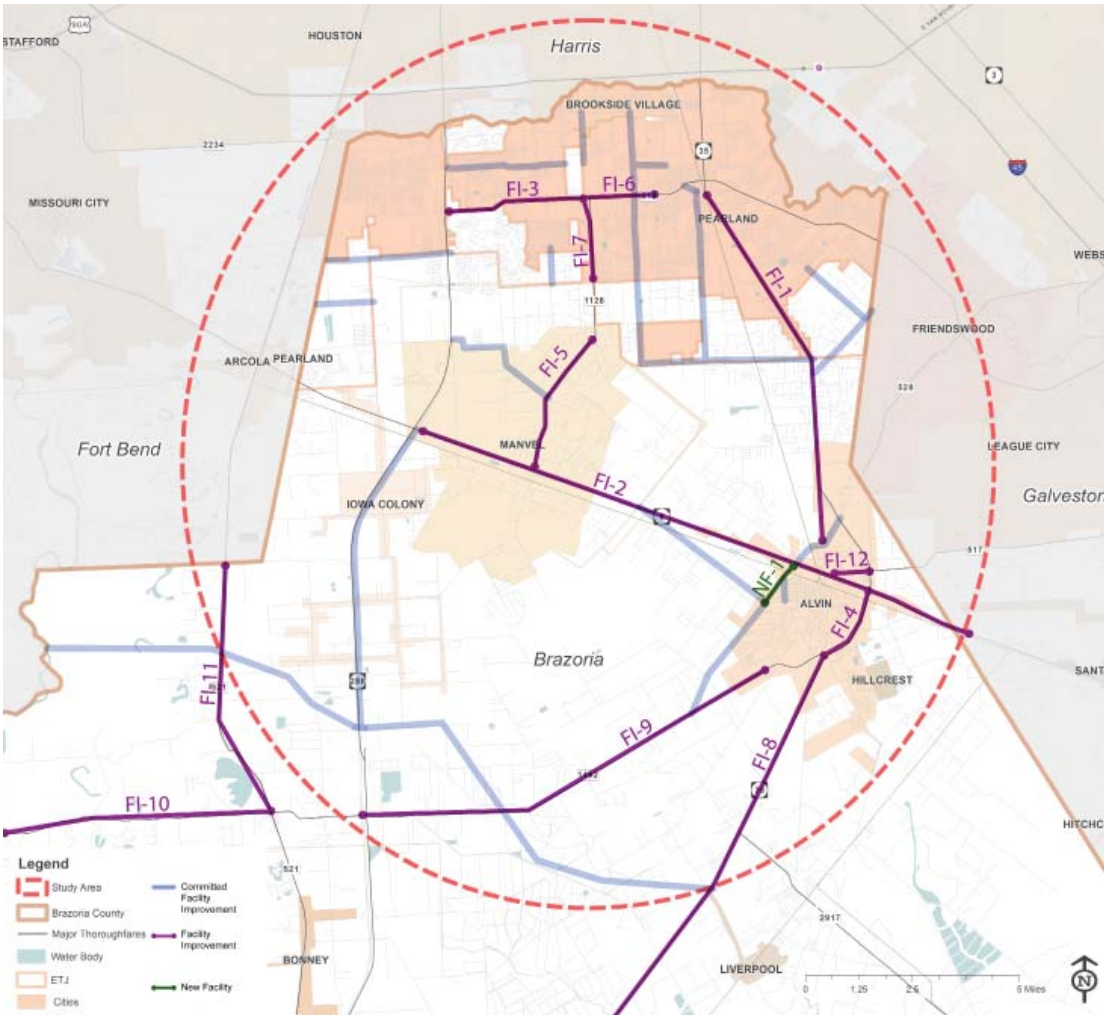
- Provide congestion relief and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the Sub-region and to and from neighboring Counties
- Enhance future development potential
- Improve roadway safety
- Continue implementation activities in support of previous and ongoing study efforts/ and planning processes
- Address congestion, mobility, and coordination of transportation services consistent with the H-GAC Regional Transportation Plan through investment in System Capacity, Operations Management, and the development of Activity Centers Support enhancement of hurricane evacuation facilities
- Support enhancement of hurricane evacuation facilities

Map 01 illustrates recommended roadway improvement projects. "FI" refers to Facility Improvements, or upgrades to existing transportation facilities and "NF" refers to New Facilities, or construction of new transportation facilities.

Recommended Roadway System Improvements – Sub-region

Map ID	Street	From	To	Description	Estimated Cost**
FI-2	SH 6	SH 288	Galveston C/L	Widen to 6 & 8-lanes	$104,601,301
FI-1	SH 35	FM 518	S of SH 6	Widen to 6-lane divided rural	$190,951,513
FI-4	SH 35	SH 6	BS 35 C South	4-lane tollway (most feasible toll alternative)	$55,082,167
FI-8	SH 35	FM 2043	FM 523	Widen to 4-lane divided	$195,244,221

01 TRANSPORTATION SYSTEM IMPROVEMENTS



"FI" = Facility Improvements
"NF" = New Facilities

TRANSIT SYSTEM IMPROVEMENTS

A long term strategy to achieving a more sustainable land use and transportation vision for Northern Brazoria County / Pearland sub-regional Planning Initiative includes the implementation of transit. Map 02 illustrates the two potential transit opportunities identified through the SPI process.

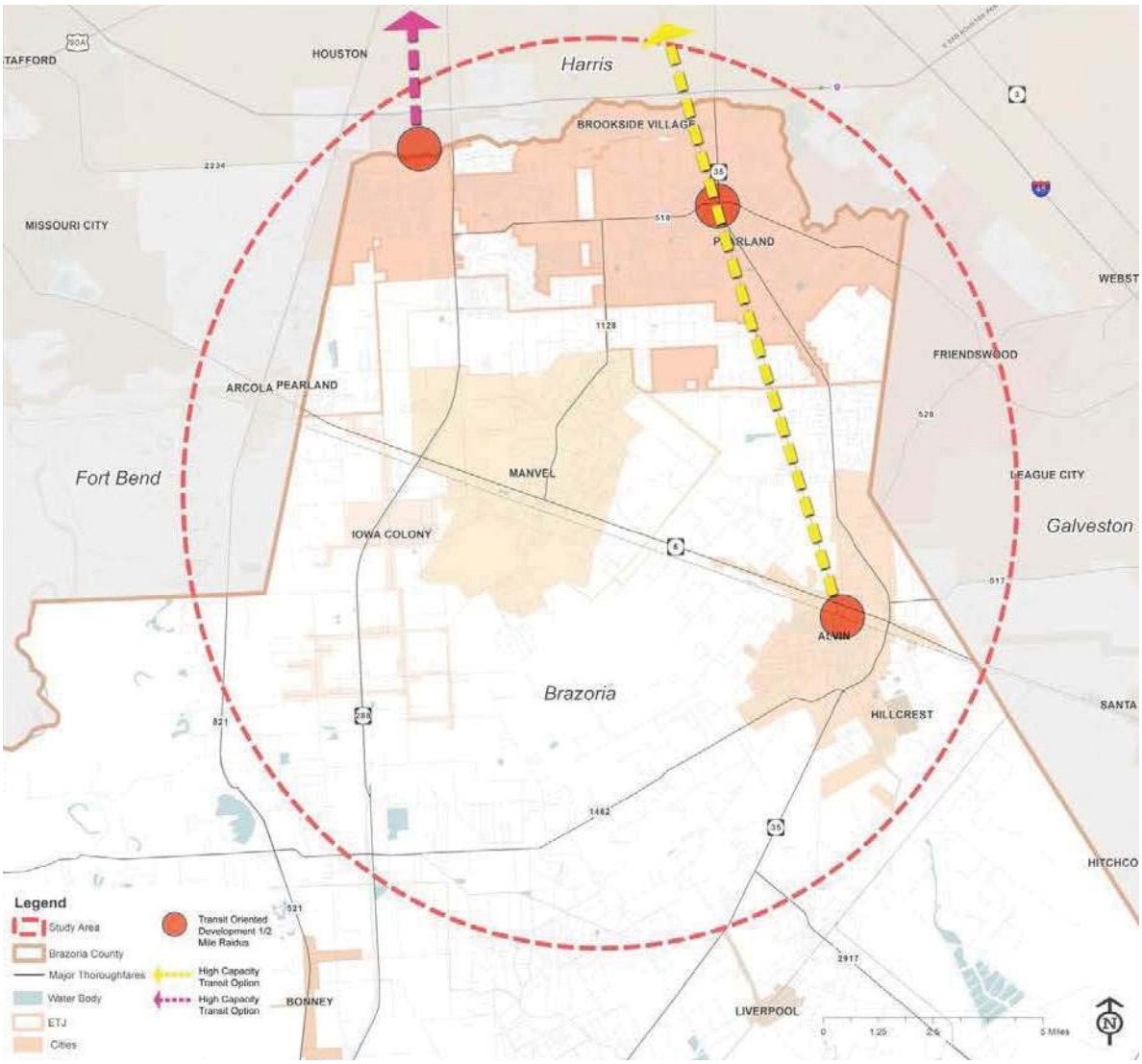
Benefits of transit solutions

- Relieve congestion and improve travel-times along major thoroughfares
- Facilitate future implementation of transit
- Enhance mobility to and from regional employment centers within the sub-region and to neighboring Counties
- Provide transportation choice
- Enhance future development potential
- Promote economic development
- Improve safety
- Reduce Vehicle Miles Traveled

Recommended Transit System Improvements

Location	From	To	Description
Kirby Drive	Lower Kirby Urban Center	Texas Medical Center	High-Capacity Transit along Kirby Drive
SH 35 / Railroad Right of Way	Downtown Alvin	Old Townsite Downtown Pearland, connecting to transit points north along Interstate 45.	High-Capacity Transit along SH 35 or within railroad right-of way from Downtown Alvin to Old Townsite Downtown Pearland

02 TRANSIT SYSTEM IMPROVEMENTS



SUB-REGION BICYCLE AND PEDESTRIAN PLAN

Bicycle and pedestrian projects are integral to developing livable communities. The City of Pearland, Alvin, and Manvel have developed city-wide bicycle/pedestrian/trail master plans. In the future, these proposed bicycle and pedestrian corridors could connect to each other to form a regional bicycle and pedestrian networks.

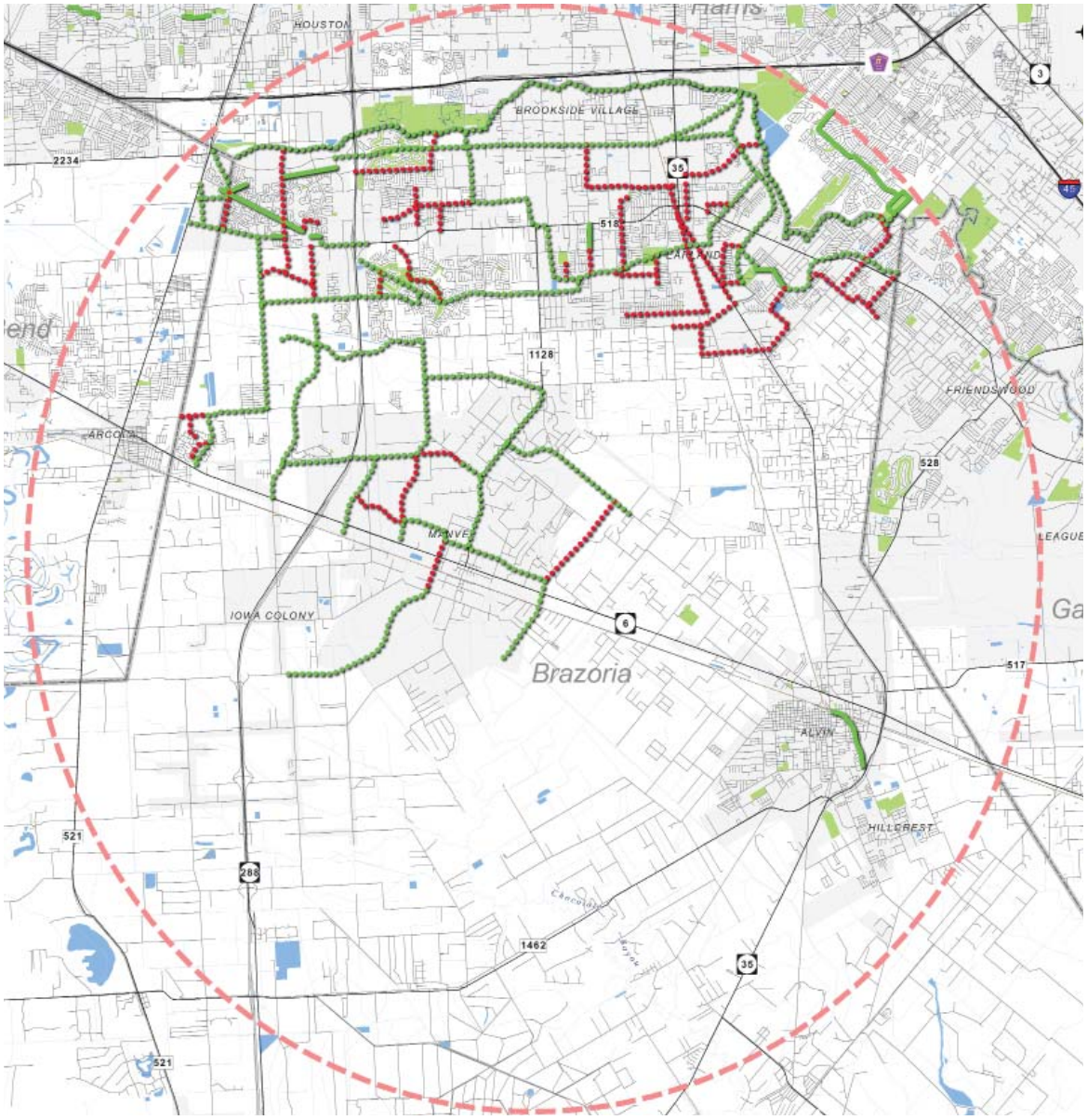
This project proposes to develop a sub-regional bicycle/pedestrian plan through H-GACs Pedestrian and Bicyclist Special District Program that would accomplish the following in support of SPI goals:

- Integration of key bicycle/pedestrian projects into the Regional Transportation Plan (RTP).
- Supports multi-modal transportation options;
- Contributes to a reduction in congestion, capital infrastructure costs, and environmental across the sub-region

SUB-REGION NEXT STEPS

- Request a formal debrief from TxDOT on the status of the SH 35 Corridor Study.
- Identify local match funding and work with partners including H-GAC and TxDOT to incorporate SPI projects in the 2040 Regional Transportation Plan.
- Work with Harris County METRO, BayTran, and other regional partners to identify a potential future transit operator for the County.
- Work with H-GAC to add proposed transit projects to the region's transit framework.
- Work with H-GAC to initiate a sub-regional bicycle and pedestrian plan

03 SUB-REGION BICYCLE & PEDESTRIAN PLAN



08 MEASURE + BENCHMARK IMPLEMENTATION PROGRESS

The overall vision of the Northern Brazoria County / Pearland Sub-regional Planning Initiative (SPI) is to provide residents of the region with a high quality of life built on livable transportation and land use solutions that promote economic development; cultural diversity; community health and safety; preservation of natural resources; and fiscal prudence. Linking the goals from this vision to specific performance metrics will enable stakeholders to measure, monitor, and benchmark benefits and positive impacts resulting from implemented projects. Documenting these benefits is an important aspect in building public and agency support and buy-in of projects. Following are various suggested performance metrics that stakeholders can use to measure the benefits and positive impacts of implemented projects.

Goal: Engage the public in the decision making process.

The extent to which the goal is being achieved as well as the desired positive effects of this goal can be determined by measuring:

- The number and the change in the number of public meetings and forums schedule for specific projects.
- The number and the change in the number of attendees to public meetings and forums.
- The number and the change in the number of responses to public survey.
- The number and the change in the number of techniques used to engage the public.

Goal: Provide a wide range of transportation choices.

The extent to which the goal is being achieved as well as the desired positive effects of this goal can be determined by measuring:

- The number and the change in the number of sidewalk, trails, and bicycle lanes implemented.
- The number and the change in the number hours of transit service provided.
- The size and the change in the size of the transit service area.

Goal: Promote economic development throughout the sub-region.

The extent to which the goal is being achieved as well as the desired positive effects of this goal can be determined by measuring:

- The number and the change in the number of local development and redevelopment initiatives and projects achieved by local jurisdictions.
- The number and the change in the number of jobs created that can be attributed to specific projects within each jurisdiction.
- The amount and the change in the amount of local, regional, state, and federal funding.

Goal: Maintain fiscal prudence.

The extent to which the goal is being achieved as well as the desired positive effects of this goal can be determined by measuring:

- The number and the change in the number of cost benefit ratio analysis completed for projects.
- The number and the change in the number of projects not completed due to unjustifiable costs.

Goal: Strengthen community well-being and safety.

The extent to which the goal is being achieved as well as the desired positive effects of this goal can be determined by measuring:

- The change in the number of vehicle, bicycle, and pedestrian accidents.
- The change in the number of fatal vehicle, bicycle, and pedestrian accidents.

Goal: Preserve and enhance natural resources.

