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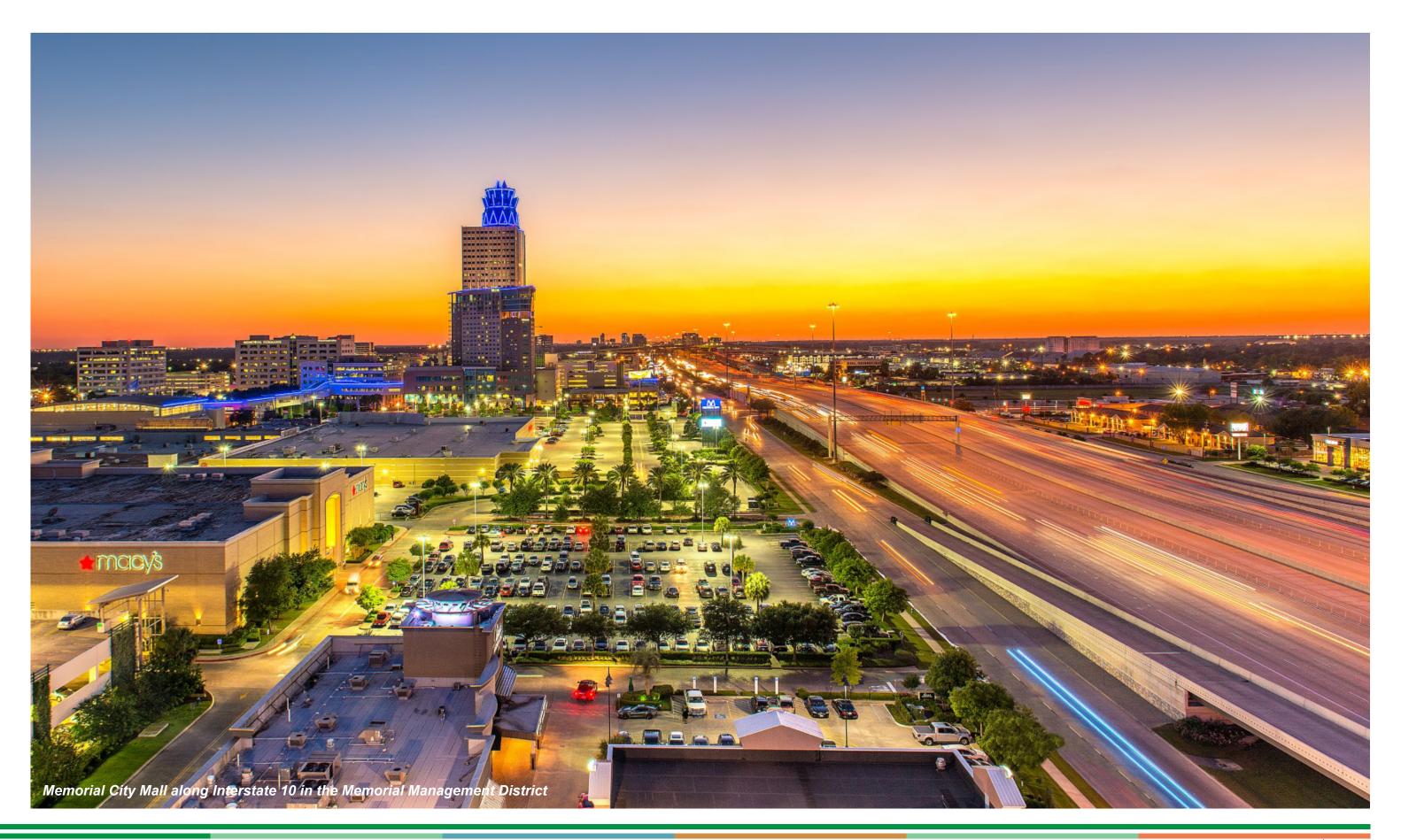
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—Stephan Gage







# INTRODUCTION



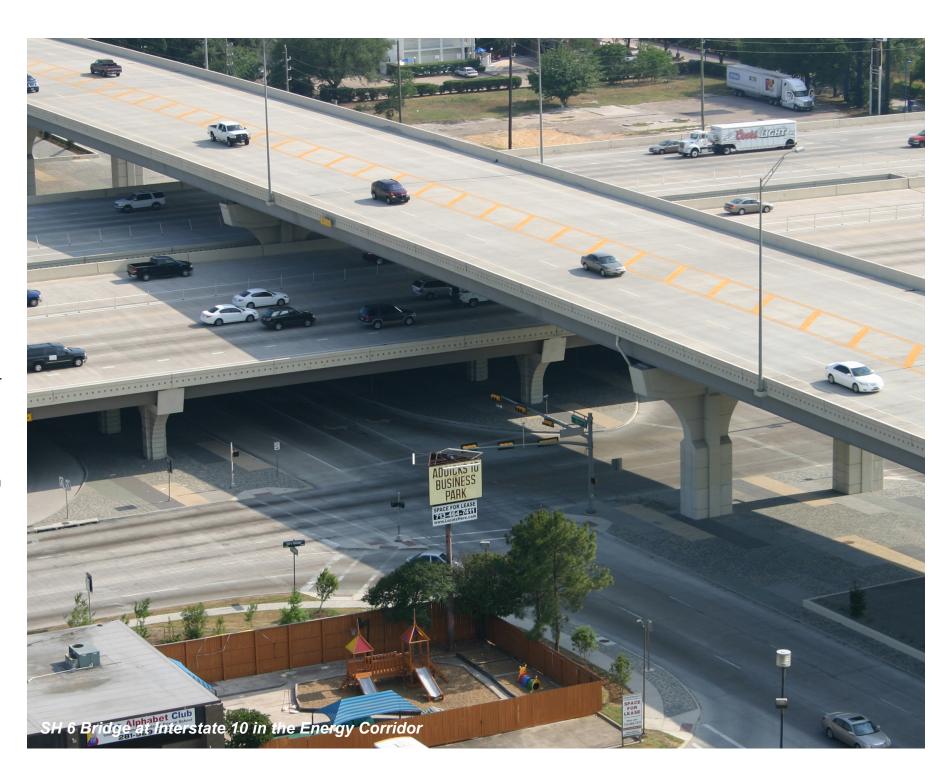
### **PURPOSE AND BACKGROUND**

The Houston-Galveston Area Council (H-GAC) is the Metropolitan Planning Organization (MPO) for the Houston-Galveston 8-County Transportation Management Area (TMA), hereafter referred to as the "Region". The Region includes Chambers, Brazoria, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties.

Over the past decade, the H-GAC region has grown by 1.2 million residents to equal a population near 6 million. It is anticipated that population growth will continue and an additional three million people will reside in the Region within the next 25 years. This growth has and will impact day-to-day activities including general mobility, access to jobs and homes, availability of amenities, impacts on the environment, and overall quality of life.

To address mobility issues arising from growth within the Region, H–GAC initiated the Subregional Planning Initiative (SPI) in 2008. The goal of the SPI is to facilitate the planning process in sub-regional areas of the TMA in order to create viable projects for the Transportation Improvement Plan (TIP) that reflect the goals of the Regional Transportation Plan (RTP). SPI is the integration of transportation and land use planning in recognition of the need for a more holistic, strategic approach to planning. SPI demonstrates how a balanced approach including added capacity, operations and demand management will be more cost-effective in achieving our goals than the current emphasis on added capacity projects.

The Greater West Houston Subregional Planning Initiative, also known as the West Houston Mobility Plan, is the seventh sub-regional planning initiative commissioned by H-GAC since 2008. The plan is intended to facilitate for the orderly provision of infrastructure to accommodate future population and employment growth in West Houston. The plan will include the conceptualization of optimal land use, identification of needed transportation improvements, and the development of multimodal transportation strategies.



# 1.2 GOALS AND OBJECTIVES

The vision, goals, and objectives of the study reflect the dynamic nature and progressive spirit of West Houston. Big ideas are what will be required to manage the ever increasing population and job growth projected in the Study Area. These goals guide the development of the study recommendations.

### PROJECT GOALS

- · Develop growth projections and alternative urban design and development scenarios
- Achieve a consensus on the vision and growth scenario(s) of the Greater West Houston Region
- Improve mobility for all modes of transportation, while balancing the quality of life for existing and future residents within the Study Area
- Recommended best practices for transportation infrastructure and urban design to maximize multimodal access to development DW/IDI
- Protect environmentally sensitive areas and green spaces
- Develop a sustainable transportation plan to help guide transportation investments within this area
- Develop feasible and practical recommendations that can be easily integrated into other local and regional plans

### PROJECT OBJECTIVES

- Define, characterize and quantify the region's existing and projected demographics, development patterns, transportation facilities, services and usage
- Integrate protection of environmentally sensitive areas and green spaces, existing land uses and future development scenarios into the transportation planning process
- Identify and assess by magnitude and mode share, the major travel markets that play a key role in impacting travel patterns
- Evaluate the ability of the existing transportation system to efficiently and effectively serve current and projected travel needs
- Examine the benefits and impacts of the proposed improvements identified by this study in the context of the regional transportation system
- Evaluate, refine and prioritize the proposed transportation improvements and modal alternatives
- Refine and integrate the multimodal street classification as proposed in the City of Houston Mobility Planning initiative for all streets

### DESIRED PROJECT OUTCOMES

- Achieve a consensus on goals and objectives through the stakeholder, Steering Committee and public meetings
- Develop and identify a preferred sub-regional development scenario to guide transportation investment
- Provide transportation and land use scenario visualizations that help stakeholders and the public make informed decisions
- Incorporate best practices to optimize transportation investments
- Identify concepts to help increase transit ridership
- Implement identified strategies
- Create a list of recommendations for integration into local and regional plans
- Provide a prioritized list of short-range, mid-range and long-range improvements with costs
- Establish a plan to promote quality communities to help attract new residents and businesses to the region and promote economic success
- · Develop a multimodal street classification methodology and recommended classification report for all streets



### 1.3 VISION

Change is an essential component of strategic planning. Articulating the purpose and value of change is important for garnering support and allaying concerns. Recommendations of this study represent major change in many ways for the residents and businesses of West Houston. And so, below is articulated their purpose and value.

The Greater West Houston Sub-regional Planning Initiative Study will enhance the quality of life in West Houston by advancing recommendations that encourage the development and expansion of a range of viable transportation modes for work and leisure travel, as well as sustainable land development that complements the area's transportation infrastructure.

Correspondingly, the vision statements of the study's Funding Partners echo this sentiment.



#### THE ENERGY CORRIDOR **MANAGEMENT DISTRICT**

Our vision is to be internationally recognized as a high-quality place in which to work live and invest. Our mission is to enhance our community's quality of life and sense of place by implementing mobility, public safety, and streetscape and business development initiatives.



#### WESTCHASE MANAGEMENT DISTRICT

Our vision is to make Westchase District an ideal place to grow businesses and raise families.



### **MEMORIAL** MANAGEMENT DISTRICT

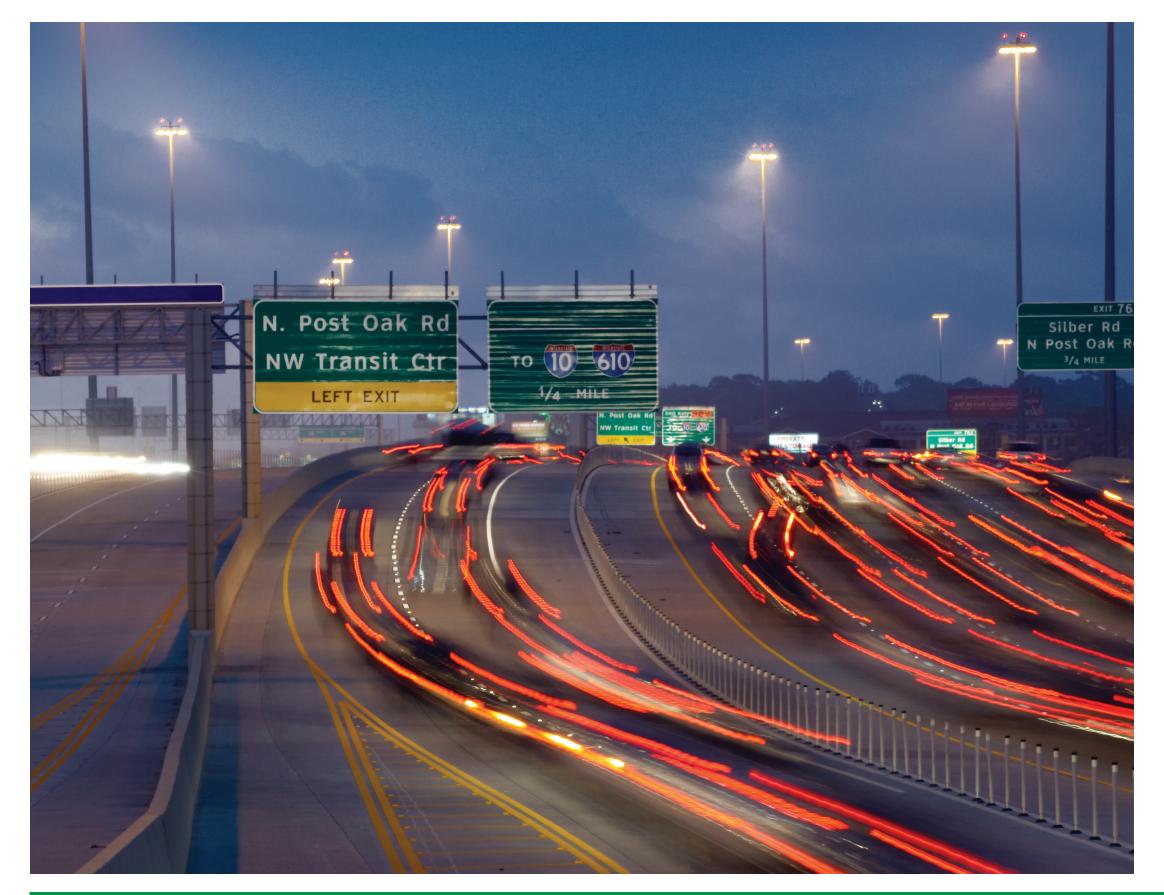
The Memorial Management District and progressive developers are looking beyond today and have a plan to keep the area thriving for the years ahead.



#### **CITY OF HOUSTON**

Houston, the 4th largest city in the United States, is a dynamic, growing city, rich in culture and diversity. The Planning and Development Department's mission is to work to ensure that it remains a vibrant and sustainable city by partnering with decision makers and the community to balance a spectrum of needs and interests while addressing the dynamics of growth and change.