The extent to which the goal is being achieved as well as the desired positive effects of this goal can be determined by measuring:

- The number and the change in the number of building permits provided in Vacant or Farm Ranch versus existing residential areas.
- The number and the change in the number of multi-family and/or mixed-used projects.
- The number and the change in the number of redevelopment projects in downtowns.
- The number of new local government initiatives to develop quality growth.
- The number of livable center initiatives underway in the study area

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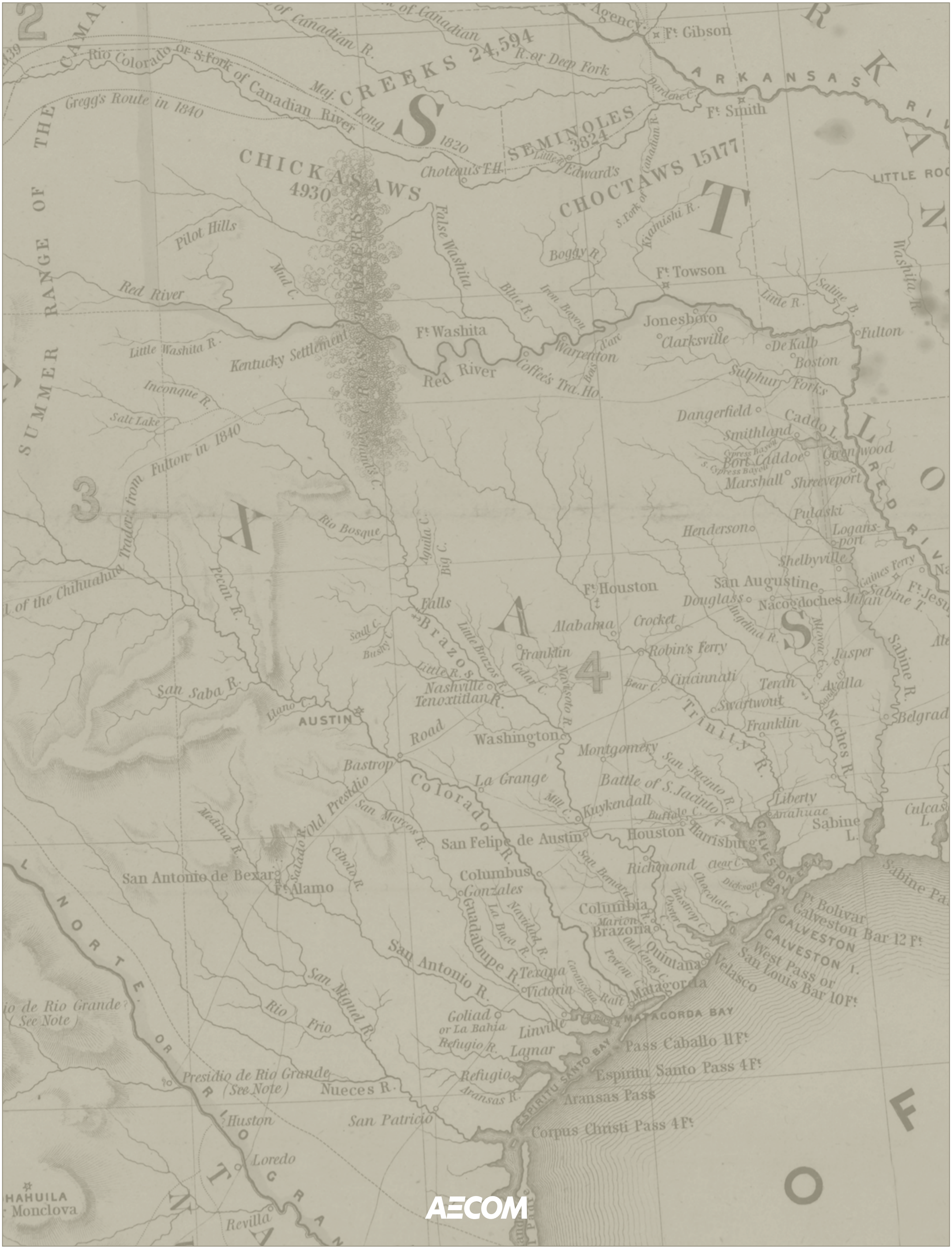

CREEKS 24,594
SEMINOLES 3824
CHICKASAWS 4930
CHOCTAWS 15177
Fᵗ Gibson
Fᵗ Smith
ARKANSAS
LITTLE ROCK
Gregg's Route in 1840
Rio Colorado or S.Fork of Canadian River
Pilot Hills
Red River
Fᵗ Towson
Fᵗ Washita
Jonesboro
Clarksville
Fulton
De Kalb
Boston
Kentucky Settlement
Salt Lake
Dangerfield
Smithland
Port Caddoe
Marshall
Shreeveport
Traders from Fulton in 1840
Henderson
Pulaski
Shelbyville
San Augustine
Nacogdoches
Fᵗ Houston
Douglass
Alabama
Crocket
Robin's Ferry
Franklin
Cincinnati
Nashville
Tenoxtitlan
Swartwout
AUSTIN
Washington
Montgomery
Bastrop
La Grange
Battle of S. Jacinto
Kuykendall
Liberty
Houston
Harrisburg
San Felipe de Austin
San Antonio de Bexar
Fᵗ Alamo
Columbus
Gonzales
Richmond
Columbia
Brazoria
Quintana
Velasco
Fᵗ Bolivar
Galveston Bar 12 Fᵗ
GALVESTON I.
West Pass or San Louis Bar 10Fᵗ
Texana
Victoria
Matagorda
MATAGORDA BAY
Goliad or La Bahia
Linville
Lamar
Refugio
Pass Caballo 11Fᵗ
Espiritu Santo Pass 4Fᵗ
Aransas Pass
Corpus Christi Pass 4Fᵗ
San Patricio
Nueces R.
Presidio de Rio Grande (See Note)
Loredo
Revilla
Monclova
Sabine L.
Sabine Pass

AECOM

HOUSTON-GALVESTON AREA COUNCIL

NORTHERN BRAZORIA COUNTY | PEARLAND

SUBREGIONAL PLANNING INITIATIVE




APPENDIX

AECOM

Appendix 1. EXISTING CONDITIONS & DEMOGRAPHICS

1.1 Household Characteristics

In terms of households, the sub-region's characteristics are consistent with the Houston metro area (Figure 2.1). The Alvin-Pearland CCD has a higher percentage of families with children (41.8 percent) versus the MSA (36.2 percent). This is likely the result of Pearland's high percentage of families with children (43.8 percent). Both the City of Alvin and the City of Manvel have a percentage of households with a person over 65 years-old (21.8 percent and 20.2 percent) respectively, especially when compared to Brazoria County as a whole (10.1 percent); Alvin also has a lower percentage of family households (70.4 percent) than its neighbors in Brazoria County. The Houston MSA has a larger average family size than every geography related to the sub-region.

Figure 1.1 Household Composition

	Alvin-Pearland CCD		City of Alvin	City of Manvel	Brazoria County	Houston-Sugarland-Baytown MSA
2010 Population	176,201	91,252	24,236	5,179	313,166	5,946,800
HOUSEHOLDS						
Average Household Size	2.92	2.91	2.84	2.80	2.84	2.83
Average Family Size	3.33	3.30	3.28	3.19	3.28	3.38
% Family	77.5	78.7	70.4	76.9	75.7	70.9
AGES						
% Families with children under 18	41.8	43.8	35.3	35.8	38.2	36.2
% Households with person under 18 years	45.8	47.3	40.7	40.2	42.8	40.8
% Households with person 65+ years	17.9	16.1	21.8	20.2	10.1	18.4

1.2 Race

Figure 1.2 Population and Race

	Alvin-Pearland CCD	City of Pearland	City of Alvin	City of Manvel	Brazoria County	Houston-Sugarland-Baytown MSA
2010 Population	176,201	91,252	24,236	5,179	313,166	5,946,800
Median Age	34.7	33.4	31.9	36.6	35.5	32.3
RACE						
% White	66.0	62.0	79.4	66.5	70.1	60.2
% Black	12.7	16.4	3.1	17.0	12.1	17.2
% Asian	8.8	12.4	0.9	5.2	5.5	6.5
% Other	9.2	6.0	13.5	8.4	9.2	12.3
% Hispanic/Latino	26.2	20.5	36.2	22.6	27.7	35.3

Source: United States Census, 2010; Community Surveys, 2006-2011

1.3 Population

Map 1.1 2035 Population Projection

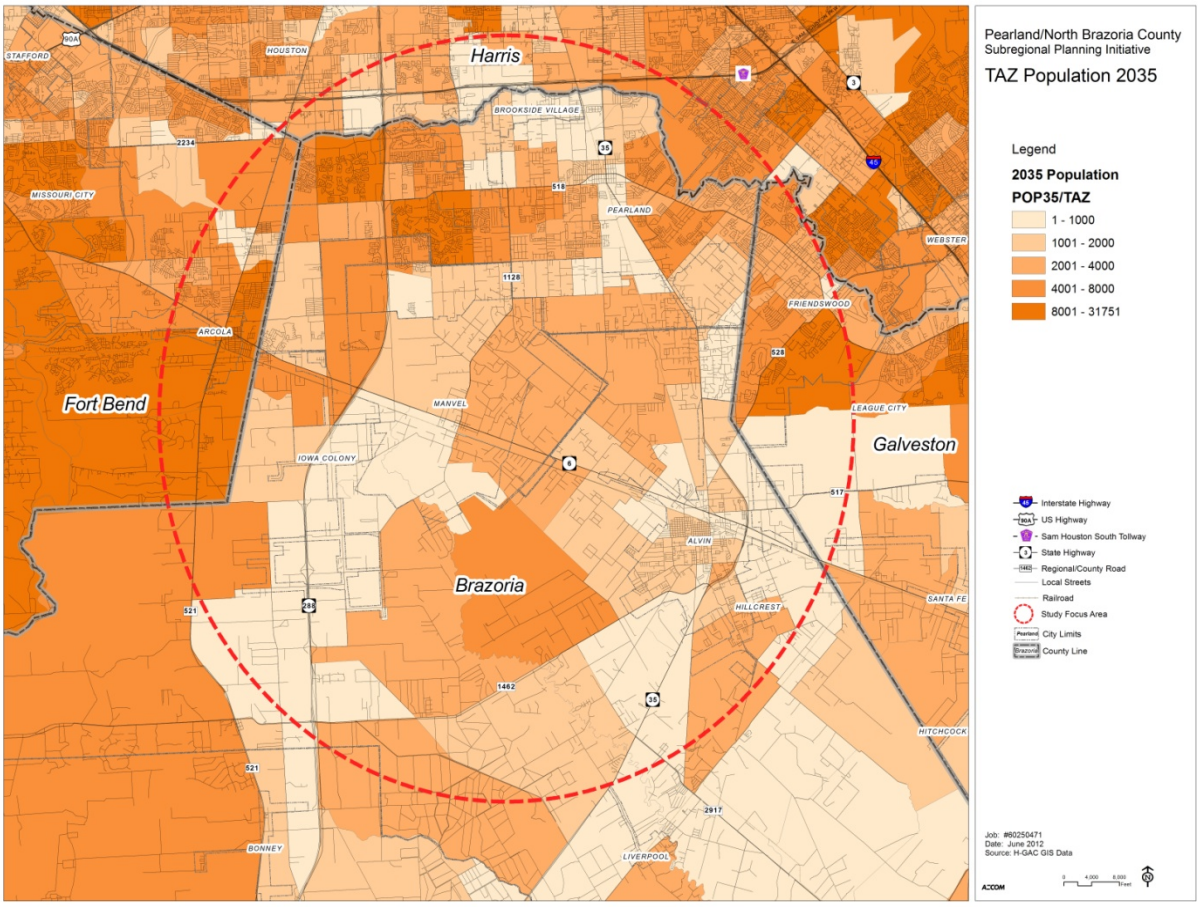


Figure 1.3 Population Change

	City of Pearland	City of Alvin	City of Manvel	Brazoria County
2010 Population	91,252	24,236	5,179	313,166
% change 2000-2010	242.4	*13.2*	70.0	*29.5*
2000 Population	37,640	21,413	3,046	241,767
% change 1990 - 2000	198.9	*11.4*	*-18.5*	*26.1*
1990 Population	18,927	19,220	3,733	191,707
% change 1980 - 1990	142.9	*16.4*	5.2	*13.0*
1980 Population	13,248	16,515	3,549	169,587
% change 1970 - 1980	205.5	*54.8*	3348.1	*56.6*
1970 Population	6,444	10,671	106	108,312
% change 1960 - 1970	430.5	*89.1*	-	*42.1*
1960 Population	1,497	5,643	-	76,204
% change 1950 - 1960	-	*52.5*	-	*63.7*
1950 Population	-	3,701	-	46,549

1.4 Economic Profile

The industry profiles of Pearland and Alvin are similar: both cities had high percentages of employees in Retail Trade, Manufacturing, and Accommodations and Food Services. Both cities had similar industry breakdowns compared to the County, but with lower percentages of Manufacturing.

Figure 1.4. Employer Establishments, Employees and Private Industry (Non-Governmental)

	Alvin-Pearland CCD*	City of Pearland	City of Alvin	City of Manvel*	Brazoria County	Houston-Sugarland-Baytown MSA*
Number of Businesses	-	8,129	1,886	-	23,071	-
Number of Employer Establishments	-	997	430	-	3,435	-
Number of Paid Employees	-	12,925	6,961	-	51,098	-
EMPLOYEES BY INDUSTRY						
% in Manufacturing	-	19.0	16.6	-	27.0	-
% in Wholesale Trade	-	5.0	2.9	-	3.1	-
% in Retail Trade	-	24.3	25.4	-	23.1	-
% in Information	-	0.9	4.7	-	1.5	-
% in Real Estate	-	3.3	3.8	-	3.1	-
% in Professional Services	-	4.0	3.3	-	5.2	-
% in Administrative Support	-	3.7	14.7	-	4.4	-
% in Educational Services	-	0.9	0.3	-	10.0	-
% in Health Care + Social Assistance	-	11.0	10.1	-	13.8	-
% in Arts, Entertainment, Recreation	-	0.1	0.2	-	2.2	-
% in Accommodation and Food Serv.	-	20.7	15.0	-	14.3	-
% in Other Services	-	5.5	4.4	-	4.3	-

Source: 2007 Economic Census

** No data available for the Alvin-Pearland CCD, City of Manvel, or Houston-Sugarland-Baytown MSA*

Map 1.2 2011 Employment

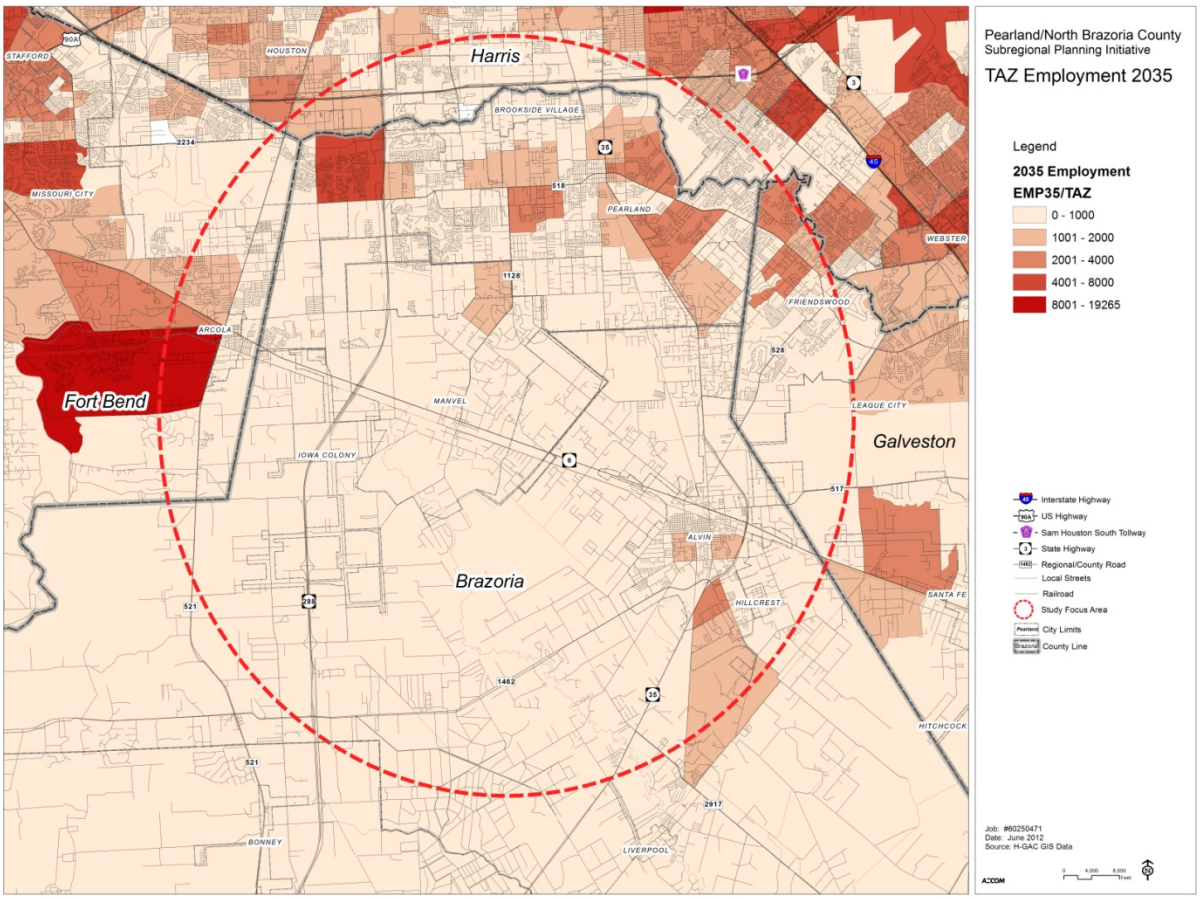


Figure 1.5 Employment and Income

	Alvin-Pearland CCD	City of Pearland	City of Alvin	City of Manvel	Brazoria County	Houston-Sugarland-Baytown MSA
2010 Population	176,201	91,252	24,236	5,179	313,166	5,946,800
EMPLOYMENT						
% Pop over 16 in labor force	70.9	76.9	51.8	61.0	65.9	67.6
% Unemployed	3.5	4.8	8.3	3.0	5.0	6.0
INCOME						
Median Household Income	$75,527	$94,204	$46,260	$70,238	$64,633	$53,942
Mean Household Income	$90,082	$104,750	$55,685	$76,874	$80,745	$75,778
% Families Under Poverty Line	7.0	5.5	14.2	11.7	9.0	13.2

Figure 1.6 Commuting Characteristics

	Alvin-Pearland CCD	City of Pearland	City of Alvin	City of Manvel	Brazoria County	Houston-Sugarland-Baytown MSA
2010 Population	176,201	91,252	24,236	5,179	313,166	5,946,800
COMMUTE						
% Drove Alone	83.7	86.9	79.3	83.1	84.3	79.4
% Carpooled	10.4	8.0	12.6	11.5	8.8	11.5
% Transit	0.3	0.5	0.8	0	0.6	2.3
% Walked	0.8	0.4	2.7	0.6	1.2	1.4
% Other	1.9	1.4	3.3	0	2.1	2.0
% Work at Home	2.9	2.7	1.2	4.8	3.0	3.4
Mean travel time (minutes)	31.1	28.6	26.1	32.3	27.7	27.7
VEHICLES AVAILABLE (by household)						
% No Vehicles	2.8	2.1	7.9	1.8	3.6	6.3
% 1 Vehicle	27.8	26.2	38.1	32.2	29.0	34.5
% 2 Vehicles	47.3	49.3	37.4	42.2	45.2	40.9
% 3 Vehicles	22.1	22.4	16.6	23.9	22.3	18.3

Figure 1.7 Vehicle Availability by Household

VEHICLES AVAILABLE (by household)						
% No Vehicles	2.8	2.1	7.9	1.8	3.6	6.3
% 1 Vehicle	27.8	26.2	38.1	32.2	29.0	34.5
% 2 Vehicles	47.3	49.3	37.4	42.2	45.2	40.9
% 3 Vehicles	22.1	22.4	16.6	23.9	22.3	18.3

1.5 Housing Characteristics

Many units in the sub-region were built recently. Across the Alvin-Pearland CCD, 39.4 percent of housing units where built in 2000 or later, compared to 27.1 percent in the MSA. The City of Manvel had a particularly high percentage of newer homes (43.3 percent), which is consistent with its high population growth rate between 2000 and 2010. In Pearland, the majority of homes were built in 1990 or after, but in Alvin there was a spike in home-building between 1960 and 1980. About half of all Sub-region residents moved into their existing homes in 2005 or later.

Figure 1.8 Housing Characteristics

	Alvin-Pearland CCD	City of Pearland	City of Alvin	City of Manvel	Brazoria County	Houston-Sugarland-Baytown MSA
2010 Population	176,201	91,252	24,236	5,179	313,166	5,946,800
OCCUPANCY						
% Housing units occupied	93.1	94.1	90.6	93.1	90.1	89.8
% Owner-occupied	77.4	79.6	24,236	5,179	74.6	62.5
UNITS IN STRUCTURE						
% 1 unit, detached	72.0	80.5	54.0	78.1	71.6	61.8
% 1 unit, attached	1.4	0.9	2.9	1.5	1.3	3.3
% 2 units	0.3	0.0	1.4	0	0.5	1.2
% 3 or 4 units	1.4	1.1	4.9	0	1.9	2.8
% 5 to 9 units	2.6	3.1	5.8	0	3.2	4.6
%10 to 19 units	4.4	5.4	7.0	0	4.8	9.1
% 20 or more units	5.2	5.9	10.0	0.7	4.8	12.0
% Mobile Home	12.3	3.1	13.6	18.7	11.6	5.1
% Other	0.3	0	0.5	1.0	0.3	0.1
YEAR STRUCTURE BUILT						
% Built 2005 or later	16.2	22.4	7.7	28.0	11.0	13.6
% Built 2000-2004	23.2	27.2	7.9	15.2	15.5	13.5
% Built 1990-1999	21.2	20.3	12.1	8.4	17.7	13.9
% Built 1980-1990	13.5	12.0	15.8	11.0	16.1	17.0
% Built 1970-1980	14.2	11.0	25.1	24.6	18.7	20.0
% Built 1960-1969	6.5	4.9	14.4	4.0	9.0	9.4
% Built 1950 – 1959	2.6	1.1	8.0	5.2	7.4	6.9
% Built 1940 – 1949	1.0	0.4	4.0	0.4	2.7	3.1
% Built 1939 or earlier	1.6	0.6	5.0	3.2	1.9	2.8
TENURE						
% Moved in 2005 or later	47.3	49.3	53.9	44.5	44.1	57.9
% Moved in 2000 – 2004	24.5	26.3	16.5	22.4	21.5	15.9
% Moved in 1990 – 1999	17.3	16.0	15.5	14.4	19.3	14.0
% Moved in 1980 – 1989	5.1	3.5	4.9	12.0	7.3	6.1
% Moved in 1970 – 1979	4.3	3.9	5.9	6.1	5.0	3.8
% Moved in 1969 or earlier	1.5	1.1	3.4	0.6	2.8	2.3

Source: 2010 Census; 2007-2011 American Community Survey 5-Year Estimates

1.6 Existing Land Use

Figure 1.8 Future Development Projects

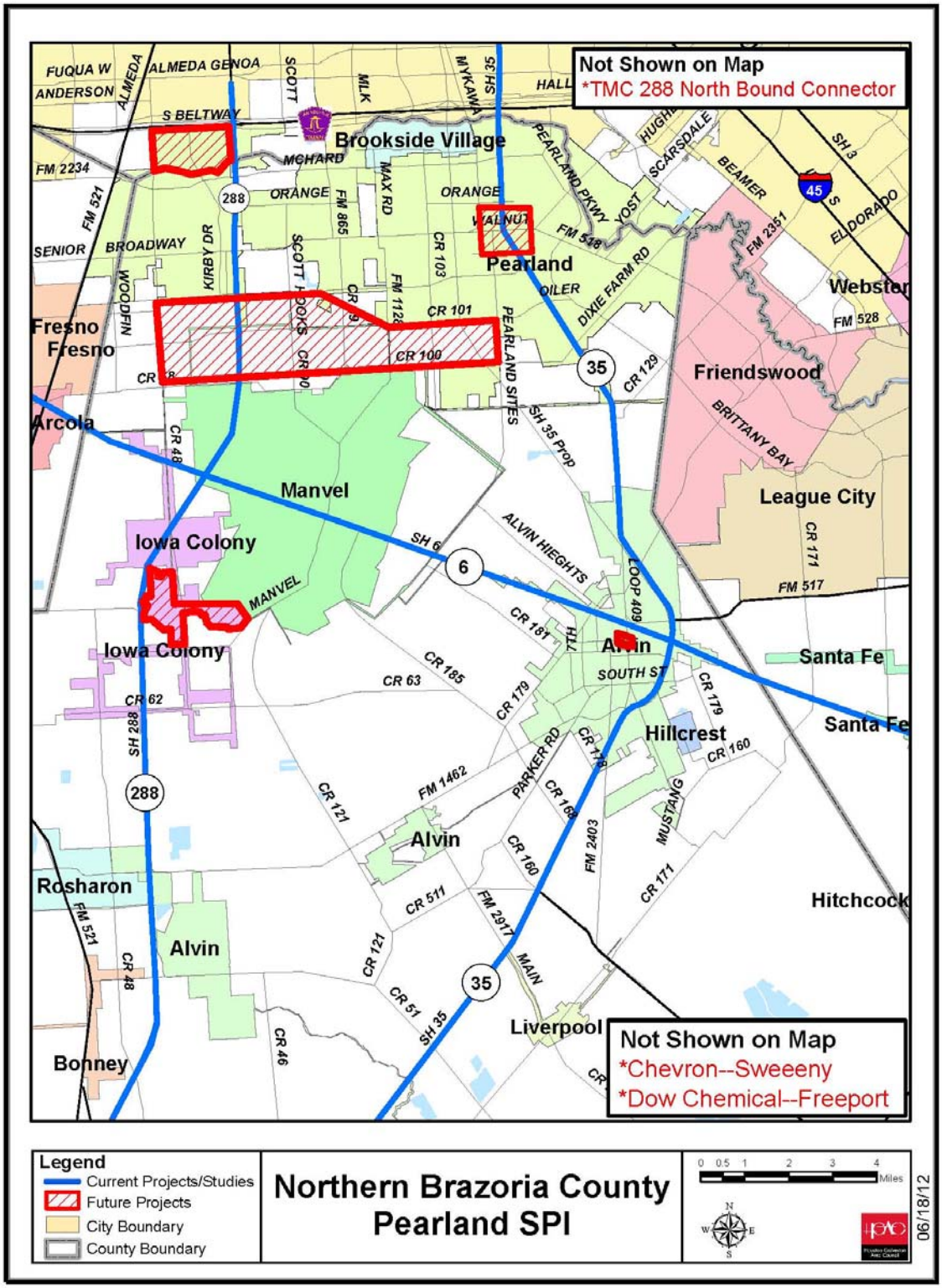


Figure 1.9 Old Townsite Downtown Development District

1.7 Previous Plans and Studies

Bridging Our Communities – The 2035 Houston-Galveston Regional Transportation Plan (RTP) Update
The 2035 RTP Update addresses the challenges of anticipated regional growth and its impacts on mobility. It is the federally required, long-range vision plan for the region that represents the fiscally constrained strategy on how to best meet the needs of the growing Houston-Galveston region and a prioritization of the most essential transportation projects. The Update's project list resulted in a projected doubling of transit usage, improved air quality, an increase in travel options, and a $400 million annual reduction in the cost of vehicle crashes. It focused on four strategies: increasing system capacity; managing demand; efficiency improvements through demand management, and the development of livable centers. H-GAC is currently updating the RTP for 2040.

Bridging Our Communities – 2013-2016 Transportation Improvement Program (TIP)
Every two to three years H-GAC, in partnership with the Texas Department of Transportation (TxDOT), develops a staged, multi-year program of transportation projects. The 2013-2016 TIP is a federally required strategic plan that includes a list of projects that were selected and prioritized to maintain, enhance, and expand the regional inter-modal transportation system. A total of $10,095,493,000 in funding has been identified for the region's projects in the current TIP. Priority projects are consistent with the RTP. Between 2013 and 2016, $561,557,000 in funding has been identified for Brazoria County. Fourteen projects in the Sub-region are included in the TIP.

H-GAC Regional Transit Framework Study
H-GAC coordinated a regional-level project in 2011 to gain consensus on the region's long-range transit vision. It found that more revenue-miles are needed in order to support anticipated growth, and that there is a consensus in the preference for seamless ticketing, a movement towards a single regional transit provider, and the need for public education regarding transit. The second phase of the study will study the feasibility of these issues, prioritize regional transit corridor development, and explore additional funding sources.

H-GAC Regional Goods Movement Study
The intent of the Goods Movement Study was to help the region address freight transportation policy issues in terms of positioning the region for economic competitiveness, improving mobility, protecting air quality, addressing safety, and minimizing negative community impacts. The plan documented existing and emerging freight trends, identified critical bottlenecks in the system, and developed strategies to enhance the system in terms of mobility, reliability, and safety. The study identified three roadways within the sub-region that are significant for regional goods movement: SH 288, SR 6, and SR 35. It notes that these roadways have low Daily Truck Annual Average Daily Traffic (AADT) compared to the rest of the region, but relatively higher trucks as percentages of total traffic. Southern Brazoria County is expected to see over 10,000,000 tons of freight growth between 2007 and 2035, which may impact mobility on SH 288 through the sub-region. Three at-grade railway crossings in the sub-region are intersections of significant Annual Average Daily Trips (AADT) and a high number of daily trains: Broadway Street (Pearland), Gordon Street (Alvin), and 2nd Street (Alvin). Freight traffic is expected to increase on SR 35.

Additionally, the study proposed pursuing multimodal opportunities that balance freight and passenger needs. Specific packages of freight rail improvements were identified that would not only provide freight rail benefits but would also advance the potential of future commuter rail.

Houston Region Freight Study
This study looked at addressing deficiencies in the eight-county Houston region's freight network including roads, ports, and railroads. It identified improvements intended to provide relief to commuters adversely affected by delays, interruptions, and noise attributed to the moment of freight within the region. It also identified alternatives intended to improve regional freight and rail capacity by enhancing the efficiently and operations of the railroads. One such proposed improvement located with the sub-region is the addition of a second mainline track along the BNSF Mykawa Subdivision from the City of Alvin north to the Tower 81 (T&NO Junction) in the City of Houston.

Houston-Galveston Area Council Congestion Management Process (CMP)
This federally required study outlined the process for a systematic approach to identify congestion, its causes, and mitigation strategies in the Houston-Galveston region. The objectives of a CMP were to identify locations of existing and future congestion; specify strategies to minimize or eliminate recurring and non-recurring congestion; evaluate effectiveness of the implemented strategies; and evaluate alternative transportation strategies. The study recommended how to better incorporated CMP into regional planning processes, but does not provide project-specific recommendations.

City of Alvin Comprehensive Plan
The City of Alvin adopted its Comprehensive Plan in September of 2005. The plan focuses on the idea of Alvin being at a crossroads in its development, and was a vehicle for the community to proactively plan for growth. The plan contains a strategic policy framework for the corporate limits of the city and its extraterritorial jurisdiction, and focuses on land use, community growth, and provision of infrastructure. It established a 2025 vision of improved economic competitiveness, a balanced pattern of land use, a revitalized downtown, improved transportation choices, better access to parks and recreation facilities, protected open space, efficient use of infrastructure, and an attractive, well-maintained community.

Manvel 2007 Comprehensive Plan – A Visionary Future
In 2007, the City of Manvel adopted its current Comprehensive Plan. The plan seeks to address growth and development pressures through strategic capital improvement planning; consideration of Home Rule Status, the development of codes to manage growth, and development of policy in critical areas such as governance and economic development. It recommended the use of form-based code to guide new development into zones that included major transportation corridors, minor transportation corridors, urban centers, general urban, sub-urban, rural, natural, and special districts.

City of Pearland 2004 Comprehensive Plan Update
The 2004 Comprehensive Plan Update is an addendum to the City of Pearland's existing Comprehensive Plan which was completed in 1999. The Update focused on policy decisions regarding an emerging multi-family housing market and provided more specific guidance on how the City can broaden its real estate market diversity with a greater range of single family lot sizes. It also examined future land use and recommended additional land use designations to better reflect existing and anticipated uses. Special attention was paid to the evolution of specific districts, such as the "Beltway District", the Lower Kirby Urban Center, and a generalized traditional neighborhood development district designation. Beautification of major transportation corridors was also addressed, including SH 288, Beltway 8, Main Street, Broadway Road, and Dixie Farm Road.

State Highway 35 Major Corridor Feasibility Study
This Corridor study evaluated the multi-modal infrastructure investments needed over the next twenty years for SH 35. It analyzed opportunities for new lanes, tolling strategies, transit support, non-motorized modes, and upgrades to existing infrastructure. The study area stretched from Interstate 45 in downtown Houston to the corridor's intersection with SH 288 in Angleton. It was spurred by anticipated growth in Pearland, Alvin, and Angleton. After evaluating a universe of alternatives, the study identified a Revised "Mykawa Alternative" as the preferred approach. This alternative called for a Tollway that continues mostly along the east side of the BSF tracks and merges with the Alvin Bypass. It also included a commuter passenger rail between downtown Houston and the Alvin depot, with stations in Pearland and Beltway 8.

SH 288 Corridor Screen Line Study
As part of a region-wide initiative to improve transit, METRO completed a study of transit alternatives for the SH 288 corridor. This study built upon the findings from a 2007 corridor transit feasibility study. The study area encompassed SH-288 from its beginning at Alabama Street in Midtown Houston south to SR 6 in Brazoria County. Four Alternatives were considered and evaluated based on cost, expected ridership, environmental impacts, and community impacts. The study did not identify a preferred alternative.

State Highway 6 South Corridor Access Management Plan
HGAC initiated this Corridor Access Management Plan in response to mobility and safety concerns associated with State Highway 6. The plan identified four crash "hot spots" (intersections with 550 crashes or more 2003-2007) on SH 6 in the Sub-region: at SH 288, at Business 35, at Tovea Road, and at the Alvin Bypass. To address these concerns, the plan identified short-, medium- and long-term improvements including safety lighting, signalization improvements, intersection improvements and median improvements. Seven of the identified projects are within the sub-region.

Old Townsite Downtown Pearland Development District Plan
The plan developed an overall vision for the Old Townsite in the City of Pearland. Its intent was to create consensus on how to best develop the site and improve Old Townsite Downtown Pearland's sense of identity. The site is located at the crossroads of SH 35 and Main Street, and was part of the original platting of the City in 1894. Currently the site is characterized by low density, segregated land uses and a lack of pedestrian connectivity between its four "quadrants". The plan recommended the evolution of Old Town into a traditional, mixed-use walkable area with a distinct identity in the next 10-15 years.

Lower Kirby Urban Center Master Plan and Implementation Strategy
In 2009, the City of Pearland developed a market-based plan and strategy for the Lower Kirby Urban Center. The goal of the plan was to create an enhanced sense of identify and capitalize on the site's key location within the region. Key issues addressed included transportation access, linkages and transit; changes to zoning and development standards; development of new parks and open spaces; drainage; and modification of existing municipal management districts. The plan positions the site to become a livable, transit-oriented community.

Other maps, data, and reports reviewed as part of the process included:

- 2010 Pedestrian and Bicyclist Special Districts Study Update (HGAC)
- Map of hurricane evacuation routes in the HGAC region
- Texas Medical Center Geographic Information Systems (GIS) 2009 Employee – Zip Code Density Map by Employee County & Zip Code
- Northern Brazoria County Pearland SPI Map (6/18/12)
- Brazoria County Building Permits List (1/1/2011 -6/4/2012)
- Tax Increment Reinvestment Zone Number Two, City of Iowa Colony Texas. 2011 Annual Report, Report Number 10. Tax Year Ending December 31, 2011
- City of Alvin 2009 Traffic Counts Map
- Brazoria County Mobility Plan Recommended Projects Map (January, 2006)
- Brazoria County Drainage Districts Map (March, 2006)
- Road Map of Brazoria County, City Limits w/ ETJ (October, 2005)
- Road Map of Brazoria County Showing Thoroughfare Plan
- Road Map of Brazoria County Showing Commissioner Precincts (October, 2005)
- Bridges of Brazoria County Map (December, 2005)
- Mitigation Plan and Impact Analysis for the Promenade Regional Development. Clear Creek Harris County Flood Control.
- Revised Mitigation Plan and Impact Analysis for the Water Lights Development.
- City of Pearland "State of the City" Presentation, February 2013
- City of Pearland Park System Master Plan
- City of Pearland Trails Master Plan
- City of Alvin State of the City Address, 2011
- City of Alvin Thoroughfare Plan Map, 2004
- Alvin Tourism Assessment
- Map of the City of Alvin Downtown Development Area
- Dow Impact Newsletter, Spring/Summer 2012

1.8 Existing Road Network

Major State Highways:

Sam Houston Tollway

Sam Houston Tollway serves the Houston region as the outer-most loop system. Within the study area, this facility is tolled and is operated and maintained by the Harris County Toll Road Authority (HCTRA) and is referred to as the Sam Houston Tollway. The frontage roads along the Tollway are known as Beltway 8 (BW 8) and are maintained by the Texas Department of Transportation (TxDOT). Within the study area, this facility traverses in east-west direction. There are two lanes in each direction on the Tollway and two-lane one-way frontage roads on either side. The posted speed limit is 65 mph.

SH 288

SH 288 is the dominant roadway serving the majority of travel needs in the study area. It traverses in a north–south direction connecting Houston downtown in the north to City of Freeport in the south. SH 288 also provide connectivity to other regional routes including Sam Houston Tollway, I-610 and US 59 and provide access to major employment centers such as Texas Medical Center, Midtown and Houston downtown. Within the study area, SH 288 serve as a freeway between Beltway 8 and SH 6 with three lanes in each direction, south of SH 6 it becomes a limited access highway with two lanes in each direction. The posted speed limit is 60 mph.

Other State Highways

SH 6 is a major regional thoroughfare in the study area. It traverses in southeast direction along the south side of Pearland area connecting cities of Manvel and Alvin and eventually connecting to Interstate 45 north of Galveston. To the west, it provides connectivity to City of Sugar Land in Fort Bend County. Within the study area, SH 6 is a six-lane highway with a center turn lane and has a posted speed limit of 55 mph.

SH 35 is a major north–south highway in the study area connecting City of Alvin and City of Pearland to the Houston region in the north. To the south, it traverses more in a southwest direction connecting City of Alvin with City of Angleton. Within the study area, SH 35 is a four-lane highway and a center turn lane with a posted speed limit of 55 mph.