### INTRODUCTION

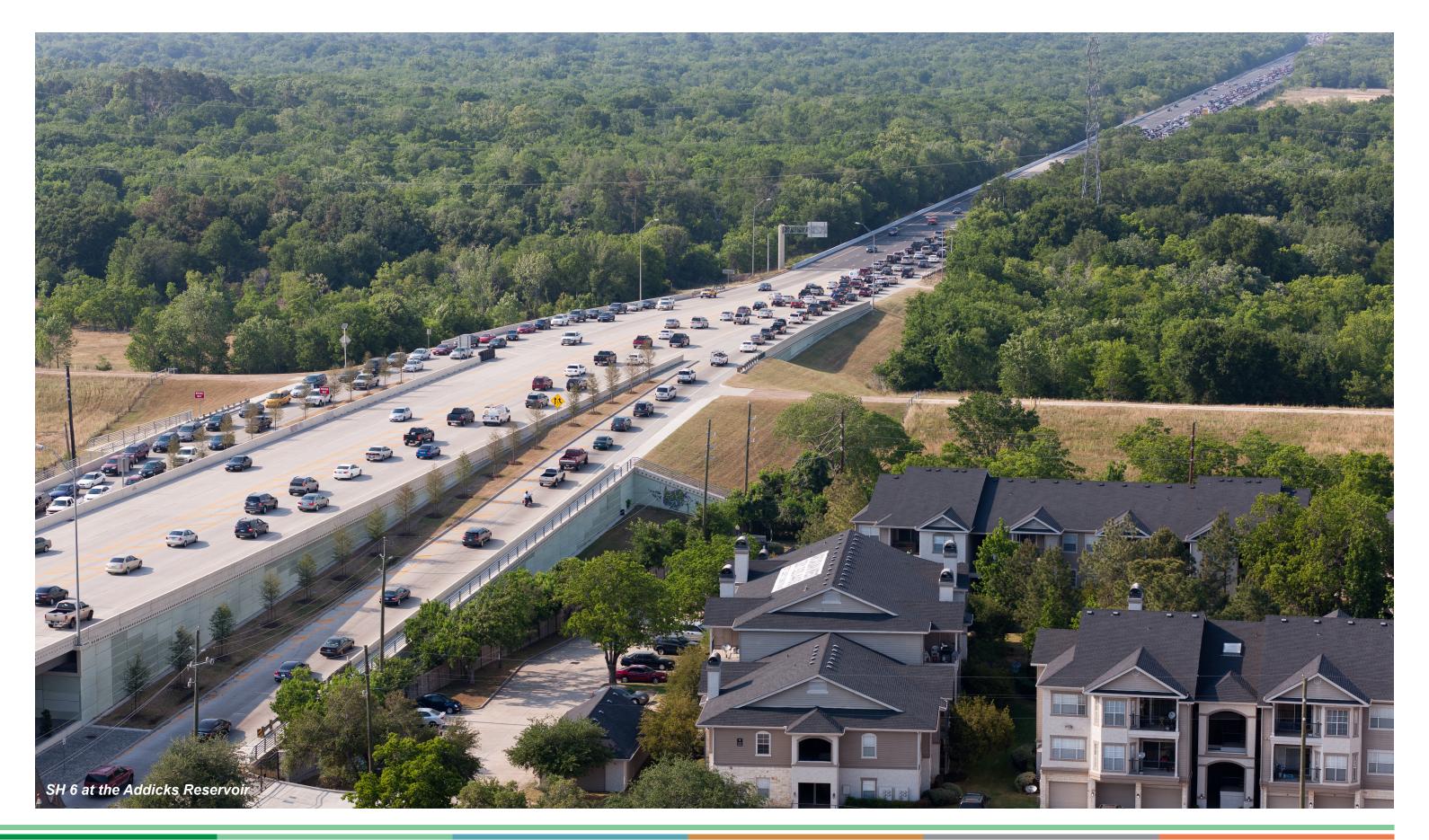


"VISION WITHOUT ACTION
IS MERELY A DREAM.
ACTION WITHOUT VISION
JUST PASSES THE TIME.
VISION WITH ACTION CAN
CHANGE THE WORLD."

- JOEL A. BARKER











# STUDY AREA CHARACTER

The boundaries of the West Houston Study Area include portions of unincorporated Harris and Fort Bend counties, the City of Houston and some of the cities within the enclave known as The Villages. The Study Area is traversed by several major creeks and bayous, including Brays and Buffalo bayous, Bear Creek, South Mayde Creek, Mason Creek, and Langham Creek. The Addicks and Barker Reservoirs are prominent physical and environmental features in the Study Area (Figure 2.2).

The Study Area has three distinct sub-areas with different physical characteristics: the undeveloped Addicks and Barker Reservoirs, the more developed "inner" sub-area to the east and southeast, and the less developed, mostly residential "outer" sub-area to the north and west. The inner and outer regions are roughly separated by SH 6 (Figure 2.1). The reservoirs were constructed in the 1940's to help control flooding in the Houston area. They are traversed by few roads and trails, and have only a few outdoor-oriented land uses such as playing fields, golf courses, dog parks, and shooting ranges. The inner sub-area contains The Energy Corridor District, the Westchase District, Memorial Management District, and the office and light industrial areas close to US 290 and Beltway 8. It has a mix of single-family residential, multifamily, commercial/retail strips, large shopping

centers, a regional shopping mall, major employment centers that including mid- and high-rise office, and several partly or fully developed trail networks.

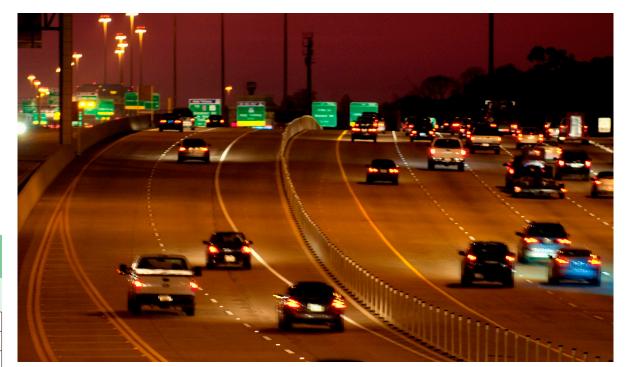
The outer sub-area contains mostly singlefamily subdivisions, primary and secondary schools, and some local parks. Commercial development is mostly retail strips with a few larger centers and a regional shopping mall. Its few denser commercial, light industrial, health care and office uses are found along or near SH 6 and IH 10. Much of the outer sub-area is outside Houston's city limits but within its Extra-Territorial Jurisdiction.

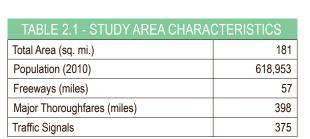
The Study Area is one of the most densely populated, economically dynamic, culturally diverse and ecologically sensitive locations in the Houston-Galveston area. Table 2.1 summarizes some of West Houston's major demographic and transportation infrastructure characteristics.

With 12 percent of the region's population and 14 percent of its jobs, the Study Area is a major socio-economic engine. The size and population of the Study Area place it on par with other major US cities (Table 2.2). As shown in Figures 2.3 and 2.4, the Study Area's population and job growth rates are comparable to those for the City of Houston and the Region.

### TABLE 2.2 - STUDY AREA IN COMPARISON TO MAJOR U.S. CITIES

City/Area	State	Land area (sq mi)	Population (2010)	
West Houston	Texas	180.9	618,953	
Denver	Colorado	153.0	600,158	
Las Vegas	Nevada	135.8	583,756	
Portland	Oregon	133.4	583,776	
Atlanta	Georgia	133.2	420,003	
Milwaukee	Wisconsin	96.1	594,833	
Seattle	Washington 83.9		608,660	
Baltimore	Maryland	80.8	620,961	





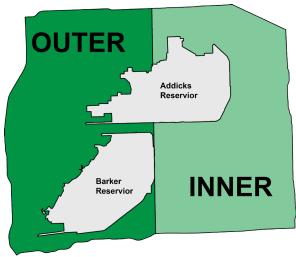
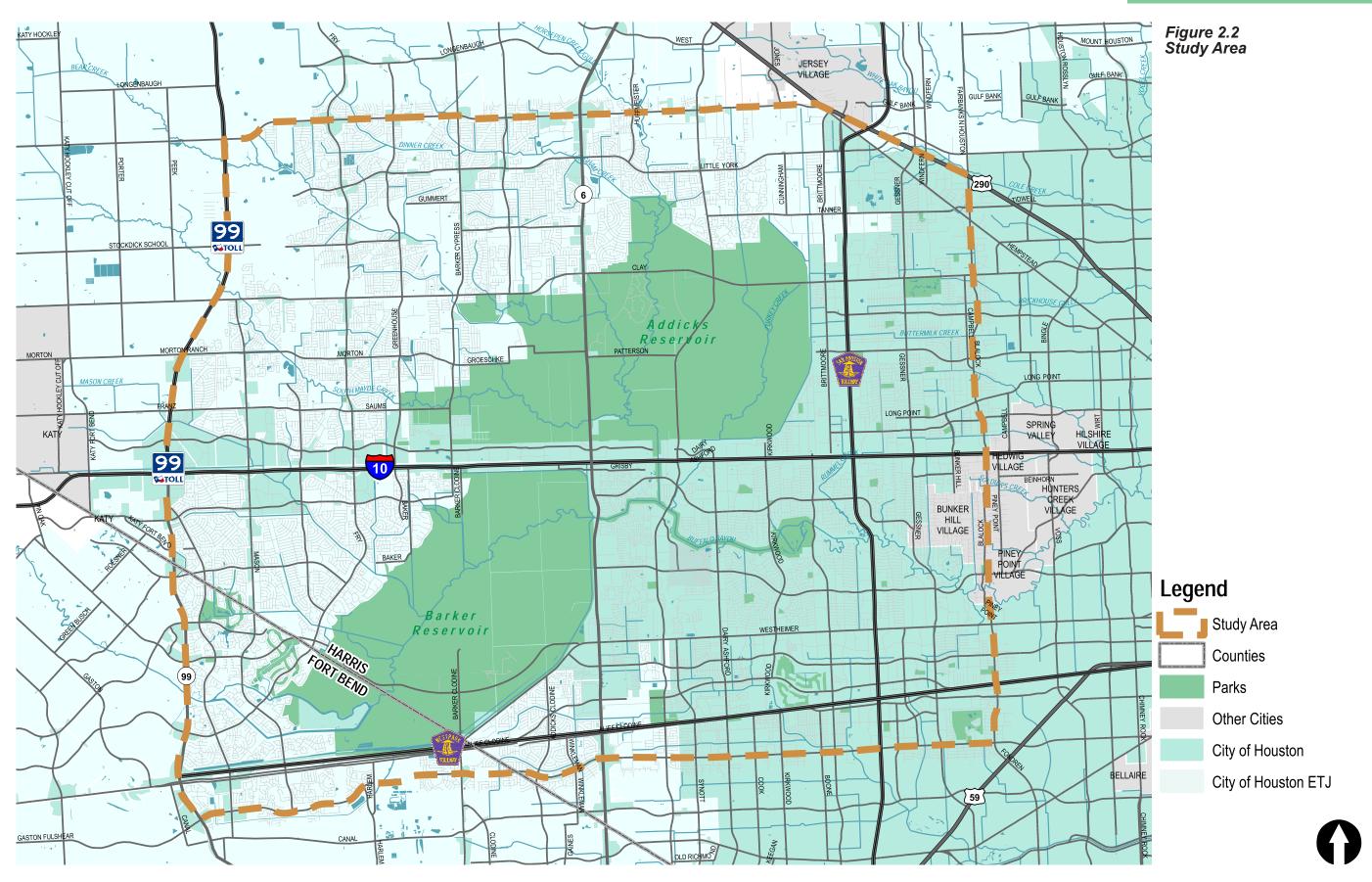


Figure 2.1 Study Sub-areas







Although the Study Area has only six percent of the businesses that collect sales tax in Harris and Fort Bend counties (Figure 2.5), it generated 28 percent of the gross sales in Fort Bend and Harris counties in 2013. Figure 2.6 compares the gross sales of the Study Area with these of the City of Houston, and Harris and Fort Bend counties from 2004 through 2013.

Figure 2.7 illustrates the current right-ofway (R.O.W.) and easements that exist within the Study Area. There are 103,465 acres of R.O.W. parcels and 341 miles of easements in the Study Area. These parcels and easements, as well as and bayous and creeks within the Study Area, represent opportunities to enhance the bicycle and pedestrian infrastructure in West Houston.

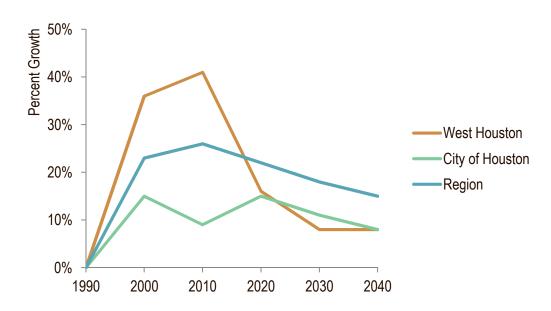


Figure 2.3 Population Growth Percentage

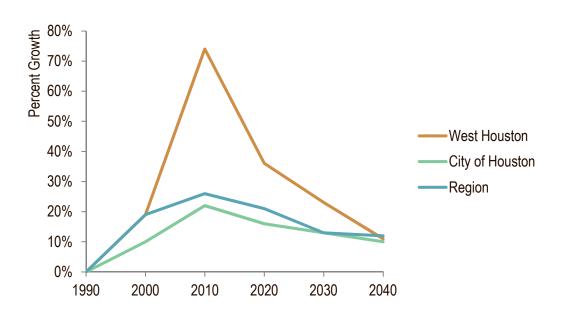


Figure 2.4 Job Growth Percentage

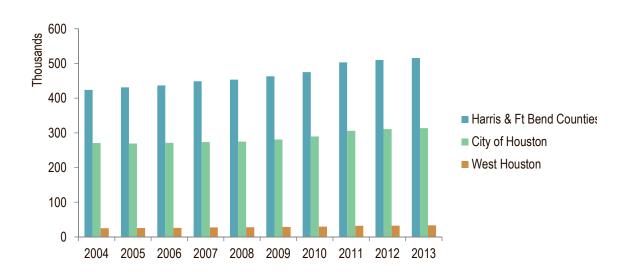


Figure 2.5 Sales Tax Generating Businesses

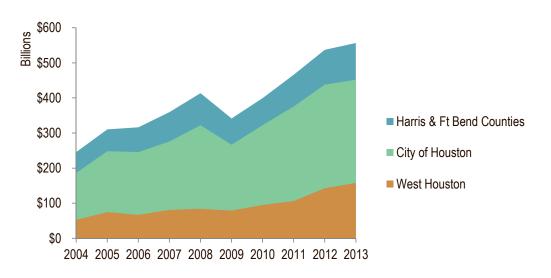
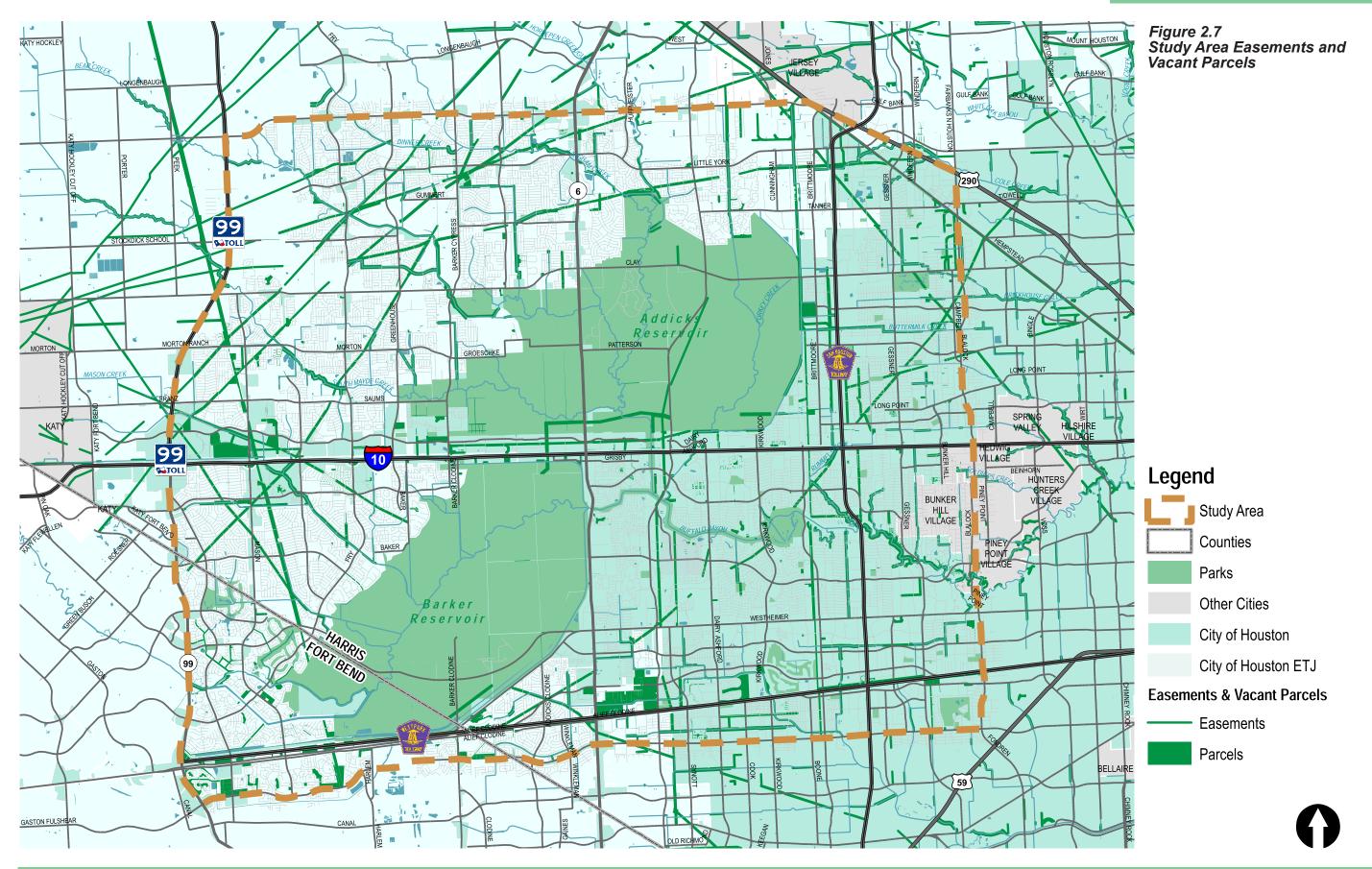


Figure 2.6 Gross Sales Tax Comparison







# **DEMOGRAPHICS**

West Houston has grown tremendously over the past 65 years. Table 2.3 compares the population growth of West Houston to that of the City of Houston and Harris County since 1950.