Farm-to-Market (FM) Roads

FM 521 serves as a major north-south arterial skirting the western city limits of Pearland and providing connectivity to regional thoroughfares including Sam Houston Tollway and I-610 and providing access to employment centers such as Texas Medical Center. FM 521 also serves as an alternate route to SH 288 that parallels this roadway to the east. To the south, FM 521 provides connectivity to Business SH 288 to the north of City of Angleton. Within the study area, FM 521 is a four-lane roadway with a posted speed limit of 55 mph.

FM 518 serves as a major east-west arterial in the study area. It traverses from FM 521 in Pearland to SH 146 in Kemah in Galveston County. Within the study area, FM 518 is a four-lane

facility with a raised median and posted speed limit of 45 mph. FM 518 serve as the major arterial corridor connecting the residents of Pearland to SH 288 and to IH 45.

FM 2234 also known as Shadow Creek Parkway or McHard Road is an east-west arterial between FM 521 and CR 561 and between Mykawa Road and Pearland Parkway. It is a four-lane roadway with raised median and posted speed limit of 50 mph.

FM 1128 serves as a north-south arterial providing connectivity between SH 6 and FM 518 in the Pearland area. It is a two-lane roadway with posted speed limit of 45 mph.

FM 1462 is an east-west arterial connecting City of Alvin to regional thoroughfares including SH 288, FM 521 and SH 36 in the west. It is a two-lane roadway with a posted speed limit of 55 mph.

FM 528 is an arterial traversing in northeast direction connecting City of Alvin to City of Webster and City of Seabrook to the east. With the study area, this facility provides connectivity between SH 35 (Alvin Bypass) and Interstate 45. It is a four-lane roadway with a center median and has a posted speed limit of 55 mph.

FM 517 is an east-west arterial connecting City of Alvin to City of Dickinson to the east. Within the study area, this roadway provides connectivity between SH 35 in Alvin and Interstate 45. It is a four-lane roadway with a raised median and has a posted speed limit of 55 mph.

Functional Classification

The functional classification of a transportation facility describes the function, hierarchical arrangement, and interaction between various roadways forming a roadway network. These classifications may change over time, as the function of roadways changes to serve different land uses or other transportation facilities. The functional classification of study area roadways is shown in Map 1.3 and is based upon H-GAC's classification system utilized in the regional travel demand model. This classification system is consistent with TxDOT functional classification.

Map 1.3: Roadway Functional Classification

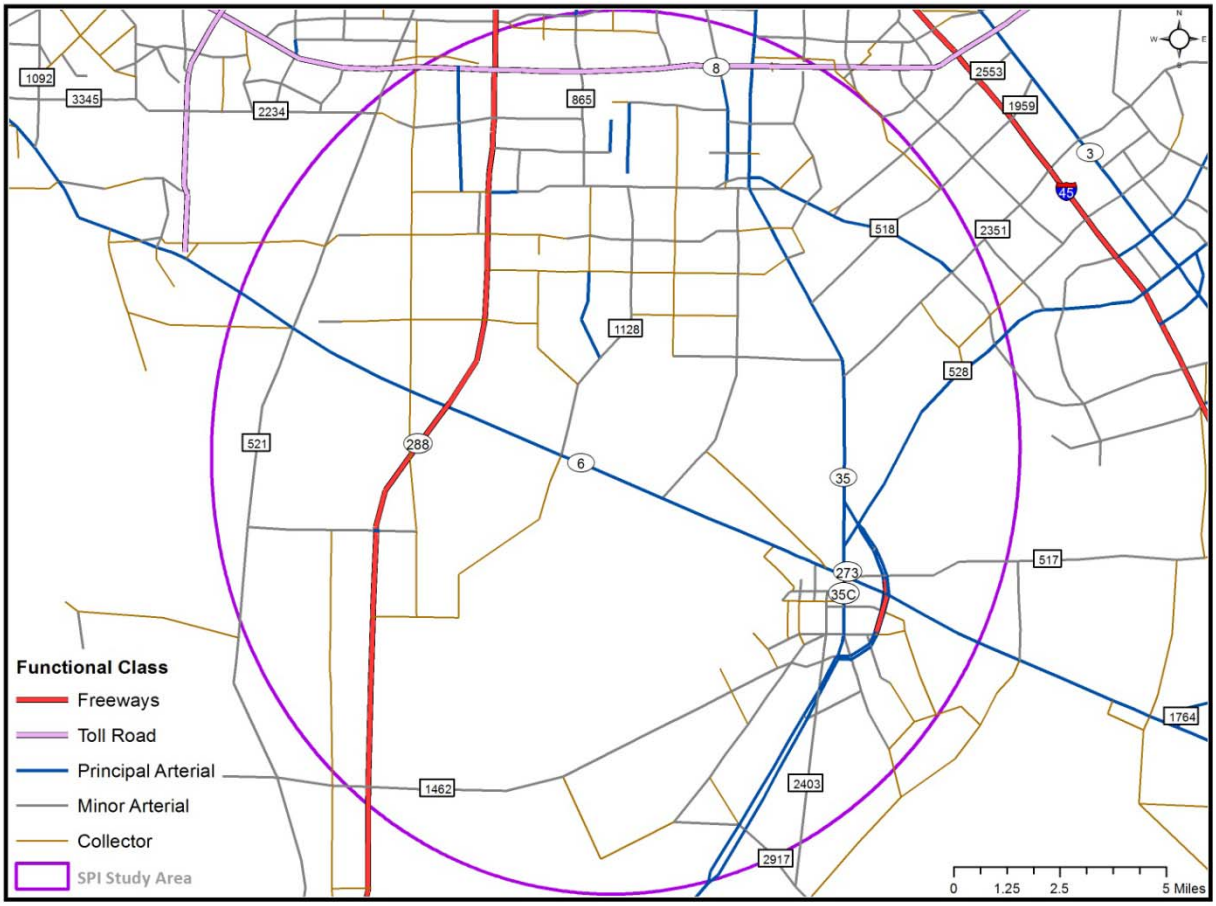


Figure 1.10 shows how the level of mobility and level of service are related to the vehicle-to-capacity ratios.

Figure 1.10 - Level of Service

LOS	DESCRIPTION
A	**Very low vehicle delays, free traffic flow, signal progression extremely favorable, most vehicles arrive during given signal phase.**
B	**Good traffic flow, good signal progression, more vehicles stop and experience higher delays than for LOS A.**
C	**Stable traffic flow, fair signal progression, substantial number of vehicles stop at signals.**
D	**Noticeable traffic congestion, longer delays and unfavorable signal progression, many vehicles stop at signals.**
E	**Unstable traffic flow, poor signal progression, substantial congestion, traffic near roadway capacity, frequent traffic signal cycle failures.**
F	**Unacceptable delay, extremely unstable flow, heavy congestion, traffic exceeds roadway capacity, stop-and-go conditions.**

Source: Highway Capacity Manual (2010)

Figure 1.11 Corridor Crash Data + Rates

Street	From Limit	To Limit	Length	Average ADT	Non Fatal Crashes	Fatal Crashes	Total Crashes	Corridor Crash Rate	Statewide Crash Rate	Ratio of 100 Million VMT to Statewide Average
7TH ST	FM 528	ADOUE ST	1.2	570	9	0	9	1201.63	95.44	12.5905
CR 59	CR 48	SH 288	1.79	3,500	49	0	49	714.27	95.44	7.4839
ODAY RD	MCHARD RD	BROADWAY	1.93	3,750	29	0	29	365.93	95.44	3.8341
HARKEY RD	BAILEY RD	HASTINGS CANNON RD	1.25	940	4	0	4	310.89	95.44	3.2574
CR 59	FORT BEND C/L	CR 48	1.01	5,150	17	0	17	298.47	95.44	3.1273
VETERANS DR	WALNUT W	BAILEY RD	2.02	6,300	41	0	41	294.22	95.44	3.0828
CR 403	CR 94	FM 865	2.13	6,500	40	0	40	263.85	95.44	2.7645
FM 2351	SH 35	GALVESTON C/L	2.3	5,823	36	0	36	245.48	95.44	2.5721
CR 181	SH 6	CR 179	3	2,740	20	0	20	222.20	95.44	2.3282
FM 518	SH 288	FM 865	6.4	28,500	443	0	443	221.80	99.49	2.2294
FM 518	FM 865	SH 35	3.4	26,111	158	0	158	162.53	99.49	1.6337
ODAY RD	BROOKSIDE RD	MCHARD RD (future alignment)	0.4	1,430	1	0	1	159.66	95.44	1.6729
CR 58	SH 288	FM 1128	3.376	3,500	19	0	19	146.85	95.44	1.5386
SH 35	FM 518	S OF SH 6	17.9	13,472	346	5	351	132.93	99.49	1.3361
FM 1128	BROADWAY	BAILEY RD	4.0	7,567	43	1	44	132.76	95.44	1.3911
CULLEN BLVD	SOUTHFORK DR	BAILEY RD	0.83	2,500	3	0	3	132.03	95.44	1.3834
ORANGE W ST	ODAY RD	HATFIELD ST	0.473	3,000	2	0	2	128.72	95.44	1.3487
FM 528	DAVIS BEND RD	FM 1462	3.69	2,500	12	0	12	118.80	95.44	1.2447
MAX RD	MCHARD RD	HUGHES RANCH RD	0.7	2,200	2	0	2	118.60	95.44	1.2427
HARKEY RD	BROADWAY	BAILEY	2	4,765	11	0	11	105.41	95.44	1.1045
FM 521	BRAZORIA/ FORT BEND C/L	FM 1462	12.3	4,317	48	1	49	84.28	99.49	0.8471
MAX RD	BROOKSIDE RD	MCHARD RD	0.5	2,200	1	0	1	83.02	95.44	0.8699
FM 1128	CR 98	CR 100	7.1	6,767	39	0	39	74.13	95.44	0.7768

Street	From Limit	To Limit	Length	Average ADT	Non Fatal Crashes	Fatal Crashes	Total Crashes	Corridor Crash Rate	Statewide Crash Rate	Ratio of 100 Million VMT to Statewide Average
SH 6	SH 288	GALVESTON C/L	27.6	20,223	443	4	447	73.14	99.49	0.7351
VETERANS DR	BAILEY RD	HASTINGS CANNON RD	4	6,950	21	0	21	68.99	95.44	0.7228
FM 1462	SH 288	SH 99	20.4	6,367	83	4	87	61.17	95.44	0.6410
HUGHES RANCH RD	STONE RD W	GARDEN RD	1.231	2,500	2	0	2	59.35	95.44	0.6219
SH 35	FM 2403	FM 523	32.6	9,353	126	3	129	38.64	95.44	0.40482
SH 288	SH 6	SH 99	7.6	30,333	72	3	75	29.71	99.49	0.29863
SH 35	SH 6	BS 35C SOUTH	4.3	28,333	28	0	28	20.99	44.51	0.47154
FM 1462	FORT BEND C/L	SUPER SPEEDWAY	12.7	5,450	10	0	10	13.19	95.44	0.13825
HASTINGS CANNON RD	HARKEY BLVD	VETERANS RD	2.02	n/a	2	0	2	n/a	95.44	n/a
HASTINGS CANNON RD	VETERANS RD	SH 35	2.49	n/a	35	0	35	n/a	95.44	n/a
FM 517	LP 409	SH 35	2.0	n/a	1	0	1	n/a	n/a	n/a

Appendix 2. PLANNING PROCESS

Public Workshops

The first workshop was held in the City of Pearland in the City of Pearland Council Chambers on Thursday July 12th from 6 pm to 8 pm. It was attended by five people. The purpose of the workshop was to provide an overview of the study process, present existing and future transportation conditions of the study area, and obtain public input regarding the proposed vision statement and goals for the study areas.

The second workshop was in held in the City of Alvin in the Alvin Senior Center on Thursday September 27th from 6pm to 8pm. It was attended by fifteen (15) people. The purpose of the workshop was to present the vision statement and goals for the study area based on findings from the technical analysis, the first public workshop, SAC discussions, and sponsoring agency staff meeting findings. Additionally, preliminary alternative vision scenarios were also presented to the public to obtain input. It is important to note that while both workshops were well advertised by H-GAC and by the local jurisdictions, only a few residents attended these workshops. Regardless, the input received from these interested residents was very valuable for the planning process.

Appendix 3. SCENARIO DEVELOPMENT + TESTING

3.1 – Scenario Introduction

In an effort to explore alternatives to accommodate the continued growth and economic development of the sub-region consistent with the developed vision and goals for the study area, four different land use and transportation scenarios were developed. They included a mix of transportation and transit projects proposed by previous studies, findings from the technical analysis, public engagement, and consultation with the SAC. The roadway improvement projects included in the scenarios were identified in the 2035 RTP. The transit projects included in the scenarios were also suggested in recent planning studies. Additionally, these scenarios included projected population, employment, and land use data as forecasted by H-GAC, as well as an alternative land use scenario that conceptualized more population in three sub-regional activity centers.

The Regional Travel Demand Model (TDM) illustrated the potential impacts to land use and mobility for each of the developed scenarios. The model used a large amount of data to analyze multi-faceted relationship between transportation and land use. These data are based on assumptions of population, employment, income, roadway and transit networks, and transportation costs. Results derived provided insight to key transportation mobility indicators such as the number of Single Occupancy Vehicles, High Occupancy Vehicles , Vehicles Miles Traveled, Vehicle Hours Traveled, and Level of Services. These indicators are then combined with other performance measures derived from the study vision and goals to determine which scenario(s) provide the local agency-preferred results for the sub-region.

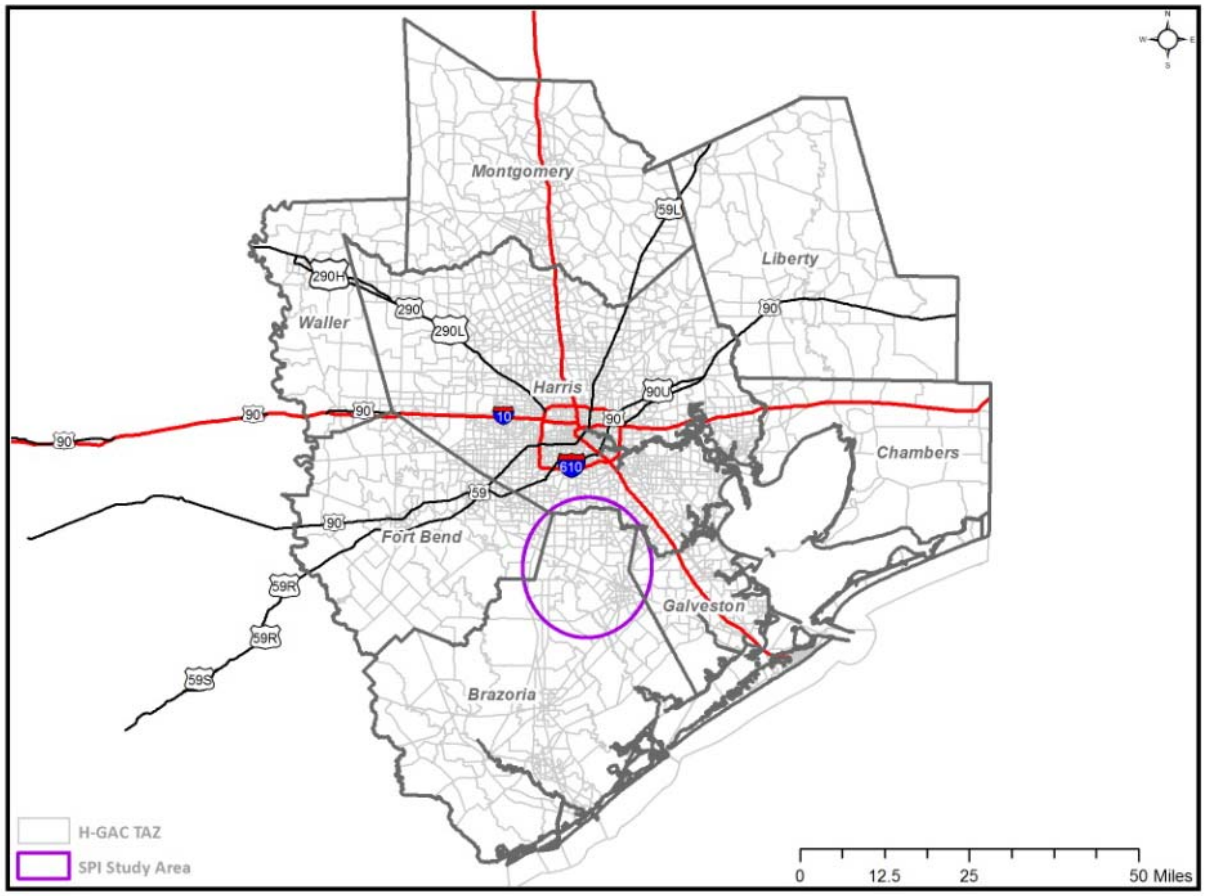
The followings section begins with a discussion of the model refinements performed in preparation for the TDM runs which include traffic analysis zones (TAZ) refinements and roadway network and socioeconomic data modifications. This section then provides a detailed description of the four different transportation and land use scenarios developed for the sub-region followed by an overview of the performance measures used to compare each of the alternative transportation and land use scenarios. The section concludes with an analysis of how each alternative transportation and land use scenario compares to the various performance measures.

3.2 - Regional Travel Demand Model

The study team reviewed the regional travel demand model, but focused mainly within the study area. The study team coordinated closely with the modeling staff at H-GAC, which provided necessary model inputs to develop a refined model with enhanced TAZ structure, additional street coverages, future local transportation improvements, and updated socioeconomic data.

The eight-county Houston-Galveston-Brazoria Consolidated Metropolitan Statistical Area has been federally designated as the Transportation Management Area for the Houston-Galveston region and its roadway network constitutes the H-GAC model. The area extends over 7,800 square miles and includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. Map 3.1 illustrates the eight-county region and its relationship to the Pearland/Northern Brazoria County SPI study area.