The Study Area population was 683,518 persons (2010), which represent 12 percent of the Region's population. A 35 percent increase in population to 924,101 persons is projected by 2040 (Table 2.4). The projected growth rate is slightly lower than, but still comparable to, the City of Houston's growth rate of 38 percent.

The Study Area population density is equivalent to the City of Houston and approximately five times that of the Region as a whole (Figure 2.10). Area population density is expected to increase by 35 percent by 2040, which is again comparable to the City of Houston's projected 38 percent.

The Study Area's ethnic diversity mirrors that of the Region as a whole with comparable percentages of major ethnic groups (Table 2.5). Likewise, housing occupancy in the Study Area is also comparable to the Region, but with a lower percentage of vacant housing units. This lower vacancy rate is indicative of the high demand for housing in the Study Area due to its strong

TABLE 2.3 - POPULATION GROWTH RATES						
Year	West Houston	Change (%)	City of Houston	Change (%)	Region	Change (%)
1950	4,665	NA	596,163	NA	1,070,387	NA
1960	22,537	383.11%	938,219	57.38%	1,583,097	47.90%
1970	79,240	251.60%	1,233,505	31.47%	2,183,285	37.91%
1980	258,704	226.48%	1,595,138	29.32%	3,121,808	42.99%
1990	356,200	37.69%	1,810,532	13.50%	3,733,121	19.58%
2000	485,035	36.17%	2,076,991	14.72%	4,671,571	25.14%
2010	683,518	40.92%	2,272,110	9.39%	5,894,009	26.17%

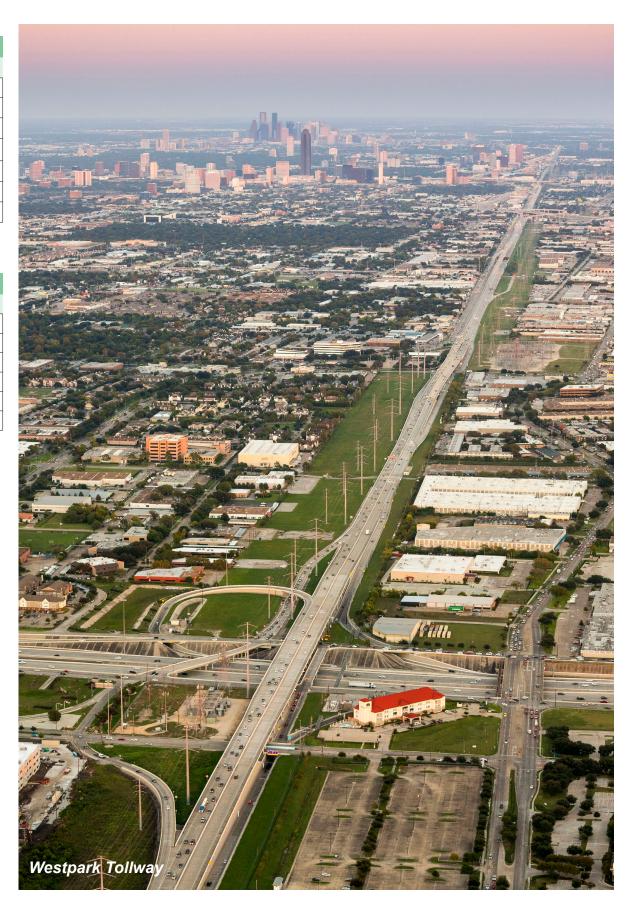
Source: US Census; H-GAC; Texas Almanac

TABLE 2.4 - POPULATION PROJECTIONS						
Year	West Houston	City of Houston	Region			
1990	356,200	1,810,532	3,731,132			
2000	485,035	2,076,991	4,595,906			
2010	618,953	2,057,617	5,887,189			
2020	790,458	2,611,001	7,086,624			
2030	852,009	2,889,872	8,339,519			
2040	924,101	3,135,395	9,557,443			

Source: H-GAC & US Census

TABLE 2.5 - P	OPULATION	, ETHNICITY	AND HOUSI	NG CHARAC	CTERISTICS	
Population	West Houston	Percent	City of Houston	Percent	8-County Region	Percent
Total Population	683,518		2,057,617		5,887,189	
Households	244,954		781,407		3,631,503	
Average Household Size	2.7		2.7		2.8	
Ethnicity						
White Not Hispanic	230,636	37%	537,272	26%	2,318,265	39%
Black Not Hispanic	91,560	15%	472,653	23%	993,091	17%
Asian Not Hispanic	66,482	11%	124,693	6%	384,324	7%
American Indian Not Hispanic	1,555	0.30%	4,081	0.20%	16,601	0.30%
Some Other Race Not Hispanic	1,635	0.30%	4,064	0.20%	725,539	12%
Two or More Races Not Hispanic	9,983	2%	67,088	3%	178,247	3%
Hispanic	217,102	35%	892,370	43%	2,089,095	35%
Housing						
Total Housing Units	247,773		874,058		2,279,035	
Housing Units Occupied	225,092	91%	767,251	88%	2,050,324	90%
Housing Units Vacant	22,681	9%	106,807	12%	228,711	10%

Source: H-GAC & US Census 2010



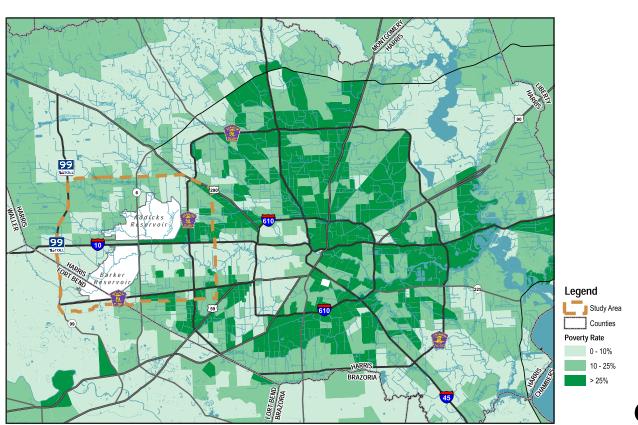
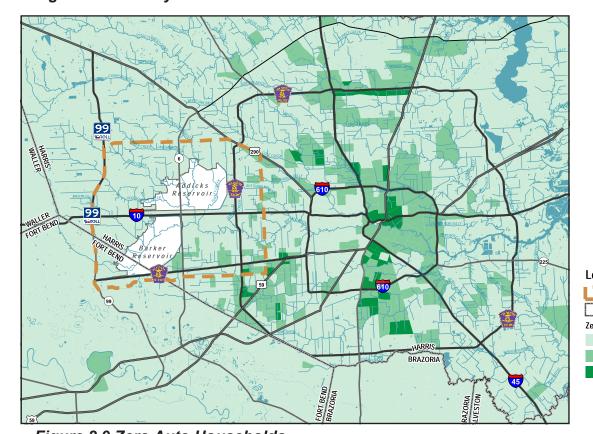


Figure 2.10 Population Density (people per sq. mile)







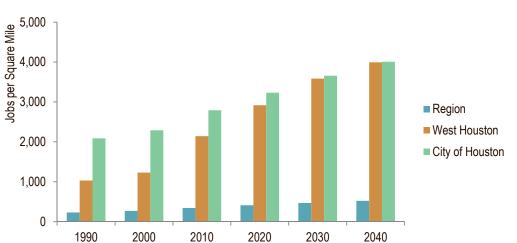


Figure 2.11 Employment Density (jobs per square mile)

Figure 2.9 Zero Auto Households



population growth. The poverty rate for the Study Area is less than the City of Houston, Harris County, and the Region (Table 2.6). Figure 2.8 shows that the Study Area contains a fewer areas with high poverty rates than the Region. The Study Area also has fewer households without access to automobiles (Figure 2.9).

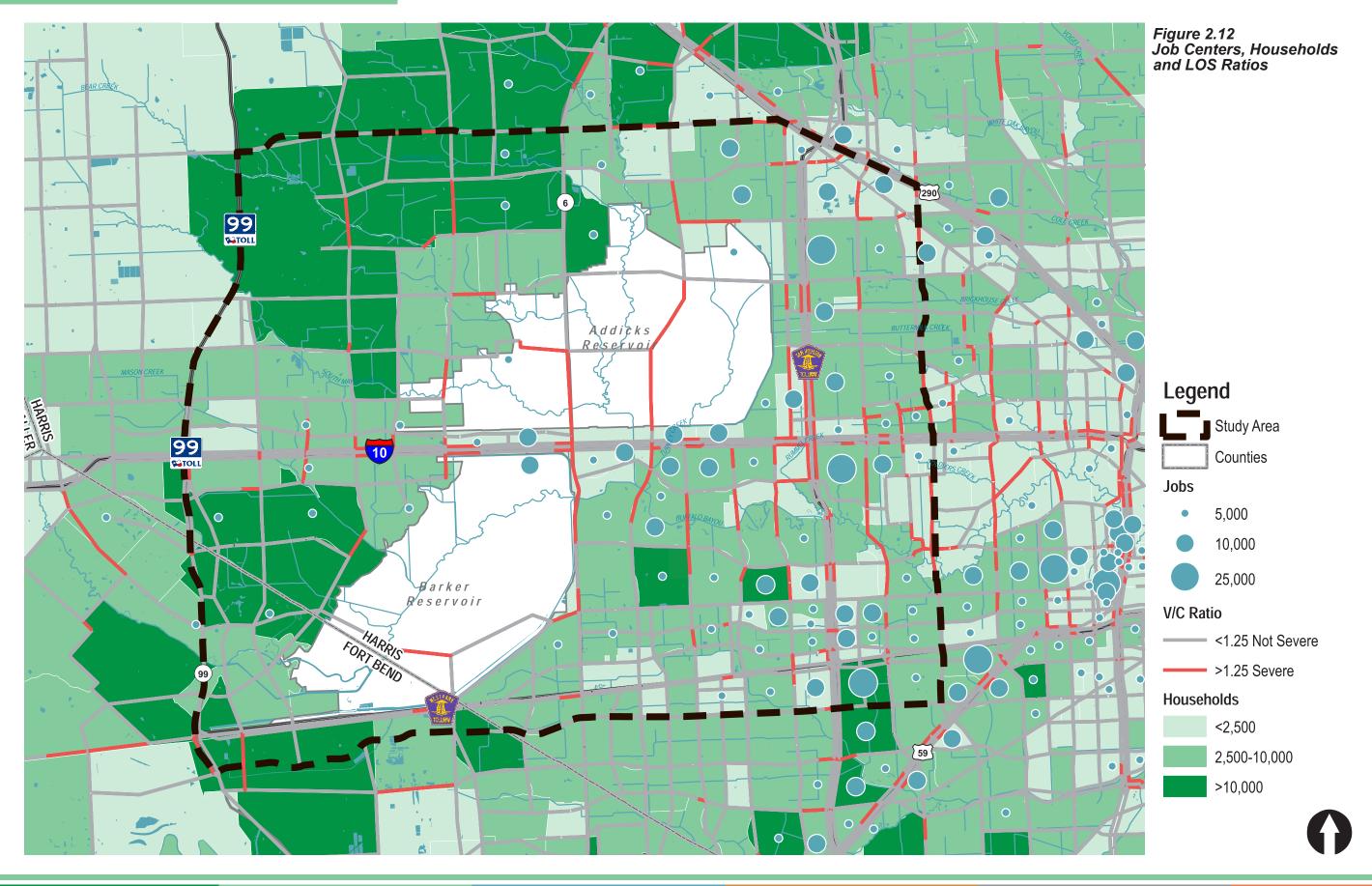
TABLE 2.6 - POVERTY RATES					
Location	Population	Percentage			
West Houston	81,516	13.40%			
City of Houston	456,791	22.20%			
Fort Bend County	48,097	8.30%			
Harris County	725,651	17.90%			
Region	952,553	15.90%			

Source: H-GAC & US Census

The Study Area includes three major employment centers: The Energy Corridor, the Westchase District and the Memorial District. There were 387,509 jobs throughout the Study Area in 2010, which was 14 percent of the Region's employment (See Table 2.7). Employment in the Study Area is projected to grow by 86 percent to 722,073 by 2040. West Houston's projected employment growth is expected to exceed the expected employment growth for both the City of Houston (44%) and the Region (53%) for the same period.

TABLE 2.7 - PROJECTED EMPLOYMENT					
Year	West Houston	City of Houston	Region		
1990	186,572	1,251,342	1,837,310		
2000	222,525	1,372,573	2,178,567		
2010	387,509	1,673,401	2,742,878		
2020	527,780	1,937,114	3,309,842		
2030	648,708	2,192,043	3,750,311		
2040	722,073	2,403,017	4,202,062		

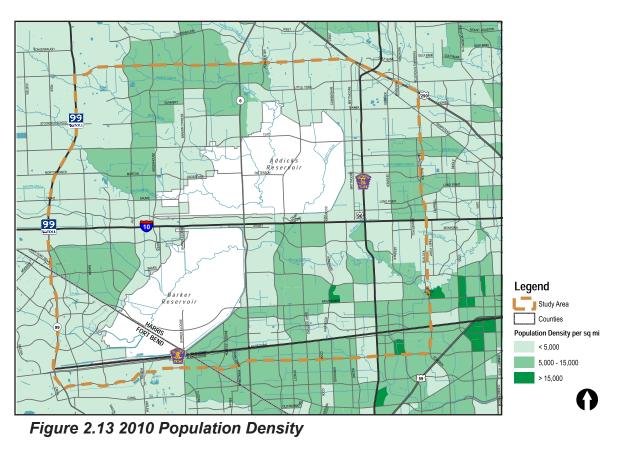
Source: H-GAC



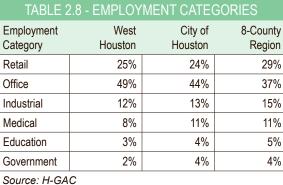
employment density in the Study Area has grown to rival employment density in the City of Houston, and is now over six times the employment density of the Region. This high concentration of jobs is an important consideration for future transportation

improvements within the Study Area. West Houston also has a higher concentration of office jobs than the City of Houston and the

As shown in Figure 2.11, projected



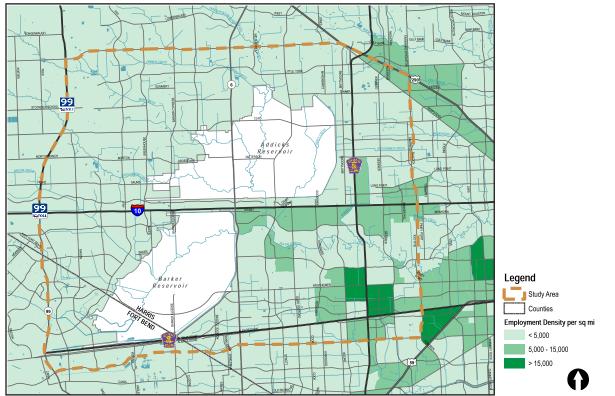
Grisby Square Social Gathering in Energy Corridor



Region (Table 2.8).

Figure 2.12 summarizes the relationship between household densities, job concentration, and current levels of mobility in West Houston. As shown in the figure, households in West Houston are heavily concentrated in the western and northwest portions of the Study Area. Jobs are primarily located in and around the major employment centers. Many of the major roadways leading to employment centers are experiencing severe congestion.

Figures 2.13 and 2.14 show 2010 Population and Employment densities, respectively, for the Houston Area as compared to the Study Area. Likewise, Figure 2.15 compares the ethnic diversity of the Houston Area to the Study Area.





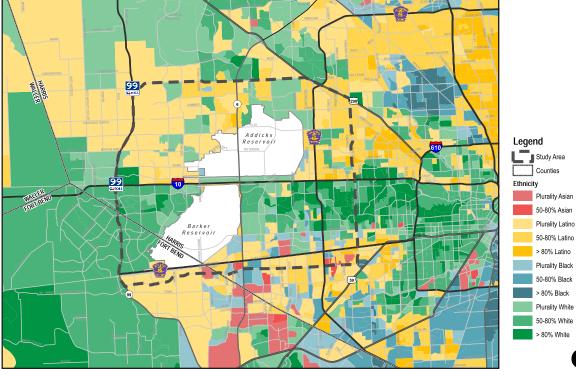


Figure 2.15 Study Area Ethnicity



# 2.3 LAND USE

The land use maps on the next pages (Figures 2.17 through 2.20) reveal patterns of land use that have developed in the Study Area, despite the absence of zoning regulations. An area locator for the land use maps is shown in the top right corner of each map.

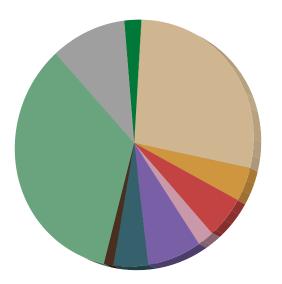
Retail, commercial and office uses are generally concentrated along major highway corridors, especially in the southern portions of the Study Area. Industrial land uses are concentrated in the northeast portion of the Study Area, where large tracts of land and rail facilities are available. The northwest portion of the Study Area, which has seen the most recent residential development, still has abundant undeveloped land and some agricultural uses.

The land use maps also make apparent the barrier that Addicks and Barker reservoirs pose to mobility and connectivity. The reservoirs totaling 26,000 acres comprise more than one quarter (26 percent) of the land in the Study Area (and 75 percent of all open space), and are situated at the junction of two of major roadways, I 10 and State Hwy 6. Only State Hwy 6, Eldridge Parkway and Clay Road traverse Addicks Reservoir, and Westheimer Parkway is the only road that crosses Barker Reservoir.

The breakdown of land used by type is shown in Figure 2.16, and listed in Table 2.9. Only 10 percent of the Study Area is undeveloped and just two percent is used for agricultural production. The small percentage of available land suggests that West Houston will develop in a denser pattern in the future. The Study Area is currently subject to rapid redevelopment due to growth and the age of existing properties.

TABLE 2.9 STUDY AREA LAND USE					
Land Use Category	Parcels	Acres			
Agriculture Production	36	2,285			
Commercial	2,564	5,371			
Industrial	2,219	7,208			
Multi-Family Residential	1,644	4,369			
Office	720	2,149			
Park & Open Spaces	3,837	34,366			
Public & Institutional	582	4,646			
Single-Family Residential	146,033	27,886			
Transportation & Utility	450	1,308			
Undeveloped	7,518	10,058			
TOTALS	165,603	99,645			
0 11045					

Source: HCAD



- Single-Family (28%)
- Multi-Family (4%)
- Commercial (5%)
- Office (2%)
- Industrial (7%)
- Public (5%)
- Utilities (1%)
- Park & Open Space (34%)
- Vacant (10%)
- Agriculture (2%)

Figure 2.16 Study Area Land Use **Percentages** 



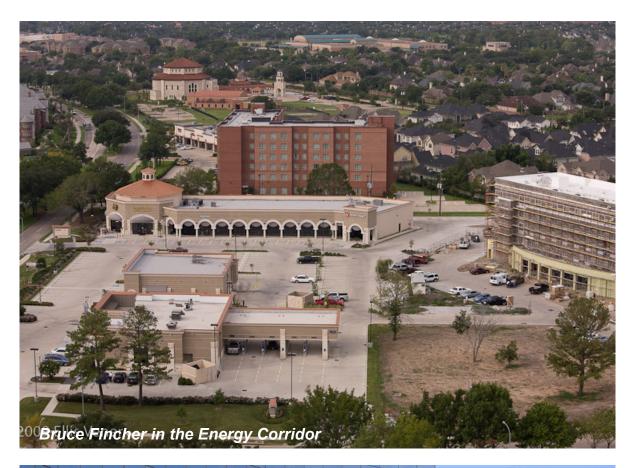
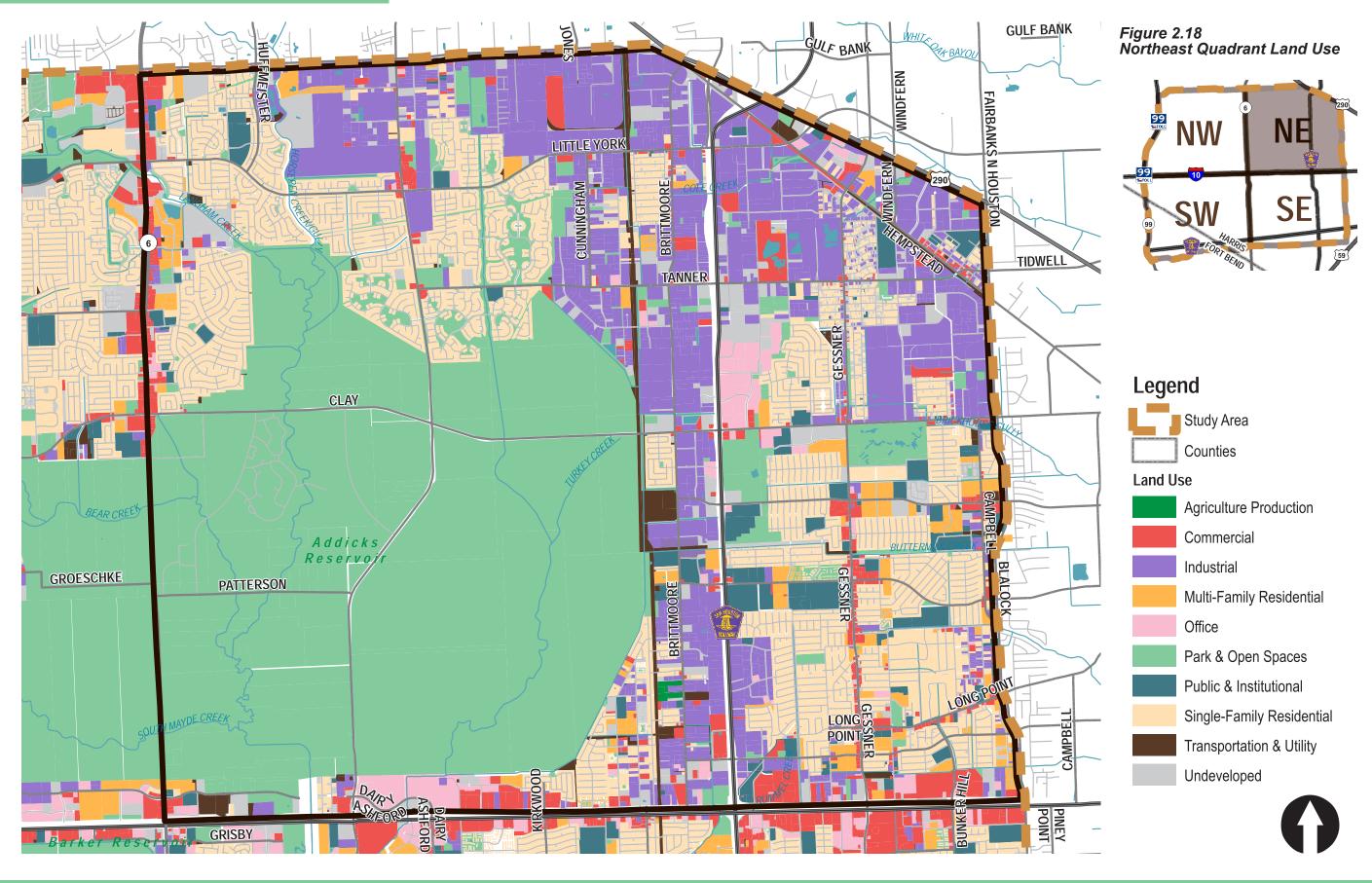
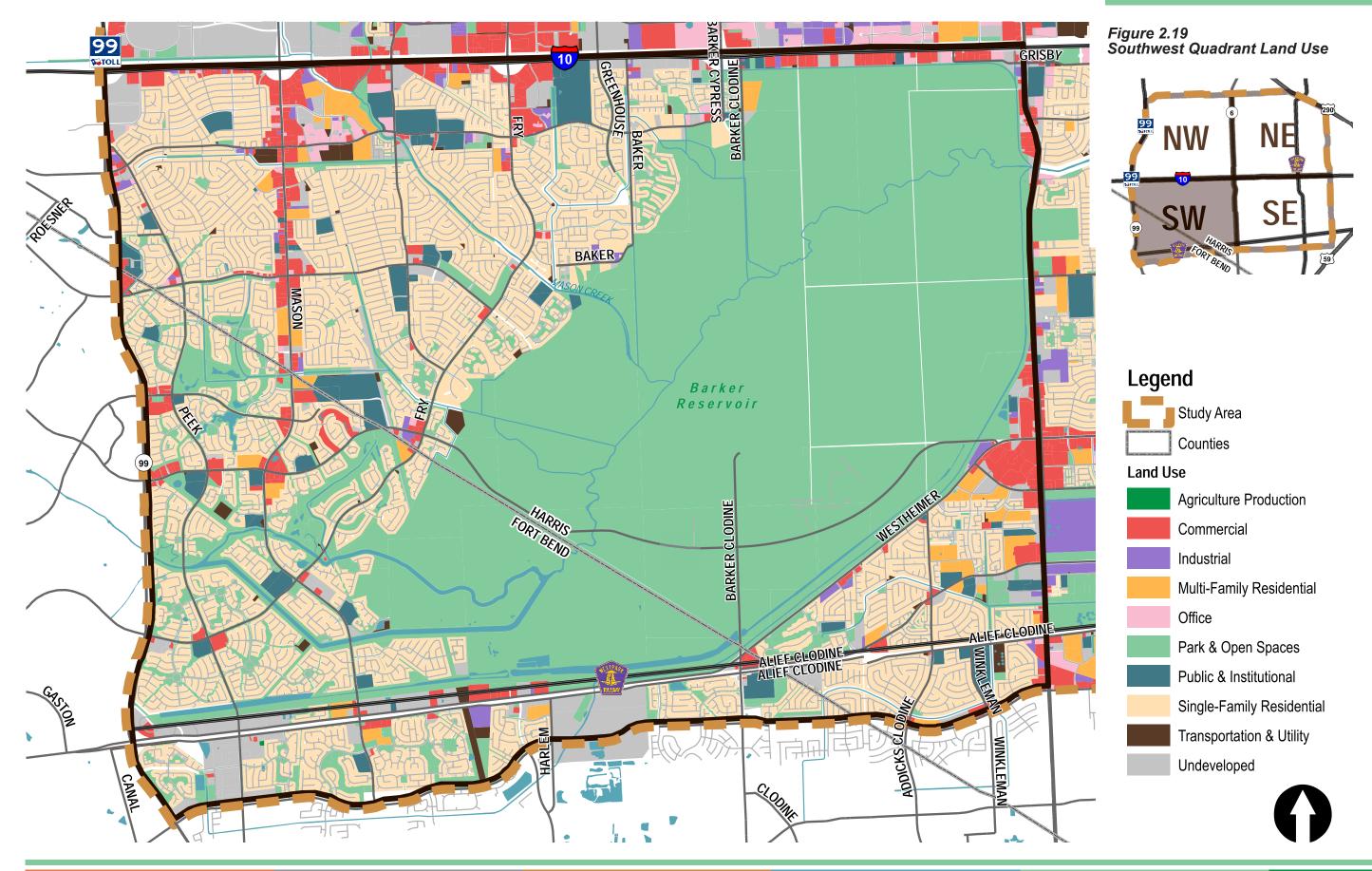




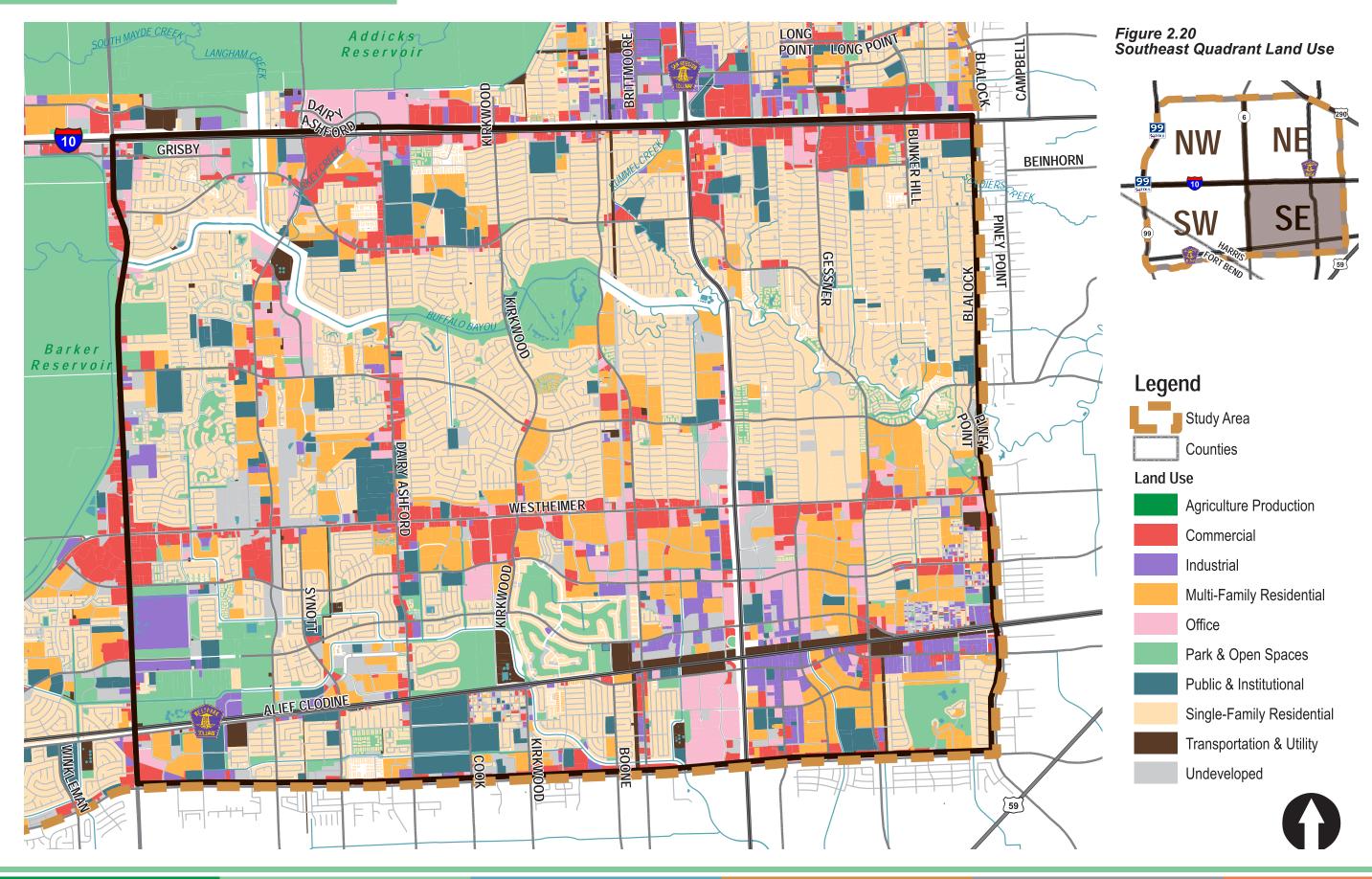
Figure 2.17 Northwest Quadrant Land Use NW LITTLE YORK PEE SW GUMMERT STOCKDICK SCHOOL Legend 99 1910LL Study Area CLAY Counties BARKER CYPRESS Land Use Agriculture Production Commercial MORTON RANCH Industrial PATTERSON MORTON GROESCHKE Multi-Family Residential Office Addicks Reservoir Park & Open Spaces Public & Institutional FRANZ SAUMS Single-Family Residential Transportation & Utility Undeveloped GRISBY











### 2.4 SPECIAL DISTRICTS

There are numerous special purpose districts in the West Houston area including six Municipal Management Districts, three Tax Increment Reinvestment Zones (TIRZs), and nine Super Neighborhoods.