Map 3.1 – Model Area and Study Network



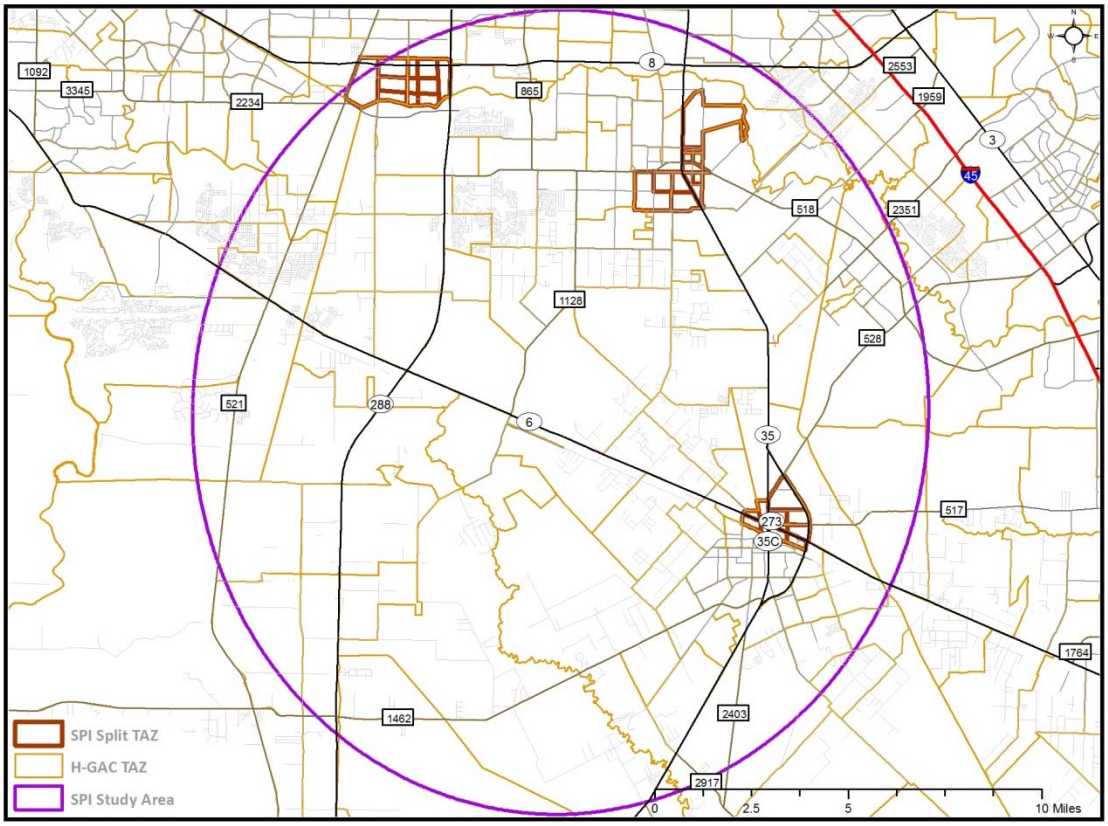
3.3 - Travel Demand Model Refinement

The 2035 regional travel demand model was reviewed and refined to reasonably depict and evaluate the various scenarios developed for this study.

Traffic Analysis Zones

Traffic analysis zones or "TAZs" define geographic areas utilized to relate travel demand with socioeconomic characteristics including population, number of households and employment. In the regional travel demand model there are 3,000 TAZs. The study team identified 13 zones adjacent to the proposed activity centers and split them into 34 smaller zones. The split zones were refined to better represent the transportation and land use integration proposed in the scenarios. The refined zones are illustrated in Map 3.2.

Map 3.2 - Traffic Analysis Zone Modifications



Roadway Network

The transportation network represents the "supply" side of the travel demand model, while drivers desiring to use the network are the "demand" side. The supply side consists of the available infrastructure (i.e. roadway and transit capacity) to support the transportation demand. The demand and supply correlation dictates the traffic flows on the various transportation facilities represented by the highway and transit network. Specific network refinements made for each scenario are discussed in each scenario description.

3.4 – Transportation and Land Use Scenarios Tested

Four alternative transportation and land use scenarios were developed for the plan and include the following:

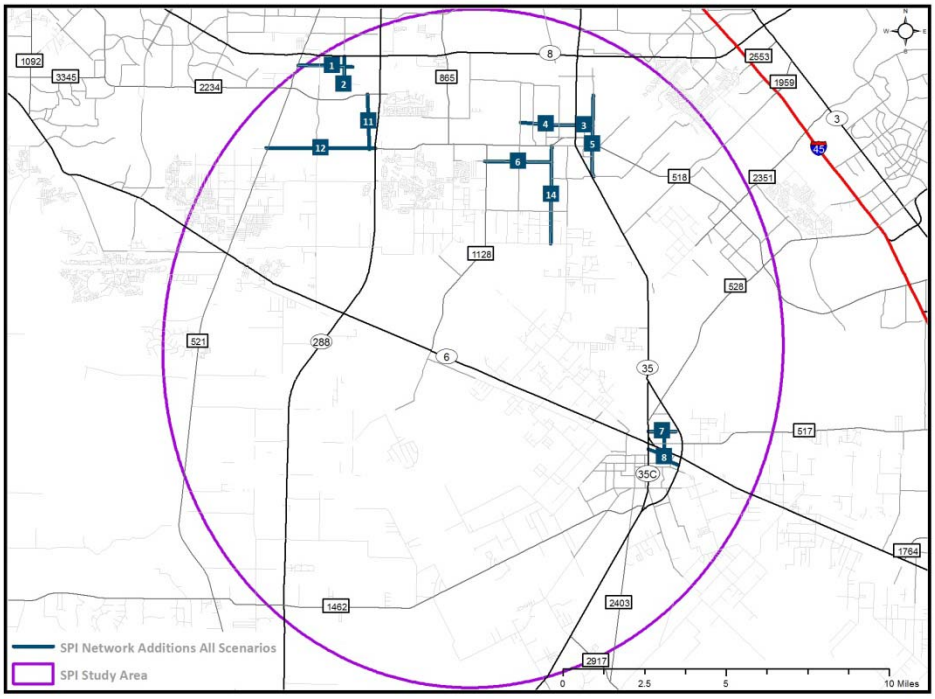
1. Baseline
2. Baseline + 2035 RTP Unfunded Projects
3. Transit Scenario:
    - **Version A** – With baseline land use, H-GAC's regional socioeconomic forecasts
    - **Version B** – With alternative land use, modified socioeconomic forecasts

Following is a detailed description of each scenario.

Scenario 1 | Baseline Scenario

Scenario 1 is the "Baseline" scenario, and is the benchmark upon which the alternative scenarios are evaluated. The baseline scenario maintains the existing transportation system and includes the future programmed/committed transportation improvements that are identified in H-GAC's 2035 RTP Update. The baseline scenario was refined to include some existing roadways that were not originally coded in the regional model, to adequately support the refined TAZ system proposed for this study. Map 3.3 illustrates the existing roadways added to the baseline scenario.

Map 3.3 - Existing Roadways Added to Baseline Scenario



Map 3.4 identifies the future programmed/committed transportation improvements identified in H-GAC's 2035 RTP Update.

Map 3.4 - Future Programmed/Committed Transportation Improvements

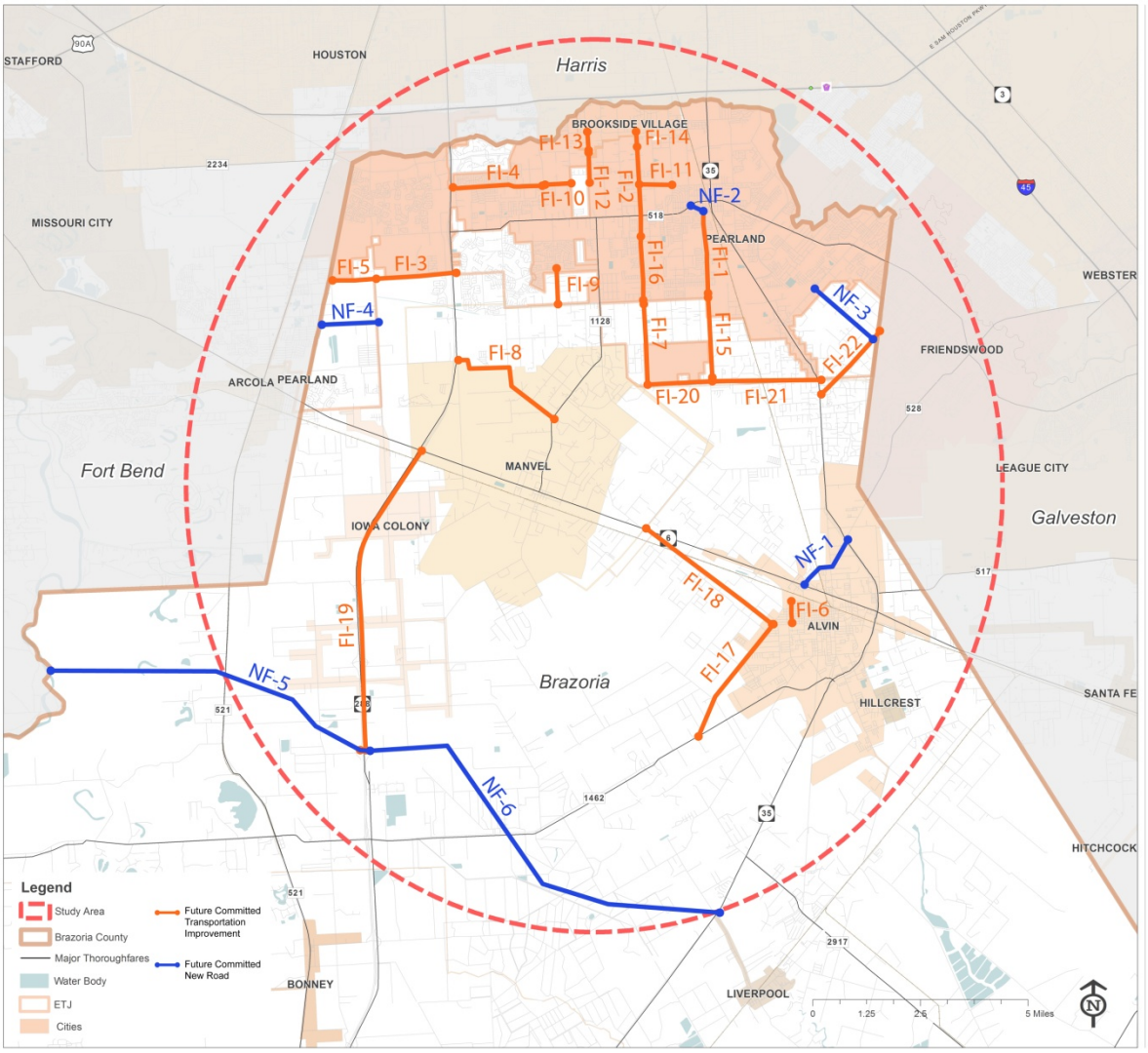


Figure 3.1 - List of Future Programmed/Committed Transportation Improvements

Map ID	Street	From Limit	To Limit	Project Description	Length
NF-1	FM 528	BS 35/GORDON ST	SH 6	EXTEND FM 528 ACROSS GORDON ST (SH 35B) TO SH 6. INCLUDES 2-LANES ON NEW LOCATION WITH A RAILROAD GRADE SEPARATION. NEW SIGNAL AT GORDON & SH 6.	1.1
NF-2	MYKA WA RD	FM 518	WALNUT ST W	CONSTRUCT NEW 4-LANE DIVIDED TO CONNECT MYKAWA TO VETERANS	0.3
NF-3	PEARL AND PKWY	DIXIE FARM RD	FM 2351	CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION	1.8

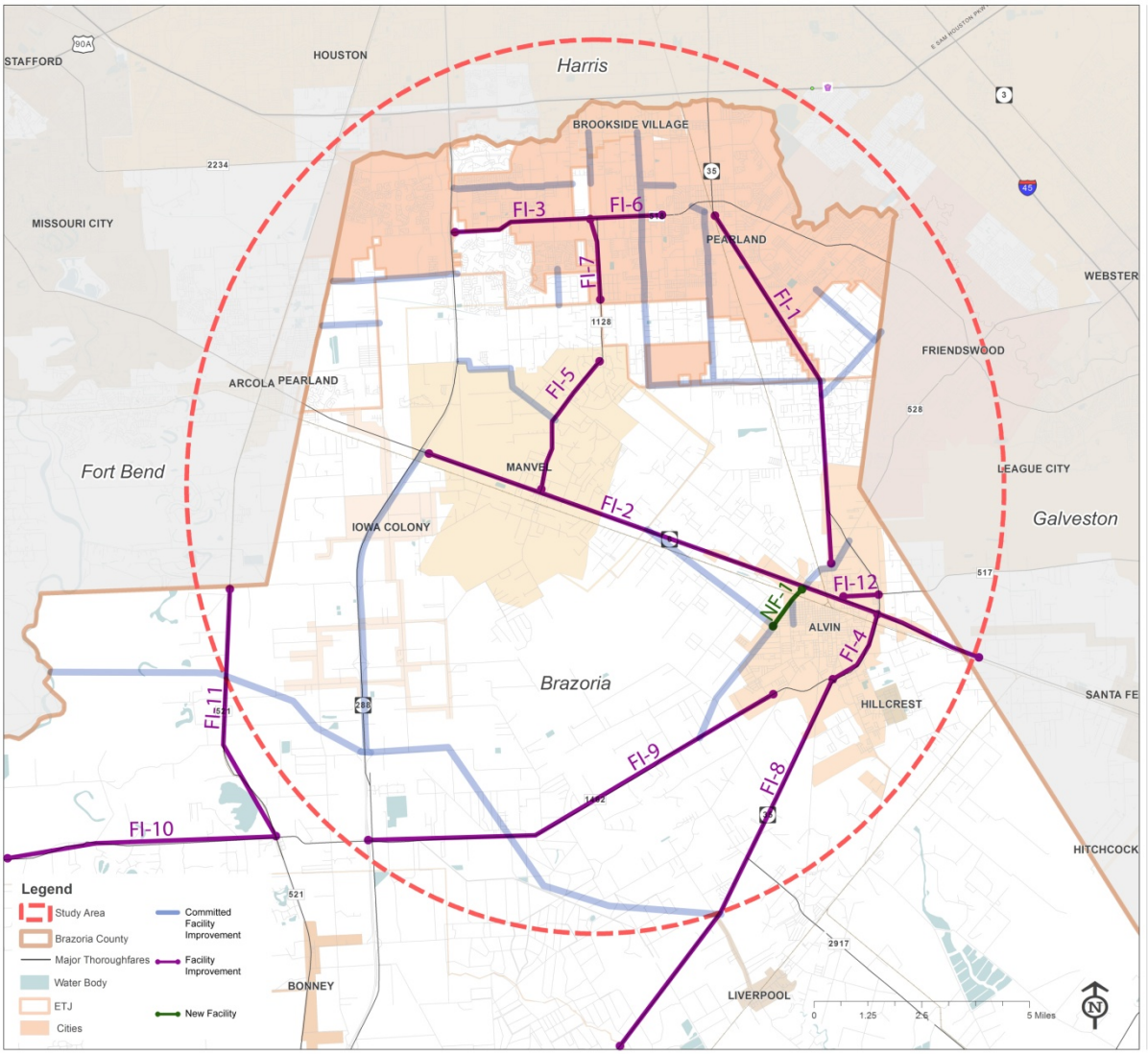
Map ID	Street	From Limit	To Limit	Project Description	Length
NF-4	CR 894	FORT BEND C/L	CR 48	CONSTRUCT 4-LANE DIVIDED CURB AND GUTTER ON NEW ALIGNMENT (IN SECTIONS)	2.3
NF-5	SH 99	AT SH 288		CONSTRUCT 4 DIRECT CONNECTORS (TOLL)	0.8
NF-5	SH 99	SH 288	FORT BEND C/L	SEG C: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	8.8
NF-6	SH 99	SH 288	GALVESTON C/L	SEG B: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	20
FI-1	VETERANS DR	WALNUT W	BAILEY RD	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	2
FI-2	ODAY RD	MCHARD RD	BROADWAY	WIDEN FROM 2 TO 4-LANE DIVIDED CURB AND GUTTER	1.9
FI-3	CR 59	CR 48	SH 288	WIDEN FROM 2 TO 4-LANES W/ BRIDGE	1.8
FI-4	CR 403	CR 94	FM 865	WIDEN 2-LANES TO 4-LANES, ADD MEDIAN & SHOULDERS, ADD SIDEWALKS	2.1
FI-5	CR 59	FORT BEND C/L	CR 48	WIDEN FROM 2 TO 4-LANES W/ BRIDGE	1
FI-6	7TH ST	FM 528	ADOUE ST	RECONSTRUCT EXISTING 2-LANE URBAN RDWY; 2-LANE URBAN RDWY ON NEW LOCATION	1.2
FI-7	HARKEY RD	BAILEY RD	HASTINGS CANNON RD	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER IN SECTIONS	1.3
FI-8	CR 58	SH 288	FM 1128	WIDEN TO 4-LANES	3.4
FI-9	CULLEN BLVD	SOUTHFORK DR	BAILEY RD	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	0.8
FI-10	HUGHES RANCH RD	STONE RD W	GARDEN RD	CONSTRUCT 4-LANE ROADWAY	1.2
FI-11	ORANGE W ST	ODAY RD	HATFIELD ST	CONSTRUCT 4-LANE UNDIVIDED	0.5
FI-12	MAX RD	MCHARD RD	HUGHES RANCH RD	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	0.7
FI-13	MAX RD	BROOKSIDE RD	MCHARD RD	WIDEN FROM 2 TO 4-LANES UNDIVIDED CURB AND GUTTER	0.5
FI-14	ODAY RD	BROOKSIDE RD	MCHARD RD (future alignment)	WIDEN FROM 2 TO 4-LANES UNDIVIDED CURB AND GUTTER	0.4

Map ID	Street	From Limit	To Limit	Project Description	Length
FI-15	VETERANS DR	BAILEY RD	HASTINGS CANNON RD	WIDEN FROM 2 TO 4 LANES DIVIDED CURB AND GUTTER	4
FI-16	HARKEY RD	BROADWAY	BAILEY	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	2
FI-17	FM 528	DAVIS BEND RD	FM 1462	EXTEND ROADWAY 2-LANES ON NEW LOCATION AND ALONG CR 284. NEW SIGNALS AT FM 1462 & CR 190.	3.7
FI-18	CR 181	SH 6	CR 179	RECONSTRUCT & WIDEN TO 4-LANE	3
FI-19	SH 288	SH 6	SH 99	CONSTRUCT 4 TOLL LANES IN MEDIAN WITH GRADE SEPARATIONS	7.6
FI-20	HASTINGS CANNON RD	HARKEY BLVD	VETERANS RD	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	2
FI-21	HASTINGS CANNON RD	VETERANS RD	SH 35	WIDEN FROM 2 TO 4-LANES DIVIDE CURB AND GUTTER	2.5
FI-22	FM 2351	SH 35	GALVESTON C/L	RECONSTRUCT AND WIDEN TO A 4-LANE DIVIDED RURAL SECTION	2.3

Scenario 2 | Unfunded Scenario

Scenario 2 is a baseline concept with the 2035 RTP unfunded projects included. Scenario 2 includes unfunded roadway capacity improvement projects within the study area that are currently not in the adopted *2035 RTP Update*. All of the network refinements identified in the baseline scenario are also included in the alternative scenarios. Map 3.5 shows the unfunded roadway improvement projects that were included in this alternative scenario.