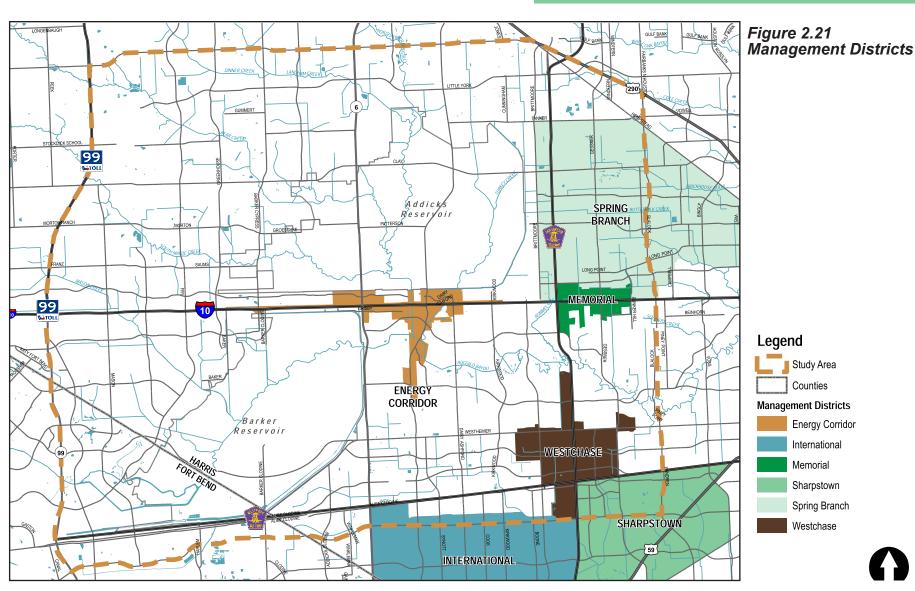
#### **MANAGEMENT DISTRICTS**

Article III, Section 52, Article XVI, Section 59, and Article III, Section 52-a, of the Texas Constitution authorizes the creation of certain special districts for limited purposes. These districts are areas of the state, county, municipality, or other political subdivision that have been divided for judicial, political, electoral, or administrative purposes. These districts may acquire, purchase, sell, or lease real or personal property; litigate legal matters; impose and collect taxes; issue bonds; borrow money; and contract with other entities. Some types of districts are granted the power of eminent domain.

#### Municipal Management Districts

Municipal Management Districts (MMD) are one of several types of special districts authorized by State law. The Texas Local Government Code governs the creation and operation of MMDs. MMDs are empowered to "promote, develop, encourage, and maintain employment, commerce, economic development, and the public welfare in the commercial areas of municipalities and metropolitan areas of this state" (Sec 375.001(b)). MMDs have the power to finance their operations by issuing bonds or other obligations, payable in whole or in part from ad valorem taxes, assessments, impact fees, or other funds of the MMD to provide improvements and services. MMDs may levy a tax only after holding an election within the district. MMDs are intended to supplement, not supplant, existing public services.

Of the six MMD in the study area (Figure 2.21), three are funding partners of this study. They include Westchase Management District, Memorial Management District, and The Energy Corridor Management District.







#### Westchase Management District

The Westchase Management District was formed in 1995. The District comprises 4.2 square miles and has 26,883 residents and 15,621 housing units in 2010. The District's employers however employ approximately 88,317 employees. The District has over 15 million square feet of office space, 2.4 million square feet of retail space, and 1.6 million square feet of service center and warehouse space. There are also 22 hotels and over 50 multi-family communities within the District.



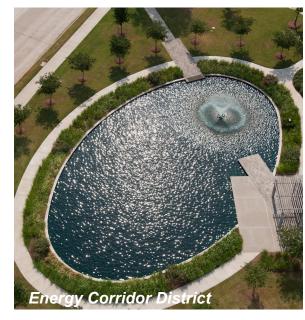
#### Memorial Management District

The Memorial Management District was created in 1999, and works in conjunction with the Memorial City Redevelopment Authority (TIRZ 17). The District is approximately 850 gross acres of land between Bunker Hill Road and the West Sam Houston Toll Road - north and south of the newly expanded Interstate 10, the Katy Freeway. The major employers in the District include the Memorial City Mall, the Memorial City Memorial Hermann Medical Center, the Chase Bank Service Center, Air Liquide, CEMEX US Operations, and the Metro National Corporation. There is more than 3.5 million square feet of retail space, almost 3.2 million square feet of office space, several eminent hotels and multifamily housing all located within the District. Businesses within the District employ more than 47,000 people who commute in daily from all over the Houston area.

#### The Energy Corridor Management District

The Energy Corridor Management District was created in 2001. Currently, the Energy Corridor is the third largest employment center in the region with more than 91,000 employees. The Energy Corridor currently has over 21 million square feet of office space, with another 12 million proposed or under construction.



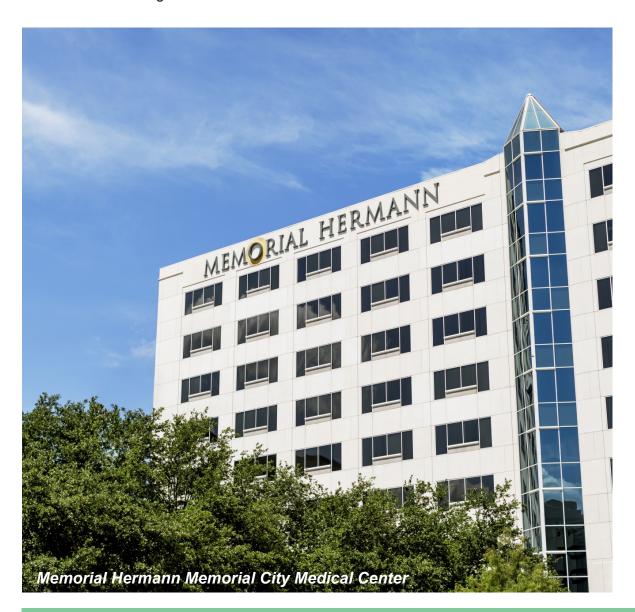


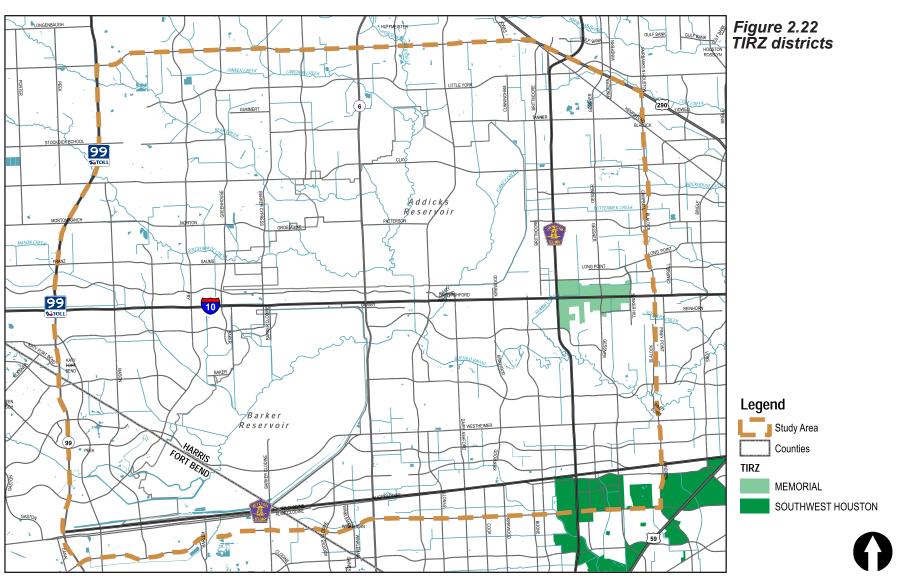




#### Tax Increment Reinvestment Zones

Chapter 311 of the Texas Tax Code enables counties and city to create Tax Increment Reinvestment Zones (TIRZs). TIRZs help finance the cost of redevelopment and encourage development within the designated area that would otherwise not attract sufficient market development in a timely manner. Taxes attributable to new improvements (tax increments) are set aside in a fund to finance public improvements within the boundaries of the zone. The two TIRZs in the Study Area are shown in Figure 2.22.







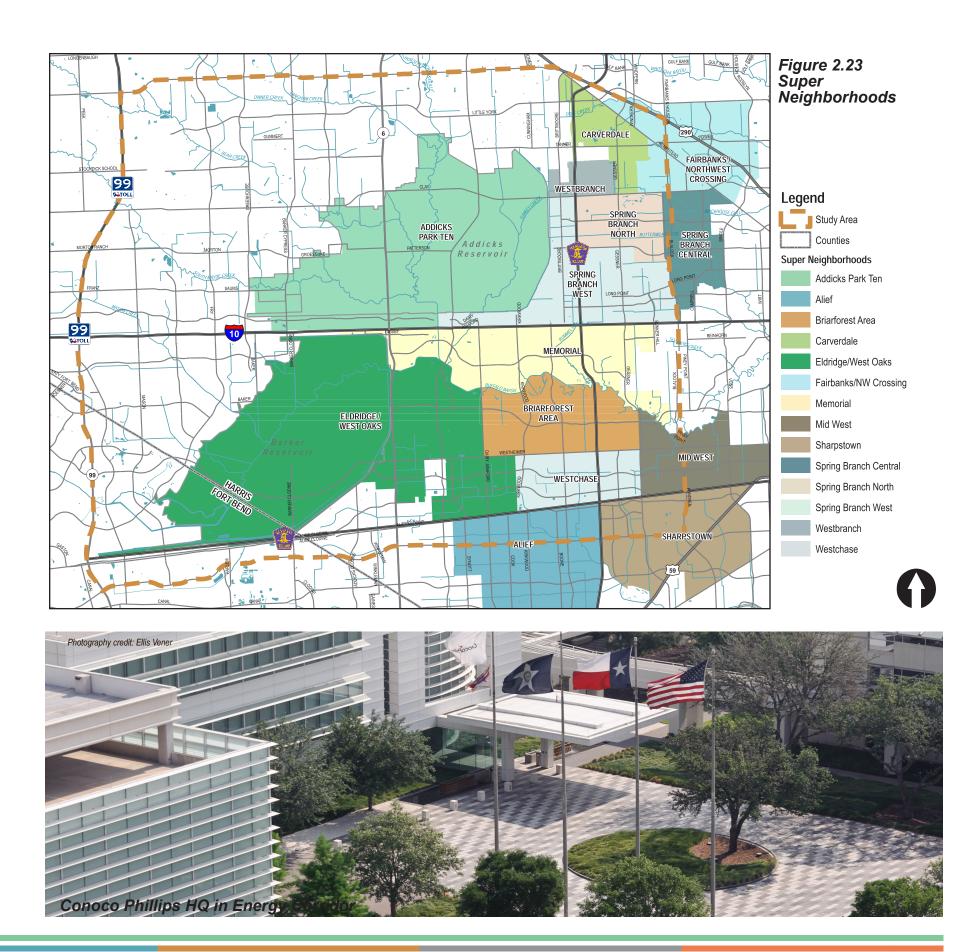


#### Super Neighborhoods

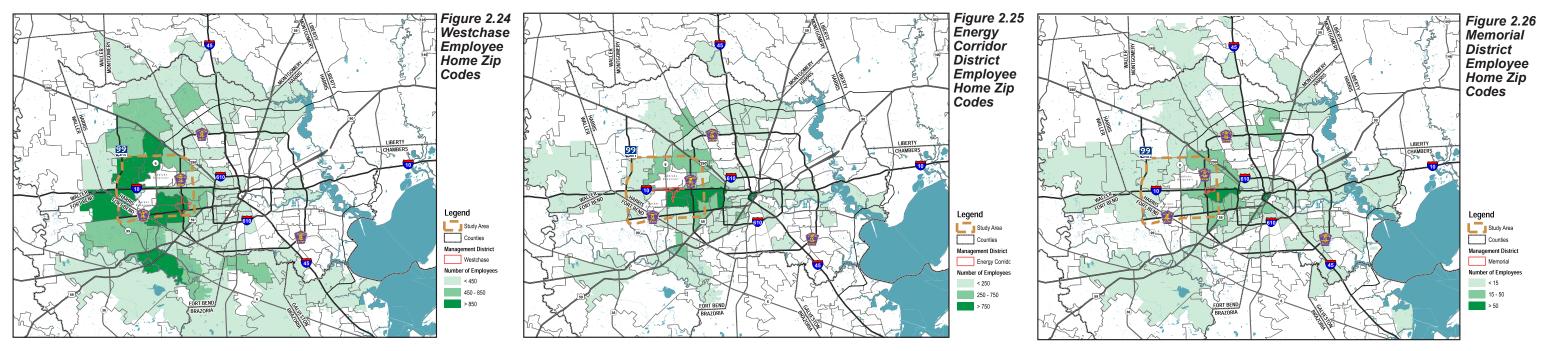
The Super Neighborhood Initiative was developed as a means to receive and consolidate input offered by residents and communitybased organizations throughout the City of Houston. The initiative provides a more organized and efficient system of community participation in decisions of local significance made of the City.

The City of Houston launched the Super Neighborhood Initiative in 1999 to encourage residents to work together to identity and prioritize needs and concerns in their communities. In 2003, the City passed an ordinance formalizing the Super Neighborhood Initiative as a program with the Department of Planning & Development. The boundaries of each super neighborhood are typically designated by major physical features (bayous, freeways, etc.) to group together contiguous communities that share common physical characteristics, identity or infrastructure. Super Neighborhoods in the Study Area are shown in Figure 2.23.

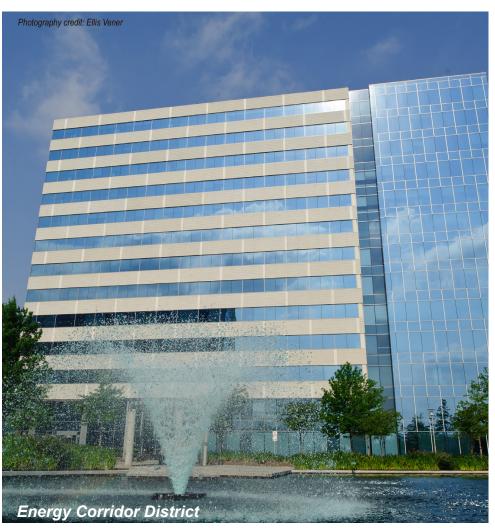
Figures 2.24–2.26 show the home zip codes of employees that work in the three funding partner management districts. These maps indicated that a significant number of people are commuting from areas along SH 6 north of Interstate 10, as well as Fort Bend County, and inside Loop 610.















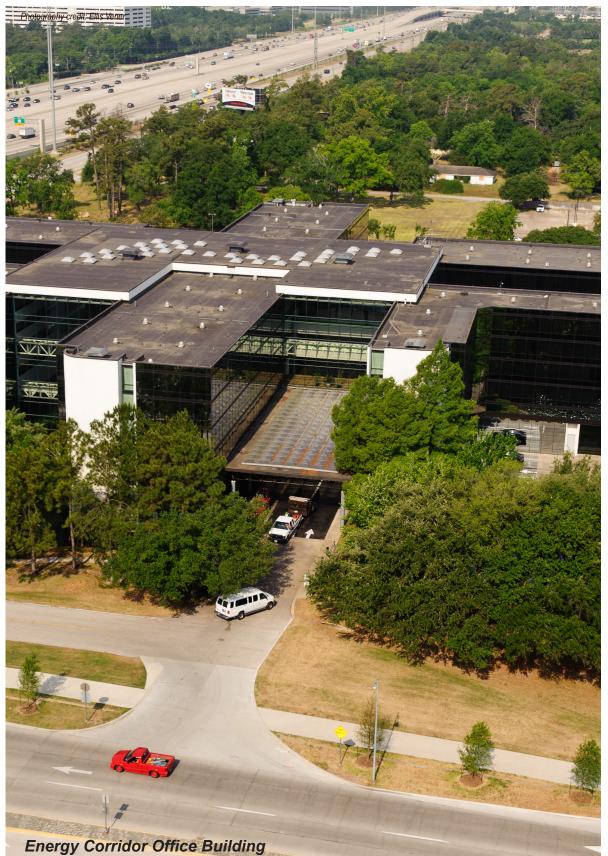
# 2.5 PROPOSED DEVELOPMENT

Figure 2.27 shows the proposed major developments in the Study Area for the next several years, as of January 2015. These developments include 2,024 residential units and 6.7 million square feet of commercial space. Table 2.10 provides a description of each project.

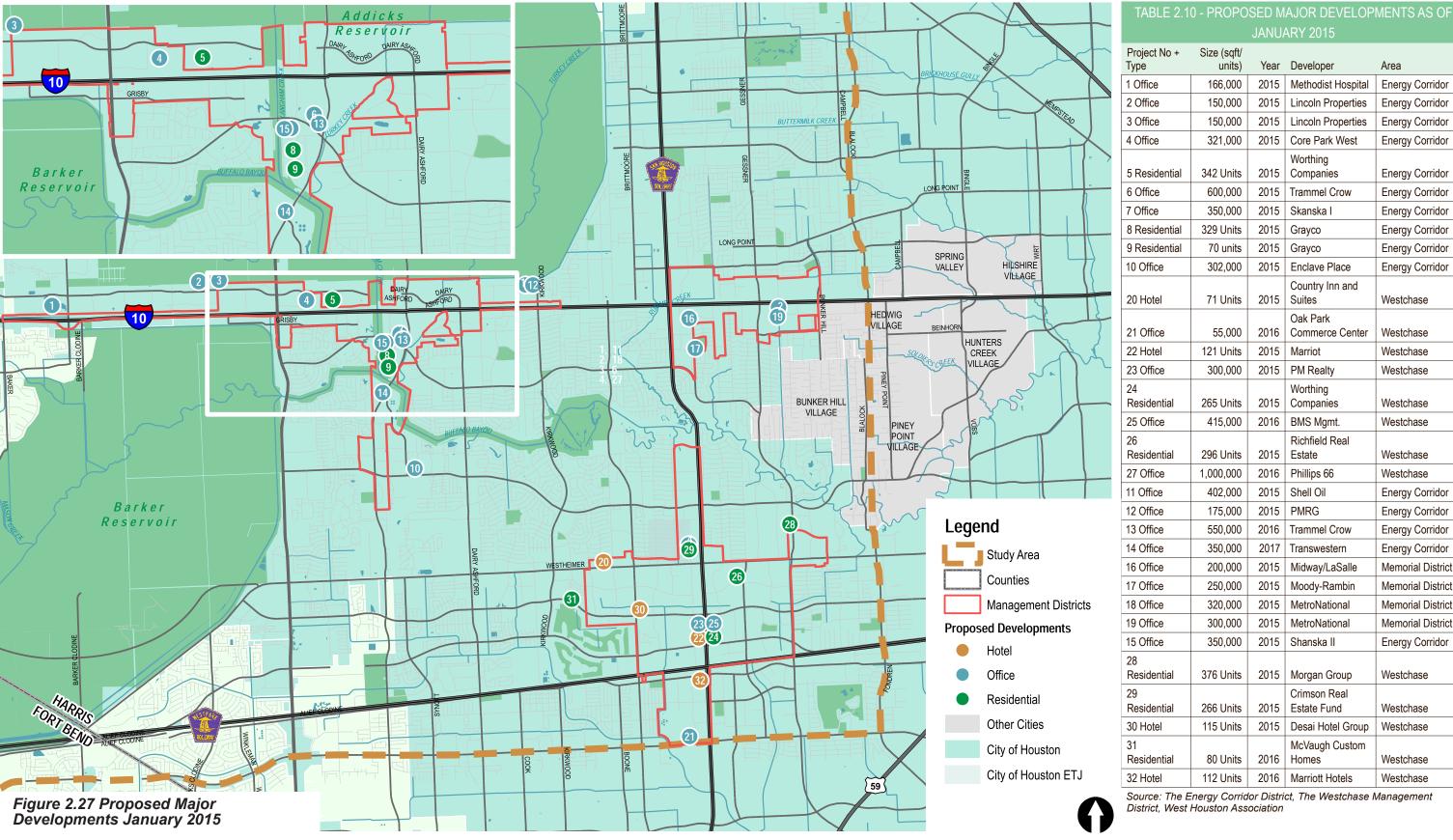
These projects are indicative of the growth in West Houston. The leasing of 6.7 million square feet of additional office space and over 2,000 residential units will undoubtedly increase congestion within the Study Area.

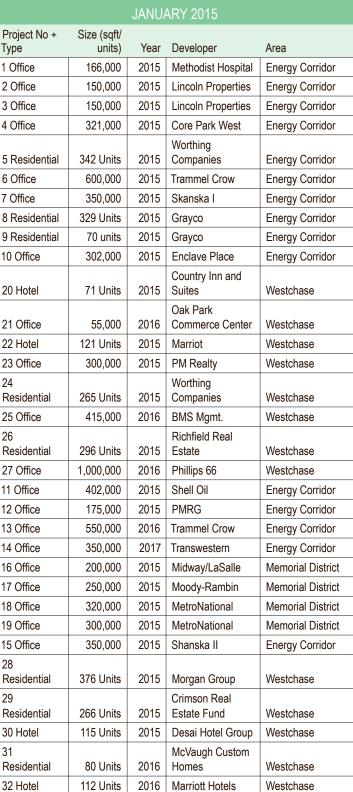
















#### 2.6 ROADWAYS AND ROADWAY **SAFETY**

The roadways in the West Houston Study Area are some of the most heavily traveled in the Region. The Study Area contains over 50 miles of limited access freeways and toll roads, and nearly 400 miles of major thoroughfares. Figure 2.28 shows the current classifications of major transportation facilities in the Study Area.

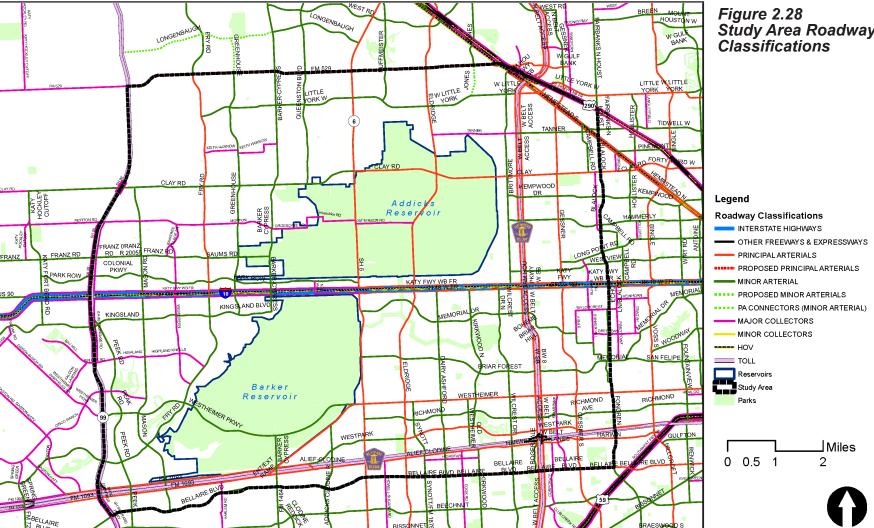
The 2014 Average Daily Traffic (ADT) volumes of the Study Area roadways are depicted in Figure 2.30. ADT is the total traffic volume for a given roadway segment during a given time period. ADT is a simply measure of how busy a road is during the year. Note that State Highway 6 and Westheimer Road (FM 1093) both carry Freeway capacity volumes (50,000+ ADT) along nearly their entire length in the Study Area.

Figure 2.32 is the City of Houston 2014 Major Thoroughfare and Freeway Plan (MTFP). The MTFP identifies roadway segments that need to be lengthened or widened based on future growth and development. The plan is updated annually, and serves as notice to the public for developing land adjacent to the identified roads.

Figure 2.31 shows the Level of Service (LOS) for roadways in the Study Area. LOS is a volume-to-capacity (v/c) ratio that measures the quality of service on a given facility. The capacity of a given roadway is constant, and is based on the facility's size and geometry. However, the volume of traffic on that facility varies by time and conditions on a given day.

LOS is a range of v/c ratios denoting the level of traffic congestion on a given facility. Typically, a v/c ratio of less than 0.85 indicates good traffic flow. A rate from 0.85 to 1.0 is acceptable. A rate between 1.0 and 1.25 indicates moderate congestion, and a rate above 1.25 is indicative of severe congestion.

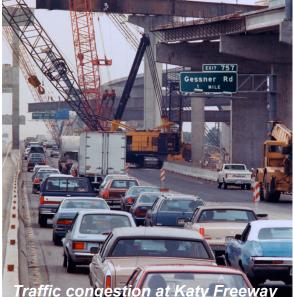
Within the West Houston Study Area, many of the major thoroughfares are currently experiencing moderate to severe congestion. State Hwy 6, Eldridge Parkway, Brittmore Drive, the Beltway 8 frontage roads, Clay Road, Briar Forest Drive, Barker Cypress Road and Gessner Road are some of the roadways currently experiencing the most congestion. Few roadways in the Study Area have v/c less than 0.85. This means that most roadways in the Study Area are already near or exceeding their designed capacity. TxDOT produces an annual list of the 100 most congested roadways in Texas. Table 2.11 lists the roadways in the Study Area that are on the 2014 Top 100 Congested Roadway in Texas.



Study Area Roadway







IABLE 2.11 - MUST	CONGESTED RUADS	WITHIN STUDY AREA

Roadways	From	То	Length (mi)	Sum of Annual Hrs of Delay per Mile
Bellaire Blvd	Addicks-Clodine	Beltway 8	6.53	416,378
IH 10/ US 90	N Eldridge Pkwy	SL 8	3.30	1,009,986
Richmond Ave	Beltway 8	IH 610	5.98	164,158
SH 6	IH 10/ US 90	Westpark Tollway	5.10	401,122
Beltway 8	IH 10/ US 90	IH 69/ US 59	8.65	159,755
US 290	SH 6	Beltway 8	4.76	697,655
Voss Rd & Hillcroft Ave	IH 10/ US 90	IH 69/ US 59	4.77	184,480
FM 1093 (Westheimer Rd)	SH 6	Beltway 8	5.22	531,234
Total			44.31	3,564,768
Total Delay Hour Cost				157,954,870

Source: TxDOT, 2014 Top 100 Most Congested Roadways in Texas

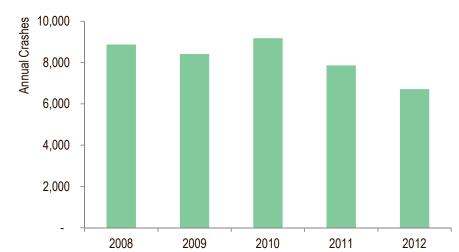


Figure 2.29 Vehicle Crashes per Year

Vehicular crash information from 2008 to 2012 was obtained from TxDOT and analyzed to determine the severity and nature of vehicle collisions in West Houston. The results of this analysis are presented below.

On average, vehicle crashes in West Houston account for nine percent of all crashes in the Region (Table 2.12).

A total of 41,043 crashes occurred in the Study Area from 2008 to 2012. Annual crash totals are shown in Figure 2.29. After peaking at 9,179 crashes in 2010, vehicle crashes declined 27 percent to 6,714 crashes in 2012.

#### TABLE 2.12 - STUDY AREA VEHICLE CRASH TOTALS

Year	West Houston	City of Houston	Region	Region Pct
2008	8,876	45,919	97,539	9%
2009	8,413	46,676	98,758	9%
2010	9,179	40,931	90,673	10%
2011	7,861	40,265	88,903	9%
2012	6,714	49,130	102,757	7%
			5 YR AVG	9%

Figure 2.34 shows vehicle crashes from 2008 to 2012 by time of day. Nearly half of all vehicle crashes (46%) in West Houston occur during peak traffic periods (6AM–9AM [17%] and 4PM–7PM [29%]), the 5PM hour having the highest crash rate of the day. Weekday analysis shows a rise in crashes as the week progressed, with Friday having the highest crash occurrence of any weekday (Figure 2.35).

In terms of severity, nearly two-thirds of all crashes were non–injury, property damage only crashes, slightly more than one-third were injury crashes, and one percent involved a fatality (Figure 2.36). Over the five year period, there were 232 fatalities and 21,706 injuries reported (Table 2.13).

#### TABLE 2.13 - CRASH SEVERITY Crashes Total Injuries **Fatalities** Year 2008 8,876 4,937 48 4,496 37 2009 8,413 2010 4,604 47 9,179 2011 7,861 3,956 2012 6,714 3,713

21,706

41,043

232

Source: TxDOT

TOTAL

According to Figure 2.37, a roughly equal number of crashes occurred at intersection and non–intersection locations. Only 12 percent related to driveway access. Over 70 percent of all crashes occurred on surface streets (city, county, and farm-to-market roads), while only 29 percent took place on highways and toll roads (Figure 2.38).

The types of collision are listed in Table 2.14. Rear-end collision were the most predominate type, accounting for nearly one–fifth of all collisions. Broadside, or "T–bone" collision, collisions with parked cars, single vehicle crashes, and sideswipe collisions rounded out the top five collision types.

TABLE 2.14 - VEHICLE	COLLISON DYNAMICS
Collision Type	Percent
Rear End	18.80%
Broadside	16.30%
Rear End-Parked Car	15.80%
One Vehicle Crash	13.20%
Sideswipe-SD	9.70%
Left Turn Broadside-OD	8.80%
Left Turn Broadside	4.30%
Through with Left Turn	2.30%
Through with Right Turn	2.20%
Right Turn Broadside	1.80%
Headon	1.10%
All Others*	5.80%

The spatial distribution of vehicle crashes is illustrated in Figure 2.39. It shows that crashes are heavily concentrated in the Southwest quadrant of the Study Area, and additional clusters along State Hwy 290 and State highway 6 at Farm-to-Market Road 529. These findings correlate exactly with the Level of Services depicted in Figure 2.32 for the same locations in the Study Area.

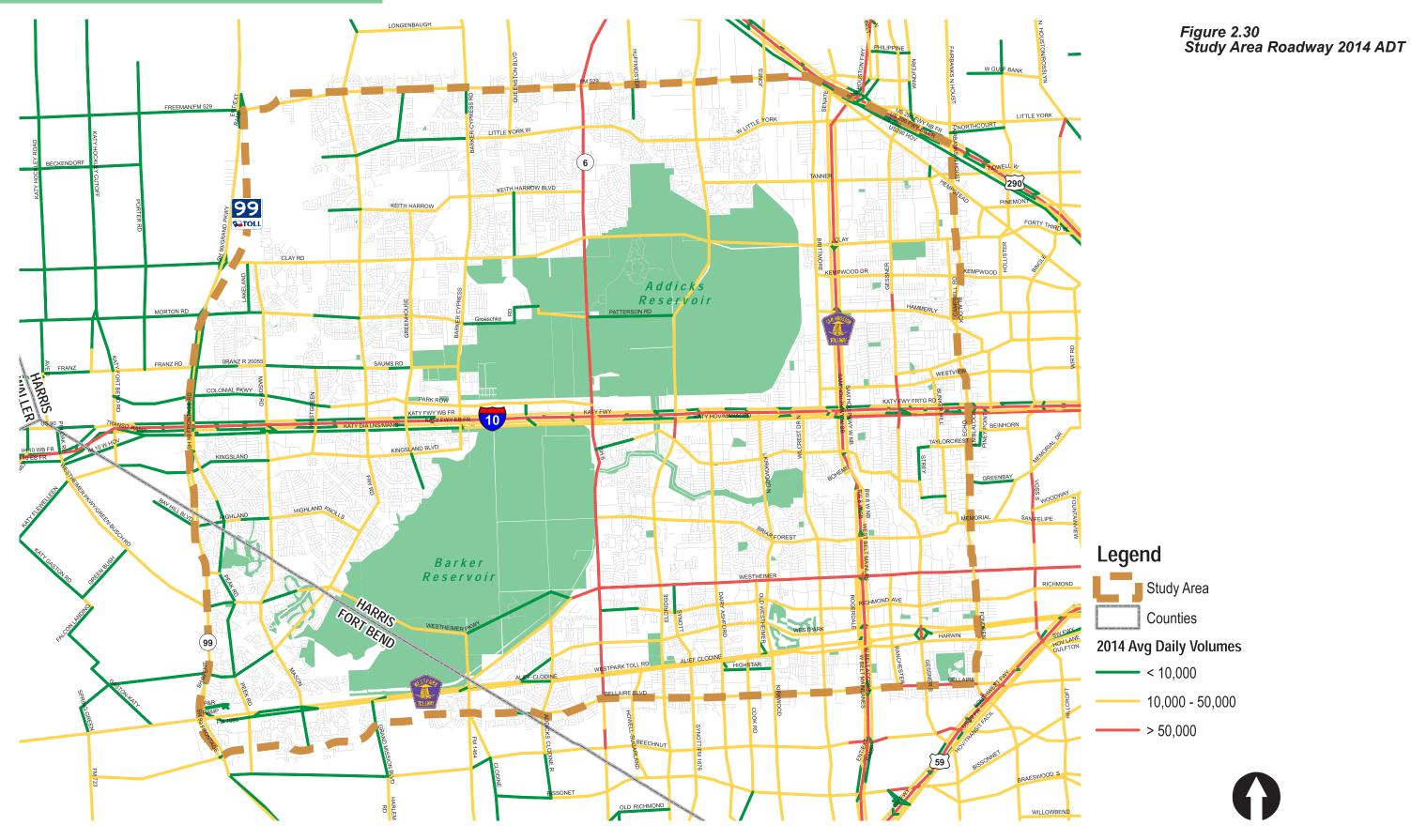
Figure 2.37 shows the number of intersection related crashes. Table 2.16 compares the Study Area roadway crash rates to State averages for those road types. Table 2.15 shows the 2012 TxDOT crash rates for varied urban and rural road types.