Map 3.5 - Projects included in the Unfunded Scenario



Scenario 3 | Transit Scenario
This transit scenario conceptualizes the introduction of high capacity transit into the study area. It includes two high-capacity transit corridors: Kirby Drive and the SH 35 corridor. Additionally, this scenario includes some specific roadway improvements, primarily intended to facilitate improved connectivity and access to the proposed transit stations.

In order to understand the impact of alternative land use policies on the transportation system, Scenario 3 was evaluated with the following two versions. The two versions are intended to evaluate two separate future land use patterns:

Version 1 – With H-GAC's future land use projections included.

Version 2 – With alternative land uses and modified socioeconomic forecasts. This version increases migration from undeveloped and flood plain areas of the study area

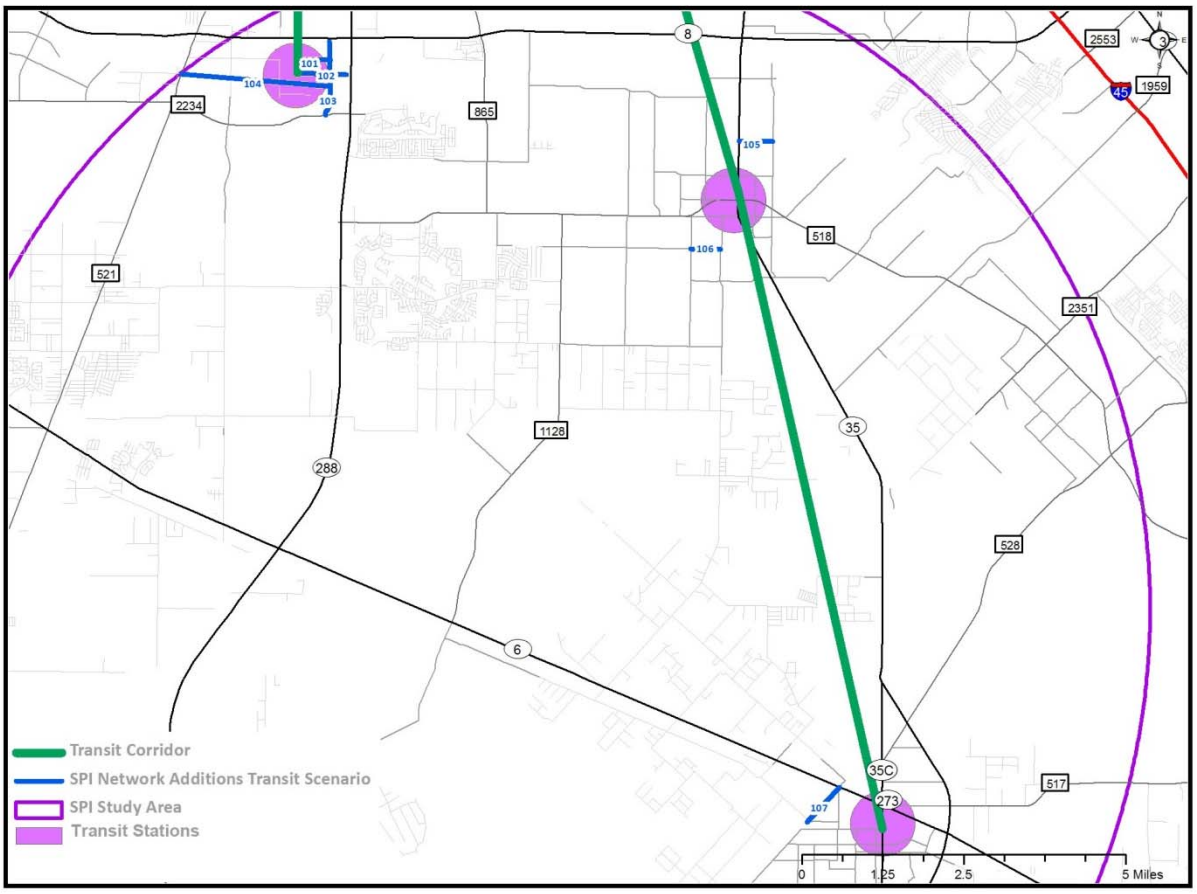
into the three locally identified activity centers of Old Townsite Downtown Pearland, Lower Kirby Urban Center, and Downtown Alvin.

The three potential activity centers were identified through the SPI process. In the model, necessary population and employment was concentrated in these areas to simulate transit supportive densities. For the Lower Kirby Area, this equated to a population density of 20 people/acre and an employment density of 50 people/acre in order to support the proposed Light Rail Transit envisioned for this corridor. For Old Townsite Old Townsite Downtown Pearland and Downtown Alvin, this equated to a population density of 16 people/acre in order to support commuter rail service.

Figure 3.2 - List of Roadway Projects included in Scenario 3

ID	Road	From	To	Lanes
101	Spectrum Dr	Kirby Dr	Business Center Dr	Construct 4-lane roadway
102	Business Center Dr	BW 8	FM 2234	Construct 4-lane roadway
103	New Rd 1	Kirby Dr	SH 288	Construct 2-lane roadway
104	South Belt Industrial Dr	FM 521	Business Center Dr	Construct 2-lane roadway
105	Halik Street	SH 35	Old Alvin Road	Construct 2-lane roadway
106	CR 408 Extension	McLean Rd	Veterans Dr	Construct 2-lane roadway
107	New Road 2	David Bend	SH 6	Construct 2-lane roadway

Map 3.6 - Network Refinements for the Transit Scenario



3.5 - Performance Criteria

Performance criteria are used to compare different scenarios and determine which scenarios are most effective in achieving a given result. For the SPI, performance criteria were established to assess the improved traffic and mobility and quality of life. These performance criteria were derived from the vision and goals established for the project, which states:

Vision

The residents of the region will have a high quality of life built on livable transportation and land use solutions that promote economic development; cultural diversity; community health and safety; preservation of natural resources, and fiscal prudence.

Goals

1. *Engage the public in the decision making process*
2. *Provide a wide range of transportation choices*
3. *Promote economic development throughout the sub-region*
4. *Maintain fiscal prudence*
5. *Strengthen community well being and safety*
6. *Preserve and enhance natural resources*

The goals were each linked to performance criteria in order to track their use in the rest of the planning process:

- **Consistency with Goals and Objectives from previous plans:**
  Measures how well each scenario matches the goals and objectives proposed in previously developed land use and transportation studies.
- **Consistency with needs and desires from public engagement:**
  Measures how well each scenario addresses the needs and desire documented during the project's public engagement process.
- **Provides multi-modal transportation options:**
  Measures the number of transportation options provides in each scenario including vehicular mobility, walking, and transit.
- **Walk to transit:**
  Measures the population that can walk to a transit station. It is based on the amount of population that lives within ½ of a transit station.
- **Drive to transit:**
  Measures the population that can drive to transit.
  Vehicle Miles Traveled (VMT) and VMT in congestion (LOS E/F):
  The amount of travel by motor vehicles is generally measured in terms of Vehicle Miles Traveled (VMT). It is based on vehicle trips and the distance motorists travel to get to their destination. VMT is best used for measuring trends in the amount of vehicular traffic in the region. VMT was also calculated for all the congested roadways in the region. Congestion is defined as a condition when traffic volume on a roadway exceeds its carrying capacity.
- **Vehicle Hours Traveled (VHT) in the study area and in the HGAC region:**
  Vehicle Hours Traveled or "VHT" is representative of the total vehicle hours expended travelling on the roadways. VMT measures the quantity of travel in terms of demand and VHT measures the quality of travel in terms of congestion. VHT was also calculated for all the congested roadways in the study area.
- **System-wide speeds within the study area (VMT/VHT):**
  This measure represents future year 2035 average daily travel vehicular speeds in the study area. This is derived by dividing VMT by VHT. Increase in travel speed indicates improved mobility along the roadways.
- **Capital Costs:**
  Quantifies the individual project construction costs in 2010 dollars. Specific costs assumptions are described in Appendix E.
- **Operations and Maintenance Costs:**
  Quantifies the cost inquired for the long term operation and maintenance of each transportation project within each scenarios. Specific costs assumptions are described in the Appendix. E.
- **Level of Environmental Impact**
  Measures the amount of Farm Ranch Land Use acreage that is developed into Residential Land Use and the amount of Vacant Land Use acreage that is developed.

Following is a matrix that illustrates how each of these performance criteria relate to the goals established for the study.

Figure 3.3 -Matrix of Performance Criteria + Related Goals

Performance Criteria	Goals					
	1 Engage Public	2 Transportation Options	3 Economic Development	4 Fiscal Prudence	5 Safety and Well Being	6 Preservation
Consistency with Goals + Objectives from previous plans	X		X			
Consistency with needs and desires from public engagement:	X		X			
Provides multi-modal transportation options:	X	X		X	X	X
Walk-To and Drive to Transit		X			X	
Vehicles Miles Traveled (VMT) in congestion (LOS E/F)		X	X		X	
Vehicle Hours of Travel (VHT) in study area and H-GAC region		X	X		X	
System wide speed within study area (VMT/VHT)			X		X	
Capital Costs				X		
Operations + Maintenance Costs				X		X
Level of Environmental Impact		X		X	X	X
Consistency with Goals + Objectives from previous plans	X		X			

3.6 – Performance Criteria Results

In order to assess the ability of the alternative scenarios to improve traffic, mobility, and the quality of life in the study area, it is important to first analyze the results of each of the aforementioned performance criteria individually. Following is a description of the results of the individual performance criteria established for the project.

Consistency with Goals and Objectives from previous plans
Over thirteen plans and studies previously developed within the study area were reviewed to establish an understanding of the planned transportation and land use conditions of the sub-region. All of the alternative scenarios proposed in this study were informed by findings and recommendations noted in these plans.

Consistency with needs and desires from public engagement
The general themes expressed by citizens and stakeholders related to transportation and land use issues, opportunities, and needs in the study area included:

- Consider all modes of travel including roads, transit, and bike/pedestrian projects
- Support economic development
- Coordinate with other regional initiatives
- Prepare for anticipated growth
- Maintain the uniqueness of the community
- Enhance travel corridors
- Leverage dollars for financial stability
- Stay consistent with previous planning efforts

All of the proposed alternatives scenarios were developed with these themes in mind and provide alternative approaches to addressing these needs within the study.

Provide multi-modal transportation options
The Baseline and Unfunded Scenarios focus on improving vehicular connectivity and capacity within the study area. Multi-modal transportation options in these two scenarios are limited to potential sidewalks that might be proposed along some of these new roadways and roadway widening projects. The transit scenario options provide additional multi-modal transportation options in the form of high capacity transit options. They also include specific roadway improvements that facilitate improved multi-modal connectivity and access to the proposed transit stations.

Walk to Transit
Figure 3.3 summarizes future year 2035 walk to transit trips within the study area for the baseline and alternative scenarios.

Figure 3.4 - 2035 Walk to Transit Trips in the Study Area

2035 Trips by Mode	Baseline Scenario	Unfunded Scenario	Transit Scenario Transit Option A	Transit Scenario Transit Option B
Walk to Transit	200	200	600	1,600
Percent Change		*0.0%*	*200.0%*	*600.0%*

While the Unfunded Scenario provides no increase in walk to transit trips, the Transit Scenarios provide a substantial increase in Walk to Transit trips. Transit Scenario Option B provides the most walk to transit trips with a six hundred percent increase from the Baseline Scenario. This can be explained by the increased population and employment intensities proposed around the transit nodes. Located within half a mile of transit, residents and employees are able to access transit efficiently from their place of residence and/or employment.

Drive to Transit

Figure 3.4 summarizes future year 2035 drive to transit trips within the study area for the baseline and alternative scenarios.

Figure 3.5 - 2035 Drive to Transit Trips in the Study Area

2035 Trips by Mode	Baseline Scenario	Unfunded Scenario	Transit Scenario Transit Option A	Transit Scenario Transit Option B
Walk to Transit	8,400	8,300	10,600	8,700
Percent Change		*-0.2%*	*135.0%*	*3.5%*

The Unfunded Scenario shows a negligible decline in drive to transit trips. The Transit Scenario Option A on the other hand, shows a one hundred and thirty-five percent increase in drive to transit trips while the Transit Scenario Option B only shows a three and one-half percent increase from the Baseline Scenario. The large increase of Transit Scenario Option A can be attributed to an increased future population that is dispersed throughout the study area and drives to the transit nodes to assess regional job centers. A large portion of these drive to transit trips disappear in the Transit Scenario Option B and are replaced by the walk to transit trips as higher development intensities around the transit nodes facilitate walkable access to transit.

Vehicles Miles Traveled

Figure 3.5 summarizes future year 2035 total daily VMT and VMT spent in congested conditions on roadways within the study area for the Baseline and alternative scenarios.

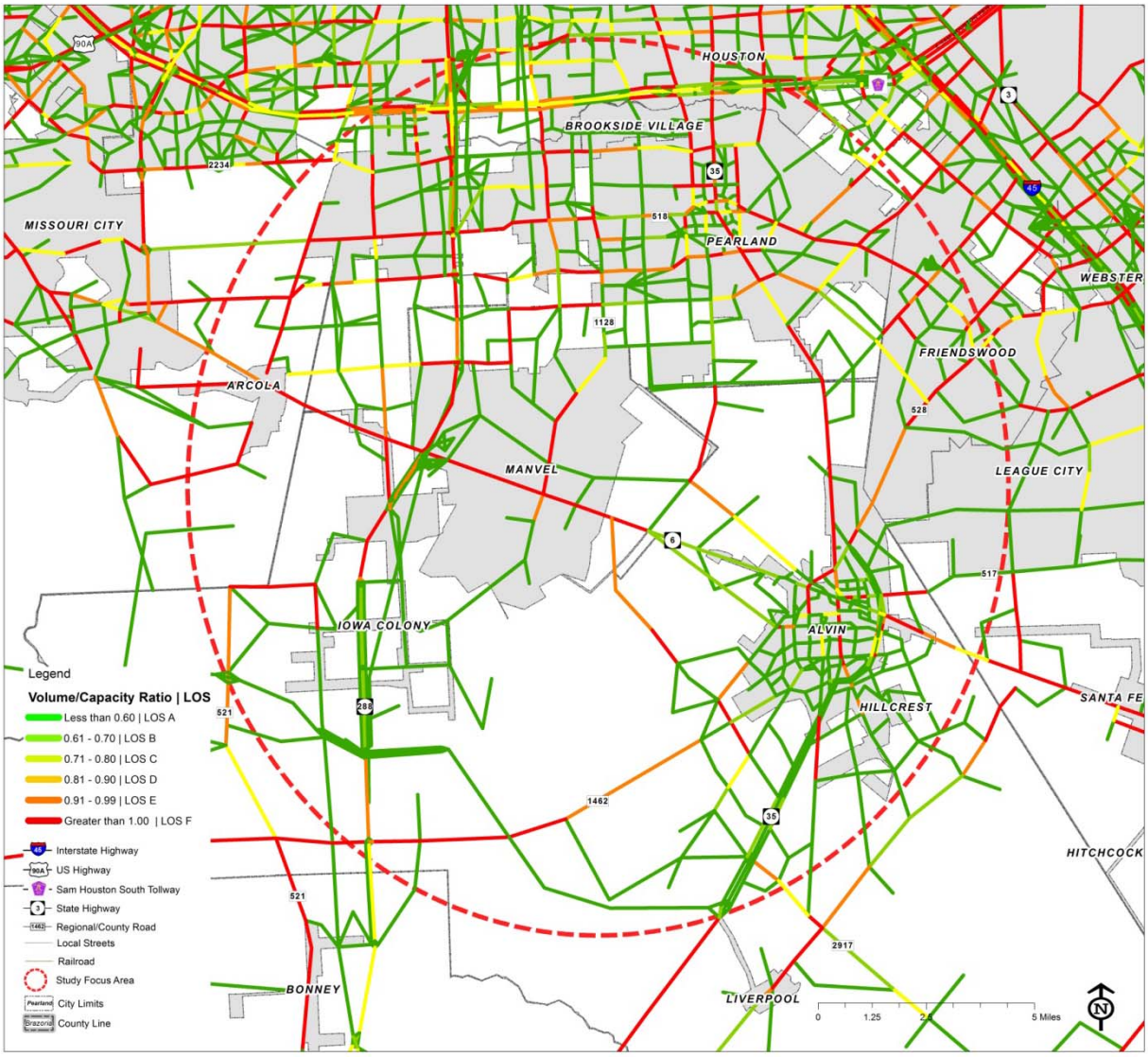
Figure 3.6 - 2035 Daily Vehicle Miles Traveled in the Study Area

2035 Daily Vehicle Miles Traveled (VMT)	Baseline Scenario	Unfunded Scenario	Transit Scenario Transit Option A	Transit Scenario Transit Option B
Total Study Area VMT	6,607,700	6,737,900	6,609,400	6,515,500
Percent Change		*2.0%*	*0.0%*	*-1.4%*
VMT in Congestion	1,971,900	1,739,700	1,870,000	1,712,300
Percent Change		*-11.8%*	*-5.2%*	*-13.2%*

The Unfunded Scenario increases the VMT by two percent while the Transit Scenario Option B reduces the VMT by almost one and half percent. Clearly, scenarios with transit add less vehicular traffic on the roadways compared to the scenarios without transit. However, when transit is implemented with land use changes such as higher development intensities around the transit nodes, the VMT decreases significantly indicating lower vehicular traffic and trip lengths in the study area.