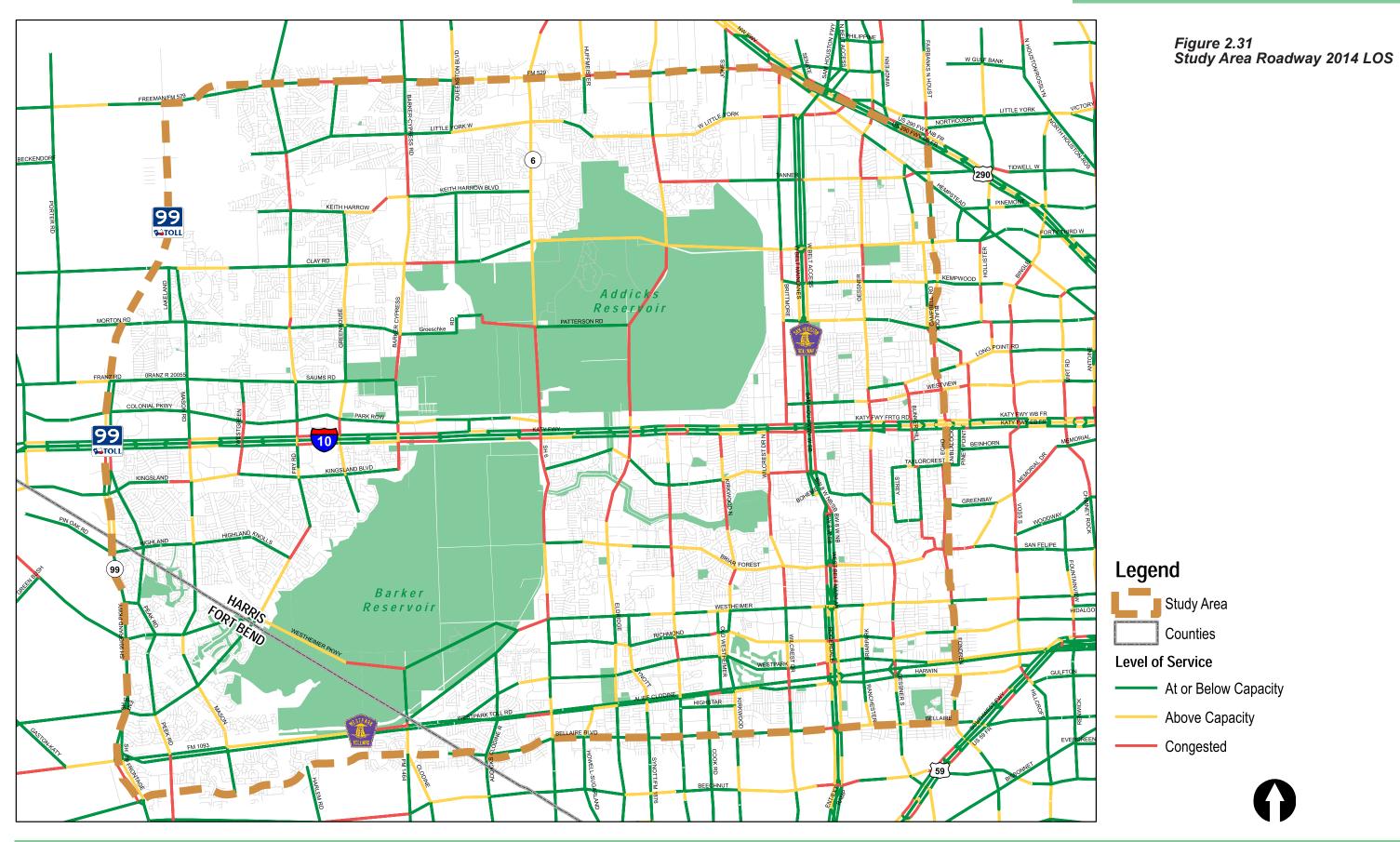
## TABLE 2.15 - URBAN TRAFFIC CRASHES PER 100 MILLION VEHICLE MILES

Highway System	Crash Rate
Interstate	94.14
US Highway	148.64
State Highway	198.3
Farm-to-Market	212.17
Road Type	Crash Rate
2 lane, 2 way	181.25
4 or more lanes, divided	117.37
4 or more lanes, undivided	276.34

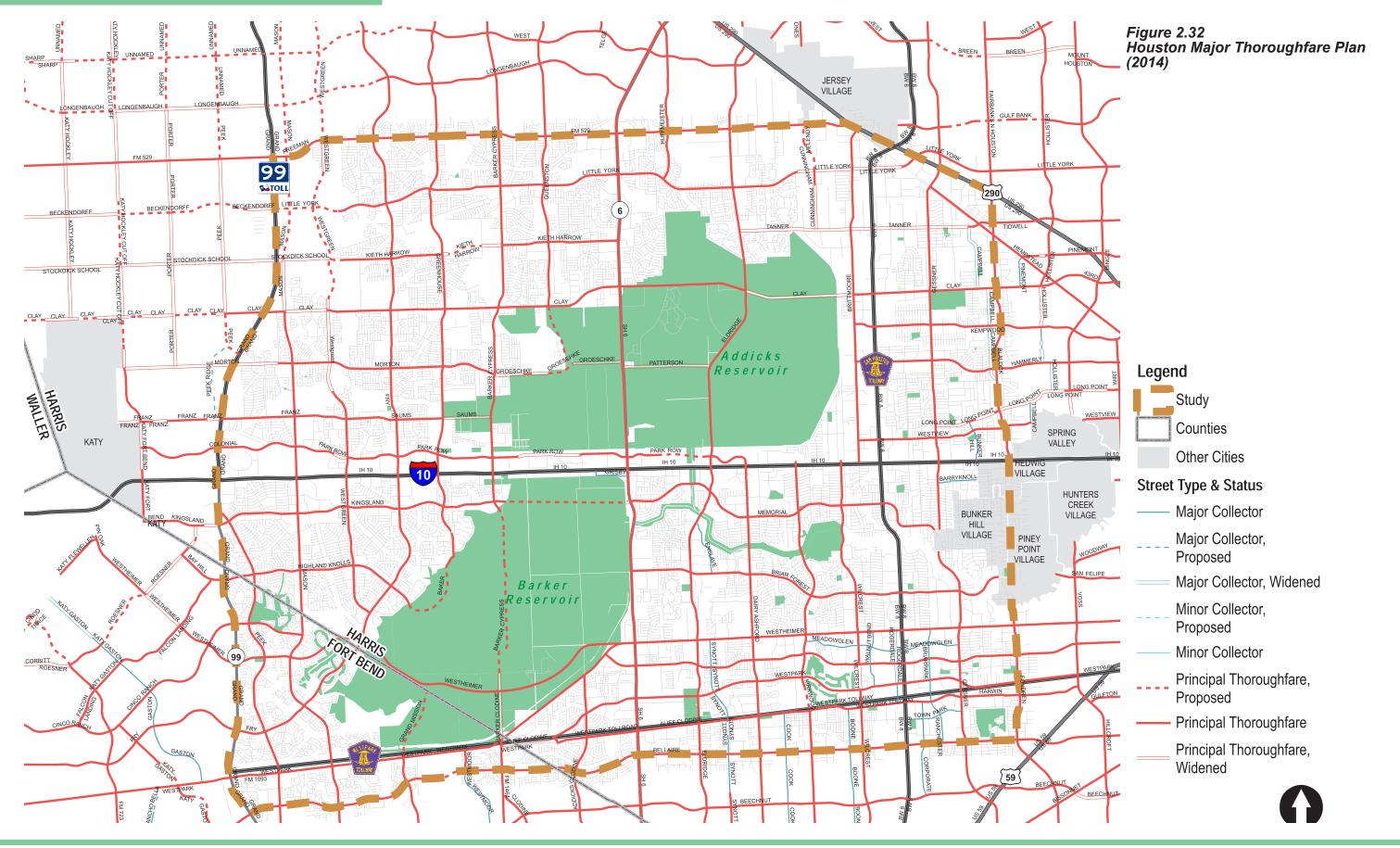
Source: TxDOT, 2012



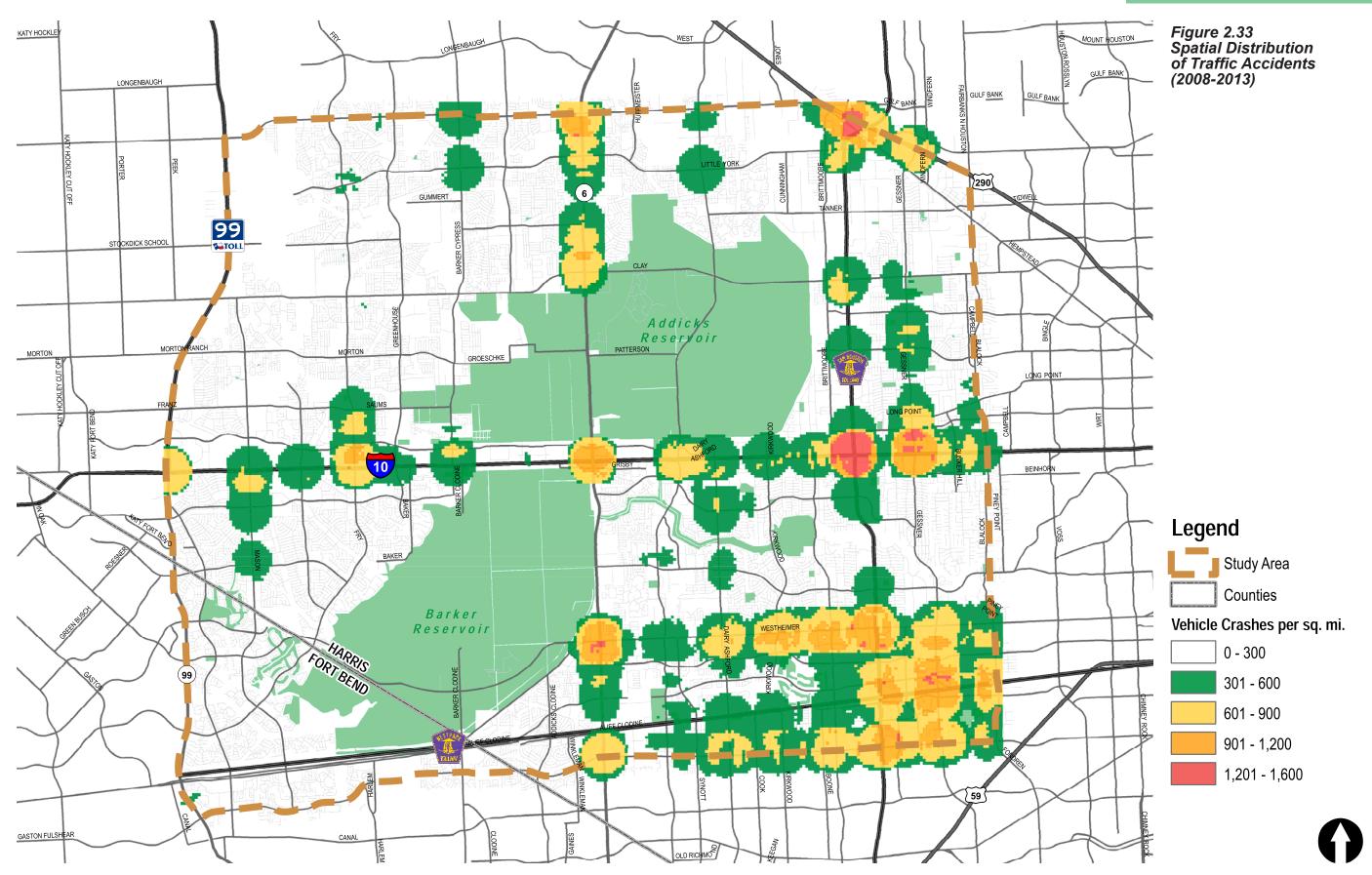




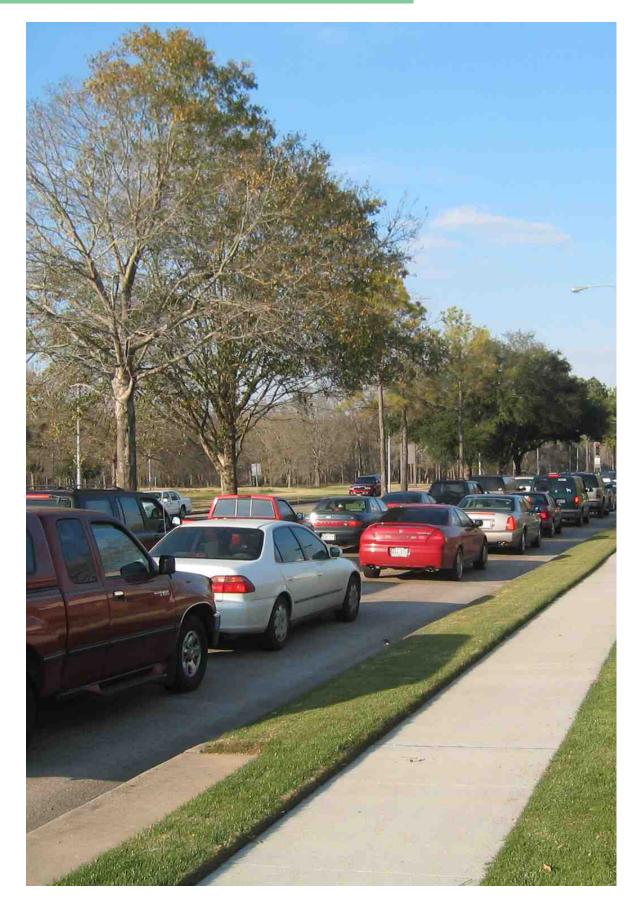












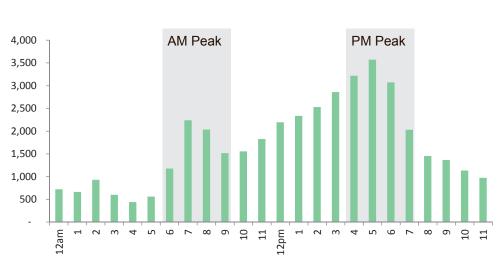


Figure 2.34 Study Area Accident Counts By Hour of Day\*
\*AM Peak 6 AM to 9 AM; PM Peak 4 PM to 7 PM