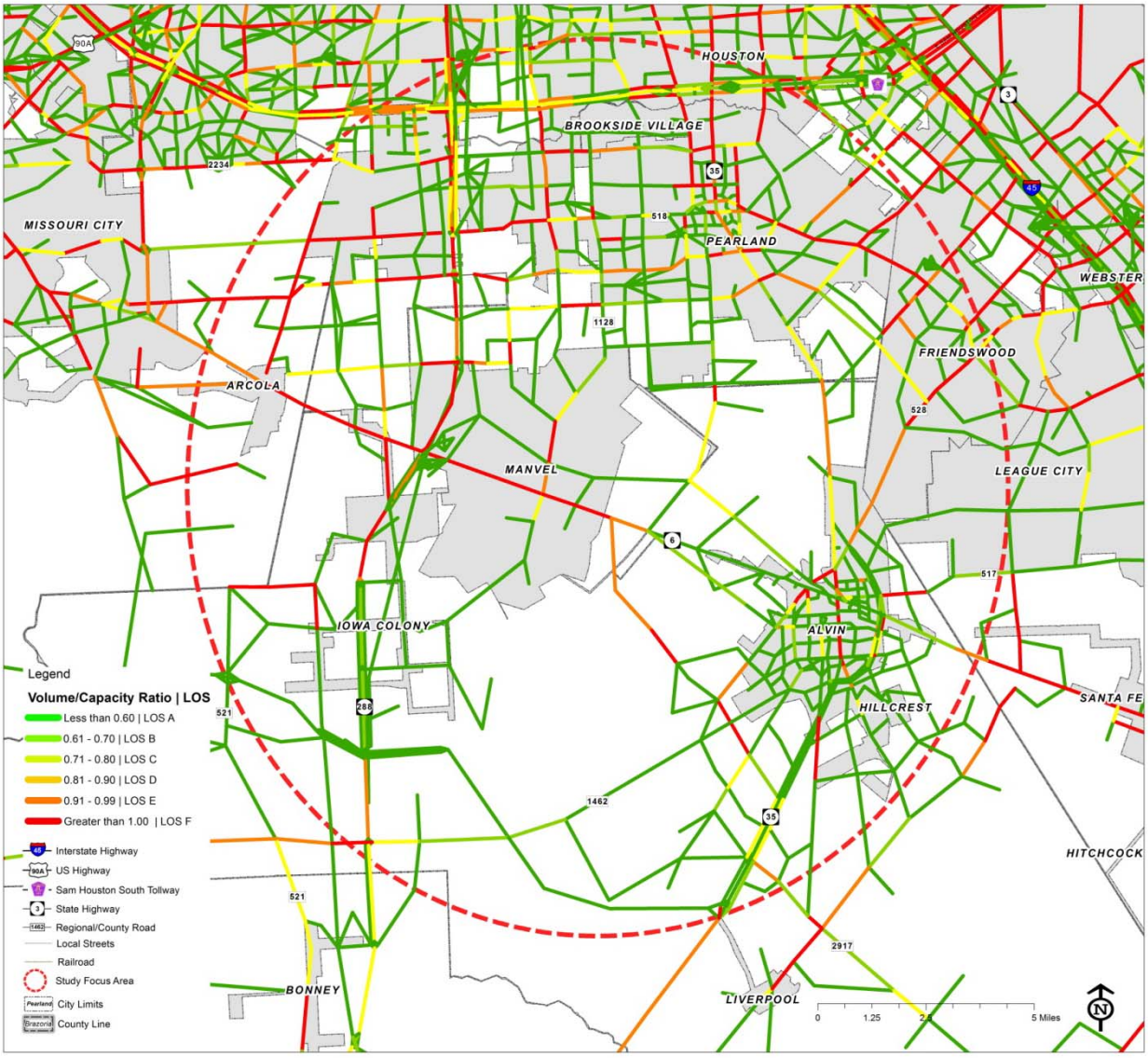
Maps 3.6 through 3.9 illustrate mobility in the corridor for each of the scenarios using Volume to Capacity Ratio/Level of Service, illustrating good mobility, and red illustrating deficient mobility.

Map 3.6 – Baseline Scenario Volume to Capacity Ratio/Level of Service



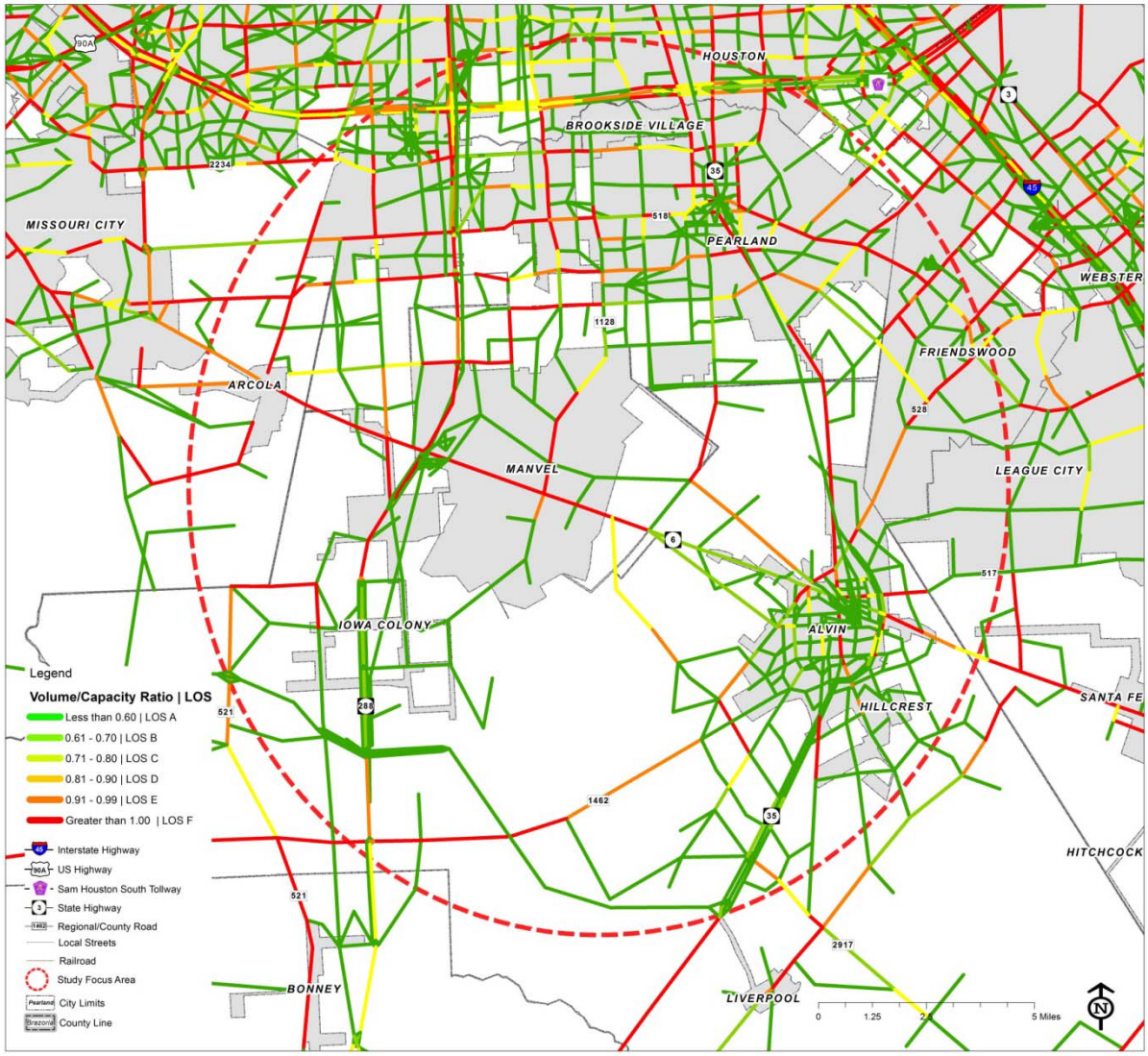
In the Baseline Scenario SR 288, SR 6, SH 35, FM 518, FM 521, and FM 1462 are all showing Volume/Capacity Ratios of LOS D or greater.

Map 3.7 – Unfunded Scenario Volume to Capacity Ratio/Level of Service



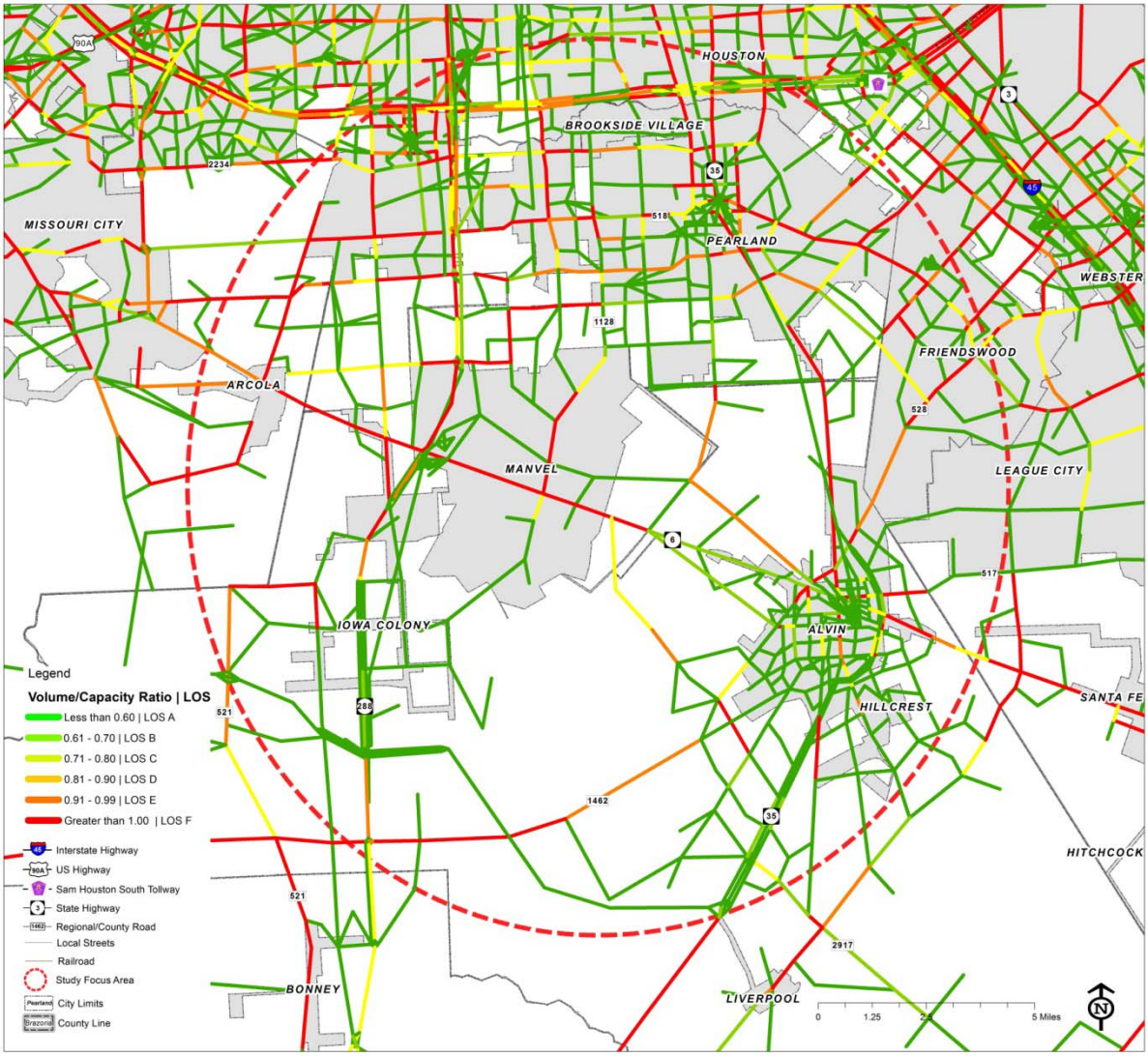
In the Unfunded Scenario congestion continues along SR 6, SH 288, and FM 518 but is substantially reduced along SH 35 and FM 1462.

Map 3.8 – Transit Scenario Transit Option A Volume to Capacity Ratio/Level of Service



In the transit scenario option A, congestion continues along SR 6, SH 288, and FM 518 and returns on SH 35 and FM 1462.

Map 3.9 – Transit Scenario Transit Option B Volume to Capacity Ratio/Level of Service



In the Transit Scenario Option B, congestion continues along SR 6, SH 288, FM 518, SH 35 and FM 1462. However, both the Unfunded and the Transit Scenario Option B show a significant reduction, of 12 percent and higher, in VMT spent in congestion compared to the baseline conditions. The reduction in VMT spent in congestion in the Unfunded Scenario is mainly attributed to the additional roadway capacity. Although no major roadway capacity improvements were included in the transit scenarios, alternative land uses of the Transit Scenario Option B provides better allocation of future growth around the proposed transit nodes to create a work, live, and play environment, thus providing the most benefit in reducing congestion along major roadways in the study area.

Vehicle Hours Traveled

Figure 3.6 shows the comparison of 2035 daily VHT for baseline and alternative scenarios along major roadways in the study area.

Figure 3.7 - 2035 Daily Vehicle Hours Traveled in the Study Area

2035 Daily Vehicle Hours Traveled	Baseline Scenario	Unfunded Scenario	Transit Scenario Transit Option A	Transit Scenario Transit Option B
Vehicle Hours Traveled	152,200	152,000	151,800	149,600
Percent Change		*-0.10%*	*-0.30%*	*-1.70%*
VHT in Congestion	60,100	52,700	57,500	54,600
Percent Change		*-14.04%*	*-4.52%*	*-10.07%*

The Unfunded Scenario decreases the VHT by a negligible one tenth of a percent in the study area while the Transit Scenario Option B reduces the VHT by more than one and half percent. Again, the Transit Scenario Option B with alternative land use provides the most savings in VHT as it provides a better population and employment mix around the proposed transit nodes compared to the baseline conditions.

VHT was also calculated for all the congested roadways in the study area. The Unfunded Scenario reduces VHT spent in congestion by over 14 percent, while the Transit Scenario Option B with land use changes reduces VHT in congestion by 10 percent. Overall all three scenarios experience lower VMT in congestion compared to the baseline scenario.

Average Travel Speed

Figure 3.7 shows the comparison of average travel speeds for baseline and alternative scenarios along major roads in the study area.

Figure 3.8 - Average Daily Travel Speed in the Study Area

Average Speed	Baseline Scenario	Unfunded Scenario	Transit Scenario Transit Option A	Transit Scenario Transit Option B
Average Speed (mph)	43.4	44.3	43.5	43.5
Percent Change	`	*2.07%*	*0.28%*	*0.34%*

The Unfunded Scenario improves the average travel speed by two percent compared to the baseline conditions. The transit scenarios show less than half a percent improvement in travel speeds. Additional roadway capacity included in the Unfunded Scenario compared to the transit scenarios resulted in better mobility in terms of speed in the study area.

Capital Costs

Figure 3.8 shows the comparison of order of magnitude capital costs for the baseline and alternative scenarios.

Figure 3.9 – Scenario Order of Magnitude Capital Costs

Capital Costs	Baseline Scenario	Unfunded Scenario	Transit Scenario Transit Option A		Transit Scenario Transit Option B	
			Bus Rapid Transit	Commuter Rail	Bus Rapid Transit	Commuter Rail
Capital Costs (2009 Dollars)	$1.12B	$3.10B	$1.95B	$1.48B	$1.95B	$1.48B
Percent Change		*175.3%*	*73.9%*	*31.6%*	*73.9%*	*31.6%*

The Unfunded Scenario requires the largest capital costs expenditure and is 175.3% higher than the Baseline Scenario while the Commuter Rail option requires the least amount of additional funds with a 31.6% increase.

Operations and Maintenance Costs

Figure 3.9 shows the comparison of operations and maintenance costs for the Baseline and alternative scenarios.

Figure 3.10 – Scenario Operations and Maintenance Costs Per Year

Operations & Maintenance Costs Per Year	Baseline Scenario	Unfunded Scenario	Transit Scenario Transit Option A		Transit Scenario Transit Option B	
			Bus Rapid Transit	Commuter Rail	Bus Rapid Transit	Commuter Rail
Operations & Maintenance Costs Per Year (2010 Dollars)	$3.43M	$4.95M	$225.14M	$252.79M	$225.14M	$252.79M
Percent Change		*144.2%*	*264.4%*	*309.2%*	*264.4%*	*309.2%*

The transit scenarios have the highest operations and maintenance costs. Within these scenarios, Commuter Rail option has the highest operations and maintenance costs which is 309.2% higher than the baseline operations and maintenance costs. The unfunded scenario has the least high operations and maintenance costs which is 144% higher than the baseline operations and maintenance costs.

Level of Environmental Impact

Figure 3.10 shows the comparison of the level of environmental impact the Baseline and alternative scenarios will have on the study area.

Figure 3.11 – Level of Environmental Impact per Scenario

Level of Environmental Impact (Acres)	Baseline Scenario	Unfunded Scenario	Transit Scenario Transit Option A		Transit Scenario Transit Option B	
			Bus Rapid Transit	Commuter Rail	Bus Rapid Transit	Commuter Rail
Environmental Impact	25,914	25,914	25,914	25,914	23,323	23,323
Percent Change		*0%*	*0%*	*0%*	*-10%*	*-10%*

The Unfunded and Transit Scenario Option A have the same level of environmental impact. These scenarios share the same land use and regional socioeconomic forecast as the Baseline Scenario, which proposes the development of farm ranch land uses, many of which are located in environmental sensitive, undeveloped, flood plain areas along the periphery of the study area, into higher density residential land uses. The Transit Scenario Option B however, reduces environmental impact by 10%. This is due to the proposed shift of forecasted population and employment from existing undeveloped and flood plain areas along the periphery of the study area into the proposed activity centers. The higher densities typical of transit and activity centers enable more population and employment growth to be located in these areas which reduces development pressures of lands located in the periphery of the study area.

3.8 – Scenario Evaluation Methodology

While it is important to first analyze the results of each of the aforementioned performance criteria individually, the overall performance of each of the scenarios is a result of the combined outcome. In order to assess the ability of the alternative scenarios to improve traffic, mobility, and the quality of life in the study area, the results of each performance criteria need to be combined and analyzed as a holistic scenario. Each scenario was evaluated against the Baseline Scenario and their effectiveness compared against each other to determine which scenario performed the best. These scenarios included the following:

1. Baseline
2. Baseline + 2035 RTP Unfunded Projects
3. Transit scenarios:
    - Version A – With baseline land use, H-GAC's regional socioeconomic forecasts
    - Version B – With alternative land use, modified socioeconomic forecasts

The effectiveness of individual performance criteria within each scenario, as well as the overall performance of each scenario, could fall into one of three categories indentified in Figure 3.11:

Figure 3.12 Performance Categories and Measures

Performance Categories	Best Performance	3 pts
		2 pts
	Low Performance	1 pts

Performance criteria within each scenario were assigned points based on their effectiveness. For example, 3 points were allocated to the performance criteria that performed the best. Points from

each performance criteria were tallied to identify the best performing scenario. Figure 3.12 illustrates the findings from this scenario analysis.

Figure 3.13 - Scenario Performance Analysis

			Transit Scenario 3A		Transit Scenario 3B	
	Baseline Scenario 1	Unfunded Scenario 2	Bus Rapid Transit	Commuter Rail	Bus Rapid Transit	Commuter Rail
Performance Criteria	Qty	% Change	% Change	% Change	% Change	% Change
Walk to transit	200	0%	200%	200%	700%	700%
Drive to transit	8,400	-1.20%	26.20%	26.20%	3.60%	3.60%
Vehicle Miles Traveled (VMT)	6,607,700	2%	0%	0%	-1.40%	-1.40%
Vehicle Hours Traveled (VHT)	152,200	-0.10%	-0.30%	-0.30%	-1.70%	-1.70%
VMT in congestion	1,971,900	-11.80%	-5.20%	-5.20%	-13.20%	-13.20%
Percent VMT in congestion	30%	-13.30%	-6.70%	-6.70%	-13.30%	-13.30%
System wide speed in study area	43.41	2.10%	0.29%	0.29%	0.32%	0.32%
Capital costs	$1,126,503,637	175.30%	73.90%	31.60%	73.90%	31.60%
Operations and maintenance costs	$61,776,000	144.20%	264.40%	309.20%	264.40%	309.20%
Environmental impact (acres)	25,914	0%	0%	0%	-10%	-10%
Total Points		**25**	**23.7**	**23.3**	**34.3**	**34.3**

3.9 – Scenario Evaluation Results

Transit Scenario 3B had the overall highest score and best performance. This is predominantly due to the increased multi-modal transportation options and the transportation modal shift that is achieved by better linking land use to transit. Transit Scenario 3B yields a 13.2 percent decrease in vehicles miles traveled in congestion, a 1.7 percent decrease in total vehicle hours traveled, and a 1.4 percent decrease in total vehicle miles traveled. Additionally, Transit Scenario 3B yields a 700 percent increase in population within walking distance, or within ½, mile of transit. The increased population and employment density within the three proposed activity centers proposed in Transit Scenario 3B provides residents with transportation options, resulting in less reliance on automobiles. Within Transit Scenario 3B, Bus Rapid Transit and Commuter Rail yielded the same results, with the exception of capital costs and operations and maintenance costs. While Bus Rapid Transit has higher capital costs then Commuter Rail, Bus Rapid Transit has lower operations and maintenance costs. Transit Scenario 3B also had the least environmental impact due reduced population growth and development in flood plain areas. By guiding development towards already developed areas, floodplains and other environmentally sensitive areas are preserved.

Unfunded Scenario 2, which includes RTP planned improvements and unfunded projects, performed second best—slightly better than Transit Scenario 3A but lower than Transit Scenario 3B. The increased roadway capacity provided in Unfunded Scenario 2 reduced the percent VMT in congestion

by 13.3 percent and improved system wide speed by 2.1 percent. The long term operations and maintenance of this scenario was also the least costly. VMT in congestion performed second best in this scenario with an 11.8 percent reduction from the Baseline Scenario 1. However, this scenario fell short of Transit Scenario 3B due to the limited multi-modal transportation options it offered, lower relative impact on VMT, VHT, increased capital costs, and environmental impact.

Transit Scenario 3A performed the worst relative to the other scenarios, demonstrating a poor link between land use and transportation. Transit Scenario 3A yielded a decrease in the population living within driving distance of transit and did not positively impact total VMT in congestion, percent VMT in congestion, the level of environmental impact. Transit Scenario 3A also incurred the high transit operations and maintenance costs, but without the benefits in other performance criteria has exemplified in Transit Scenario 3B.

3.10 – Scenario Evaluation Summary

It's important to note that these scenarios are intended to provide a "what if" analysis of the potential impacts, benefits, and implications of alternative futures. The scenario findings inform project identification and assessment based on the SPI goals and objectives and serve to establish a dialogue to drive the overall project recommendations.

In summary, the scenario results suggest that better linkage of transportation and land use decisions can positively impact the mobility of residents within the sub-region. By coordinating transportation investment options and land use decision-making, northern Brazoria County stakeholders can encourage transit supportive densities that are aligned with natural market activity. This will improve the sub-region's mobility and reduce impacts to the environment—all while alleviating traffic congestion.

3.11 – Qualitative Criteria

Qualitative criteria were established to evaluate the transportation corridor improvement projects based on various conditions/standards established through the study process and based on transportation planning best practices. These criteria were vetted through the SAC and sponsoring agency staff. The following list documents the qualitative criteria established for the evaluation of individual transportation corridor improvement projects:

- Continuation of Existing Road Widening Projects
- Municipality Development
- Connectivity
- Construction Design Process
- Parallel Relief
- Protection of Downtown
- Preservation of Community Character
- Environmental Impacts
- Transportation Land Use Linkage

Potential projects were considered alongside the established criteria scoring presented in Figure 3.13. Based on the resulting scores, an initial project assessment list was established. The highest possible score based on qualitative criteria alone is 36 points. The qualitative score is combined with the quantitative score documented in the following pages for the ultimate assessment score.

Figure 3.14 - Qualitative Criteria Scoring

Corridor Assessment Criteria	Possible Points	
Continuation of Existing Road Widening Projects Is the proposed project a continuation of any previously completed or current project providing added lanes to the specific transportation corridor?	No Yes	0 4
Municipality Development Is the proposed project located in a developing area within City limits or ETJ?	No Yes	0 4
Connectivity Does the proposed project improve access between activity centers or link existing or proposed projects or provide regional connectivity?	No Yes	0 4
Construction Design in Progress Are the design plans for the proposed project already complete or in the process of being completed?	No Yes	0 4
Parallel Relief Does the proposed project provide relief to parallel congested/deficient corridors?	No Yes	0 4
Protection of Downtown Does the proposed project enhance the quality of life in downtown areas?	No Yes	0 4
Preservation of Community Character Does the proposed project preserve or enhance the character of existing communities?	No Yes	0 4
Environmental Impacts Does the proposed project impact or encourage the development of environmentally sensitive areas?	No Yes	4 0
Transportation Land Use Linkage Has the proposed project coordinated with, or support, land use decisions in the area?	No Yes	0 4
Total Possible Qualitative Points		36

3.12 – Quantitative Criteria

Quantitative criteria were identified to evaluate transportation corridor improvement projects based on various measurable conditions. Each measure was vetted through the SAC and sponsoring agency staff. The following list documents the quantitative criteria established for the evaluation of individual transportation corridor improvement projects:

- Level of Service (LOS) Assessment Score
- Fatal Crash Score
- Total Crash Score | Ratio of 100 Million VMT to Statewide Average

Crash data was obtained from TxDOT's Crash Records Information System (CRIS)® which incorporates both county and city crash data. Crash data was obtained and analyzed for the three-year period of 2009 – 2011.

Figure 3.14 displays the quantitative criteria and the associated scoring. The total points established by the Quantitative Criteria range from 0 to 14 points.

Figure 3.15 - Quantitative Criteria Scoring

Corridor Assessment Criteria	Possible Points
LOS Assessment Score	
Less than 0.60	1
0.61 – 0.70	2
0.71 – 0.80	3
0.81 – 0.90	4
0.91 – 0.99	5
Greater than 1.00	6
Fatal Crash Score	
0	0
1	1
1+	4
Total Crash Score | Ratio of 100 Million VMT to Statewide Average	
0.01 – 0.49	1
0.50 – 0.99	2
1.00 – 1.99	3
2.00 – 2.49	4
Total Possible Quantitative Points	14

3.13 – Project Assessment Recommendations

The total points that a facility can receive for both the qualitative and quantitative criteria is 50. The total points for new roadway improvement project, such as NF-1, is less than the total points for existing roadway improvement projects because the quantitative data for LOS Assessment, Fatal Crash, and Total Crash scores does not exist for these corridors and therefore cannot be evaluated. In order to assess new projects against existing projects, projects were assessed based on qualitative criteria only. The scoring for corridors is displayed on Figure 3.15.

Figure 3.16 - Transportation Corridor Improvement Prioritization Projects

	Recommended Projects			Qualitative Criteria										Quantitative Criteria				
Map ID	Street	From Limit	To Limit	Continuation of Existing Widening Projects	Municipality Development	Connectivity	Construction Design in Progress	Parallel Relief	Protection of Downtown	Preservation of Community Character	Environmental Impact	Transportation Land Use Linkage	Qualitative Criteria Sub-Total	LOS Assessment Score	Fatal Crash Score	Total Crash Score	Quantitative Criteria Sub-Total	Total Score
				0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0-36	1-6	0,4	1-4	0-14	
FI-1	SH 35	FM 518	S OF SH 6	0	4	4	0	4	0	4	4	4	24	4	4	3	11	35
NF-2	FM 528	SH 35 BUSINESS	SH 6	0	4	4	0	4	4	4	0	4	24	n/a	n/a	n/a	0	N/A
FI-2	SH 6	SH 288	GALVESTON C/L	0	4	4	0	4	0	4	4	4	24	3	4	2	9	33
FI-3	FM 518	SH 288	FM 865	4	4	4	0	4	0	4	4	4	28	6	0	4	10	38
FI-4	SH 35	SH 6	BS 35C SOUTH	0	4	4	0	4	4	4	4	4	28	1	0	1	2	30
FI-5	FM 1128	CR 98	CR 100	0	4	4	0	4	0	4	4	4	24	4	0	2	6	30

	Recommended Projects			Qualitative Criteria										Quantitative Criteria				
Map ID	Street	From Limit	To Limit	Continuation of Existing Widening Projects	Municipality Development	Connectivity	Construction Design in Progress	Parallel Relief	Protection of Downtown	Preservation of Community Character	Environmental Impact	Transportation Land Use Linkage	Qualitative Criteria Sub-Total	LOS Assessment Score	Fatal Crash Score	Total Crash Score	Quantitative Criteria Sub-Total	Total Score
				0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0-36	1-6	0,4	1-4	0-14	
FI-6	FM 518	FM 865	SH 35	0	4	4	0	4	0	4	4	4	24	2	0	3	5	29
FI-7	FM 11 28	BROADWAY	BAILEY RD	0	4	4	0	4	0	4	4	4	24	1	0	3	4	28
FI-8	SH 35	FM 2403	FM 523	0	0	4	0	4	0	4	4	4	20	1	4	2	7	27
FI-9	FM 1462	SH 288	SH 99	0	0	4	0	4	0	0	0	0	8	1	4	2	7	15
FI-10	FM 1462	FORT BEND C/L	SUPERSPEEDWAY	0	0	0	0	4	0	0	0	0	4	4	0	1	5	9
FI-11	FM 521	BRAZORIA/ FORT BEND C/L	FM 1462	0	0	0	0	4	0	0	0	0	4	1	0	2	3	7
FI-12	FM 517	LP 409	SH 35	0	4	4	0	4	0	4	0	0	16	1	0	0	n/a	n/a

Appendix 4. FUTURE RECOMMENDATIONS

The focus areas within Brazoria County could benefit from two types of Overlay Districts: a Pedestrian Overlay District and a Transit Supportive Overlay District. The recommendations provided should be further refined by each municipality in accordance to their communities' vision, goals and proposed transit opportunities.

4.1 - Overlay Districts

Overlay Districts are designed to grant additional use or development regulations upon underlying zoning districts. Overlays can be applied to general and conditional zoning districts and its boundaries are often not required to coincide with the boundaries of the underlying zone.

Pedestrian Overlay

A Pedestrian Overlay District is designed to establish a walkable urban framework. In general, the Pedestrian Overlay should:

- Promote a mix of uses in a pedestrian-oriented setting of moderate intensity.
- Support economic development in designated future transit areas.
- Encourage high-quality design.
- Encourage the reuse of existing structures and allow new development that complements adjacent neighborhoods.

Below is a list of example of specific policies that could be included in a Pedestrian Overlay District. These example policies are followed by specific recommendations that could be considered for each focus area.

Pedestrian Overlay

- All uses, other than single-family detached units, must provide buffering along all edges abutting residential districts
- Encourage base building height of 40 feet; max height to be determined from building to boundary of nearest single-family residential district.
- Right-of-way line should be minimum front set back.
  - Minimum Side Yard- 5 feet
  - Minimum Rear Yard- 20 feet
- Parking requirements may be met on-site or off-site at a distance up to 800 feet from permitted use. 25% parking reduction allowed if property is located within 400 feet of parking facility available to public.
- No surface parking within street right-of-way.
- All new development on lots one acre or more must provide urban open space:
  - Private open space is accessible to residents or tenants; includes balconies and courtyards.
  - Public open space should be visible from the street or public areas, located on ground floor and located behind the sidewalk.
  - Develop urban design standards that reflect community character.

Figure 4.1 – Pedestrian Overlay District Recommendations

City of Manvel	City of Alvin	Old Townsite Downtown Pearland	Pearland (Spectrum)
Community Character			
Rural residential community	Traditional small town	Suburban single family community, with historic urban core	Future high-density Greenfield development
Recommendations			
• Develop urban design standards that: o Encourages active first floor retail o Limits blank walls o Relocates drive-through service at rear of buildings o Screens loading spaces • Identify and enhance pedestrian circulation routes and amenities. • Encourage new buildings to be built to the street with surface parking in rear of property. • Encourage shared parking and minimize curb cuts along SH6.	Suggested Pedestrian Overlay recommendations should be applied to areas along E. South Street and Gordon Street where pedestrian activity is encouraged. Focus should be on the built form and a walkable street framework.	Suggested Pedestrian Overlay recommendations should be applied to areas along Broadway, Orange Street, and North Main Street. Focus should be on the built form and a walkable street framework.	Not Applicable

Transit Supportive Overlay

A Transit Supportive District sets forth land use and zoning standards designed to accommodate existing uses while transitioning to a more compact, higher intensity, transit supportive mix of uses—but at a lesser intensity than traditional transit oriented developments. Areas where a Transit Supportive Overlay Districts are applicable include the three (3) identified Activity Centers.

Transit Supportive Overlay Districts are designed to:

- Create transit support and pedestrian oriented development regulations and uses.
- Encourage properties to transition to a more transit support development and uses up to one-half (1/2) mile walking distance from future transit node.

A Transit Supportive Overlay District should consider the following policies and land use strategies:

- Minimum residential density of twelve (12) dwelling units per acre within ½ mile walk.
- Minimum FAR shall not be less than .50 within ½ mile walk.
- Minimum setback (from existing curb) should be twenty-four (24) feet on major thoroughfares and sixteen (16) feet on all other streets.
- No minimum side or rear yard required except if it abuts existing single family.
- Minimum height shall be forty (40) feet.
- Parking standards should include:
  - Residential maximum= 1.6 spaces/unit.
  - Office maximum= 1 space per 300 sf.
  - Restaurant maximum=1 space per 75sf.

- Parking maximums can be exceeded if parking is structured, shared or within 800 feet of public parking facility.
- Buffer standards apply between residential and non-residential uses.
- Internal/external pedestrian circulation
- Provision for open space

Develop urban design standards.

Figure 4.2 – Transit Supportive Overlay District Recommendations

City of Manvel	City of Alvin	Old Townsite Downtown Pearland	Pearland (Spectrum)
Community Character			
Rural residential community	Traditional small town	Suburban single family community, with historic urban core	Future high-density Greenfield development
Recommendations			
Not Applicable	Suggested Transit Supportive recommendations should be applied as a precursor to areas that will receive transportation investment. This can include local bus corridors and high-capacity transit initiatives like commuter rail. It is recommended that the ½ mile station area around the proposed commuter rail line be defined. The Transit Supportive overlay should be focused on encouraging properties to transition to a transit supportive development while supporting and enhancing existing uses.	Suggested Transit Supportive recommendations should be applied as a precursor to areas that will receive transportation investment. This can include local bus corridors and high-capacity transit initiatives like commuter rail. It is recommended that the ½ mile station area around the proposed commuter rail line be defined. The Transit Supportive overlay should be focused on encouraging properties to transition to a transit supportive development while supporting and enhancing existing uses. Areas that are recommended to receive this overlay include: • Historic Downtwon • Intersection of Pearland Parkway and Broadway. • Intersection of Broadway Street and Walnut Street.	Not Applicable

Transit Oriented Development recommendations are designed to create compact, high-intensity mixed-use developments that support the potential for enhanced transit and pedestrian activity within a one-half (1/2) mile walking distance from the potential future transit station location. The alternative transportation and land use scenarios discussed in Section 4.0 – Scenario Development +

Testing of the report, were designed to include transit oriented development in the three identified Activity Centers. Zoning districts that are typically included in transit oriented development areas include:

- **Residentially Oriented (TOD-R) -** designed to support high-density residential communities with limited non-residential uses in a pedestrian friendly area.
    - Minimum density of twenty (20) units per acre within ¼ mile distance from station.
    - Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station.
    - Retail, institutional, civic, and office uses are permitted at a ratio of 1 dwelling unit to 2,000 square feet of development
- **Employment Oriented (TOD-E) -** designed to accommodate high-intensity office uses or residential uses in a pedestrian friendly area.
    - **(**Employment/Office Oriented)
    - Minimum .75 FAR within ¼ mile from station and .5 FAR between ¼ mile and ½ mile of station.
    - Office should comprise a minimum of 60% of uses, of which only 20% of retail, institution or civic uses should be used to meet minimum FAR standards.
    - Up to 20% of total development gross square footage should be residential uses.
- **Mixed-Use Oriented (TOD-M) –** established to support a mix of high destiny residential, employment, civic uses along with limited retail uses in a pedestrian supportive environment.
    - Minimum .75 FAR within ¼ mile from station and .5 FAR between ¼ mile and ½ mile of station.
    - Up to 20% of total gross square footage that is composed of retail uses may be credited toward meeting minimum FAR standards.
    - Residential uses shall meet the below standards.
    - Minimum density of twenty (20) units per acre within ¼ mile distance from station.
    - Minimum density of fifteen (15) units per acre between ¼ mile and ½ mile from station

The following policies should be considered in a Transit Oriented Development area:

- Creation of urban design standards
- Development standards should include:
    - Setbacks (from existing curbs) should be determined by station area plan and not to exceed sixteen (16) feet.
    - Minimum floor area ration shall not be less than .75 FAR within ¼ mile, .50 FAR within ½ mile.
    - Parking maximums should be established and no surface parking shall be established within right-of-way.
    - Internal and external pedestrian connections
    - Open space requirements
- Buffer requirements between non-residential and residential uses.
- Develop urban design standards.

Figure 4.3 outlines Transit Oriented Development recommendations for each sub-region area.

Figure 4.3 – Transit Oriented Development Recommendations

City of Manvel	City of Alvin	Old Townsite Downtown Pearland	Pearland (Spectrum)
Community Character			
Rural residential community	Traditional small town	Suburban single family community, with historic urban core	Future high-density Greenfield development
Recommendations			
Not Applicable	The City of Alvin should identify principles in TOD-R to refine and further develop based on the community's vision and goals. The intent of TOD-R should be to implement a walkable framework to increase overall residential density within the ½ mile commuter rail station area.	Not Applicable	• Develop urban design standards that address the overall district as well as subareas. • Further refine zoning regulations to set FAR minimums. • Encourage structured parking, shared parking and/or reducing parking requirement within 800' of transit or public parking.

HOUSTON-GALVESTON AREA COUNCIL

NORTHERN BRAZORIA COUNTY | PEARLAND

SUBREGIONAL PLANNING INITIATIVE




APPENDIX

AECOM