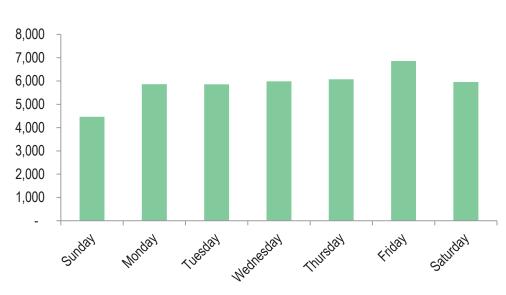


Figure 2.35 Study Area Accident Counts By Weekday

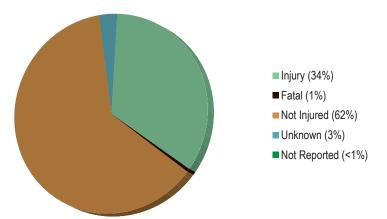


Figure 2.36 Study Area Accident Severity

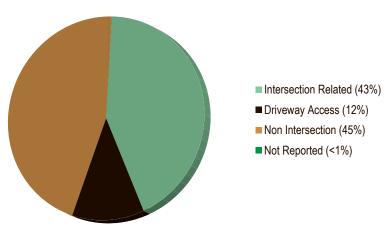


Figure 2.37 Study Area Accident Intersection Relationship

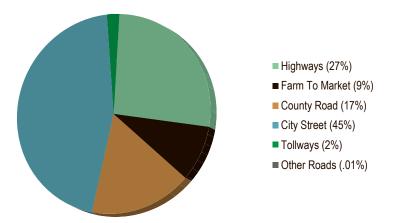
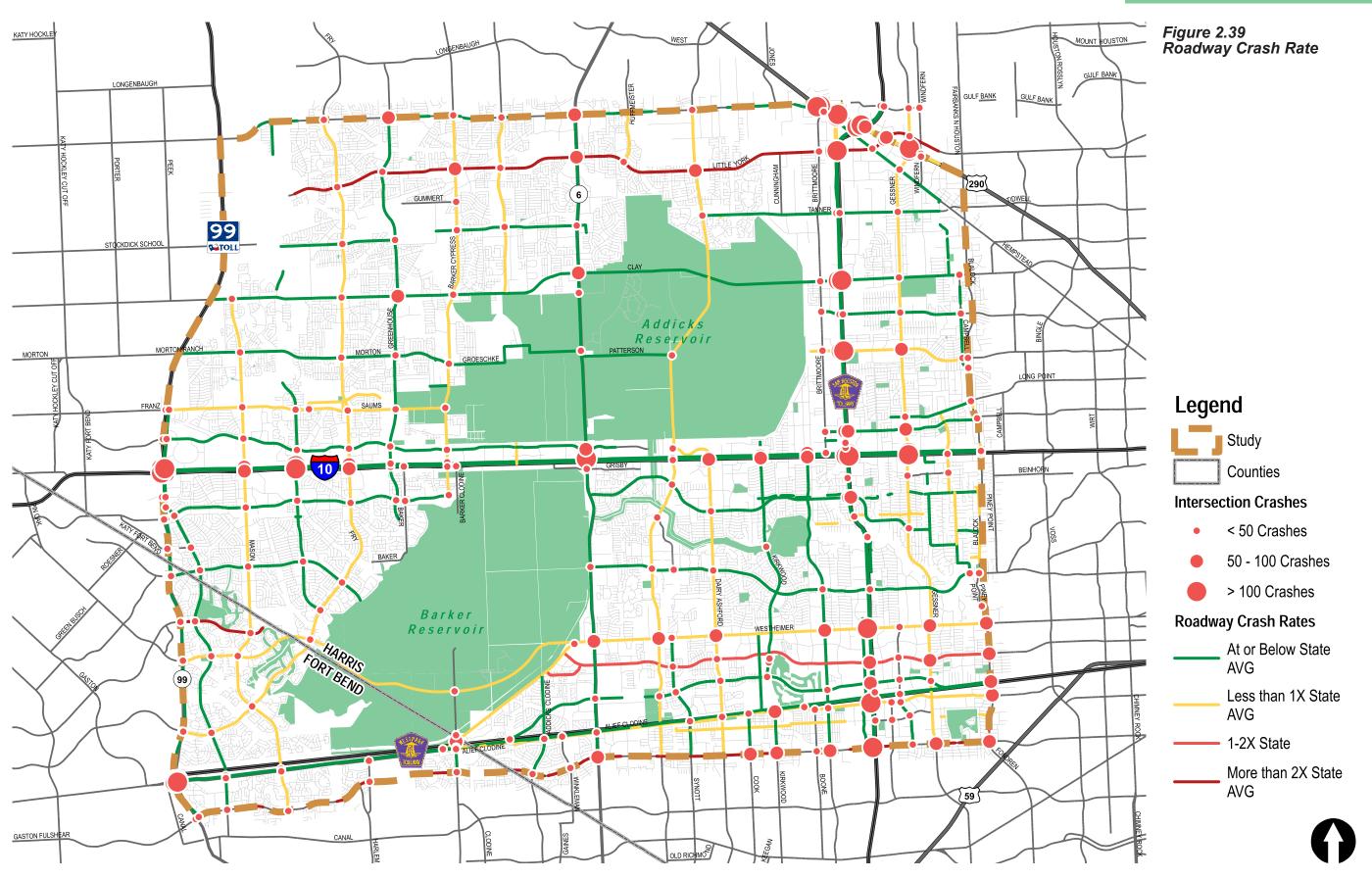


Figure 2.38 Study Area Accident Roadway Type







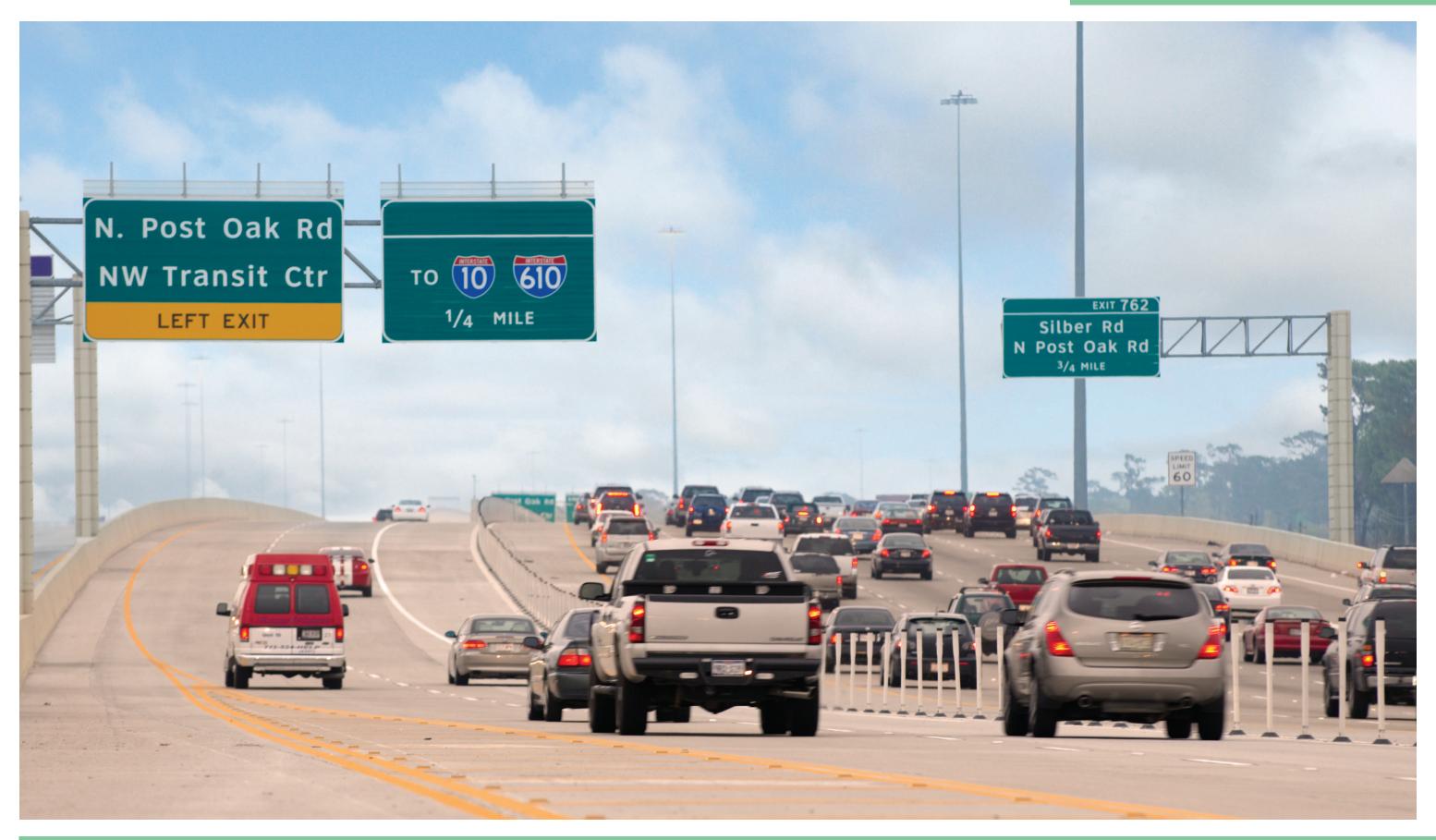
TABL	E 2.16 - HIGHWAY AND MA	JOR ROADWAY CRASH RATES	
Street Name	Road Type	Rate(Crashes per 100M VMT)	Percent State Average
US 290	US Highway	175.67	18%
Beltway 8	State Highway	69.90	-65%
Grand Parkway	State Highway	33.35	-83%
Katy Frwy	Interstate	61.43	-35%
W Little York Rd	4+ Undivided	703.16	154%
Boheme Dr	4+ Undivided	330.71	20%
Synott Rd	4+ Undivided	227.45	-18%
Hammerly Blvd	4+ Undivided	173.72	-37%
Barker Cypress Rd	4+ Undivided	171.66	-38%
Alief Clodine Rd	4+ Undivided	169.60	-39%
Long Point Rd	4+ Undivided	168.21	-39%
Memorial Dr	4+ Undivided	157.29	-43%
Eldridge Parkway	4+ Undivided	138.15	-50%
Addicks-Fairbanks	4+ Undivided	108.70	-61%
Rogerdale Rd	4+ Undivided	103.78	-62%
Cook Rd	4+ Undivided	91.33	-67%
Brittmore	4+ Undivided	70.95	-74%
SH 6	4+ Undivided	38.77	-86%
Hempstead Hwy	4+ Undivided	32.63	-88%
Old Westheimer Rd	4+ Undivided	3.86	-99%
Cinco Ranch Blvd	4+ Divided	781.11	566%
Bellaire Blvd	4+ Divided	405.53	246%
Harwin Dr	4+ Divided	375.99	220%
Fondren Rd	4+ Divided	276.83	136%
Ranchester Dr	4+ Divided	240.50	105%
Richmond Ave	4+ Divided	235.64	101%
Franz Rd	4+ Divided	196.18	67%
Gessner Road	4+ Divided	190.06	62%
Dairy Ashford	4+ Divided	186.26	59%
Fry Road	4+ Divided	184.16	57%
Senate St	4+ Divided	175.36	49%
Park Ten Blvd	4+ Divided	172.33	47%
Westheimer	4+ Divided	168.89	44%
Mason Road	4+ Divided	166.25	42%
Saums Rd	4+ Divided	146.29	25%
Westview Dr	4+ Divided	142.48	21%

TABLE 2.16 - H	IGHWAY AND MAJOR ROAI	DWAY CRASH RATES (CONT	ΓINUED)
Street Name	Road Type	Crash Rate (per 100M VMT)	Percent State Average
Blalock Rd	4+ Divided	140.44	20%
Clay Road	4+ Divided	139.03	18%
FM 1464	4+ Divided	137.72	17%
Queenston Blvd	4+ Divided	124.74	6%
Huffmeister Rd	4+ Divided	123.26	5%
Kingsland Blvd	4+ Divided	112.04	-5%
Wilcrest Dr	4+ Divided	110.07	-6%
Greenhouse Road	4+ Divided	89.45	-24%
Kempwood Dr	4+ Divided	84.56	-28%
Briar Forest Dr	4+ Divided	83.15	-29%
Kirkwood	4+ Divided	81.80	-30%
Highland Knolls Dr	4+ Divided	79.10	-33%
Addicks Clodine Rd	4+ Divided	76.03	-35%
Keith Harrow Blvd	4+ Divided	73.32	-38%
Park Row	4+ Divided	69.52	-41%
Westheimer Pkwy	4+ Divided	56.33	-52%
Groeschke Rd	4+ Divided	44.05	-62%
Peek Rd	4+ Divided	33.78	-71%
Westgreen	4+ Divided	28.97	-75%
Colonial Pkwy	4+ Divided	16.48	-86%
Westpark Tollway	4+ Divided	11.83	-90%
FM 529	4+ Divided	6.87	-94%
Howell Sugarland Rd	4+ Divided	3.10	-97%
High Star Dr	2 lane, 2 way	440.46	143%
Bunker Hill Rd	2 lane, 2 way	177.90	-2%
Campbell Rd	2 lane, 2 way	136.62	-25%
Greenbay	2 lane, 2 way	127.56	-30%
Strey Ln	2 lane, 2 way	99.98	-45%
Taylorcrest Rd	2 lane, 2 way	88.40	-51%
Briar Hill Dr	2 lane, 2 way	85.22	-53%
Tanner Rd	2 lane, 2 way	74.64	-59%
Morton Road	2 lane, 2 way	72.76	-60%
Clodine Rd	2 lane, 2 way	28.86	-84%
Patterson Rd	2 lane, 2 way	11.39	-94%
Study Area	All Major Roads	92.76	N/A
Source: TxDOT/H-GAC			

TABLE 2.16B - CRASH RATES BY ROAD TYPES (2012)					
Road Type	Crash Rate (per 100M VMT				
Interstate	94.14				
US Highway	148.64				
State Highway	198.30				
Farm-to-Market	212.17				
2 lane, 2 way	181.25				
4+ Divided	117.37				
4+ Undivided	276.34				

Source: TxDOT/H-GAC







#### TRANSIT AND **ALTERNATIVE MODES**

West Houston is served by public transit and other alternative travel modes. The availability and capacity of these services varies significantly throughout the Study Area. All of these services have the potential for improvement and expansion, as they can play a more vital role in enhancing mobility in West Houston. Indeed, mode choice and integration will be the keys to resolving the transportation challenges facing West Houston residents and commuters in the future.

The Metropolitan Transit Authority of Harris County (METRO) is the primary transit service provider for the study area (Figure 2.40). There were previously 31 routes serving the study area (as shown in Figure 2.41), including 18 local routes, 11 Park and Ride routes, a Signature Bus service, and an employee shuttle. Five of the 18 local routes have the highest average daily ridership in the METRO system in 2013. Moreover, these routes accounted for nearly 25% of METRO's daily ridership. Ridership information and Productivity/Performance metrics these routes are shown in Table 2.15. Additional information about each route is provided in Appendix C.

ADA/paratransit service is provided by METROLift within Harris County. Park and Ride services are focused on the IH 10 Katy Freeway, Westpark Tollway and US 290 corridors, using the HOV/HOT lanes. Local services were provided on the following corridors:

- North Eldridge Parkway
- Dairy Ashford Road
- Wilcrest Drive
- Gessner Road
- Kempwood Road
- Hammerly Road
- Long Point Drive
- Memorial Drive
- Briar Forest Drive
- Westheimer Road
- Richmond Avenue
- Alief-Clodine Road/Harwin Drive
- Bellaire Boulevard

The seven Park & Ride facilities in the study area are listed below with their respective parking capacities:

PARK AND RIDE FACILITIES					
Park & Ride	Parking Spaces				
Grand Parkway	423 parking spaces				
Kingsland	2,377 parking spaces				
Addicks	2,428 parking spaces				
Mission Bend	862 parking spaces				
Westchase	1,468 parking spaces				
Gessner	415 parking spaces				
West Little York	1,102 parking spaces				

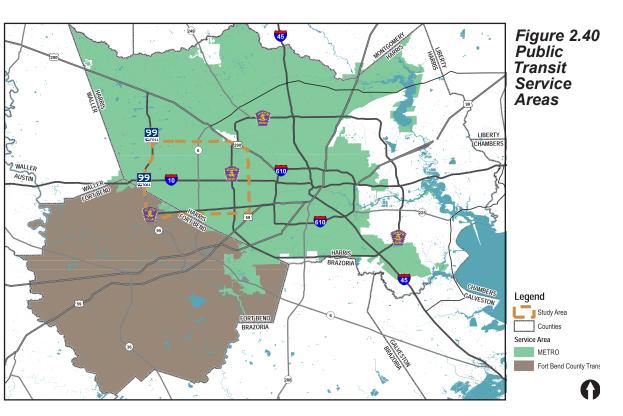
METRO supports vanpool services known as METRO STAR. METRO also supports groups with common destinations by providing matching and administrative services. Currently, there are 127 METRO vanpools serving destinations in West Houston and these vanpools have 9,655 commuters registered to use the service.





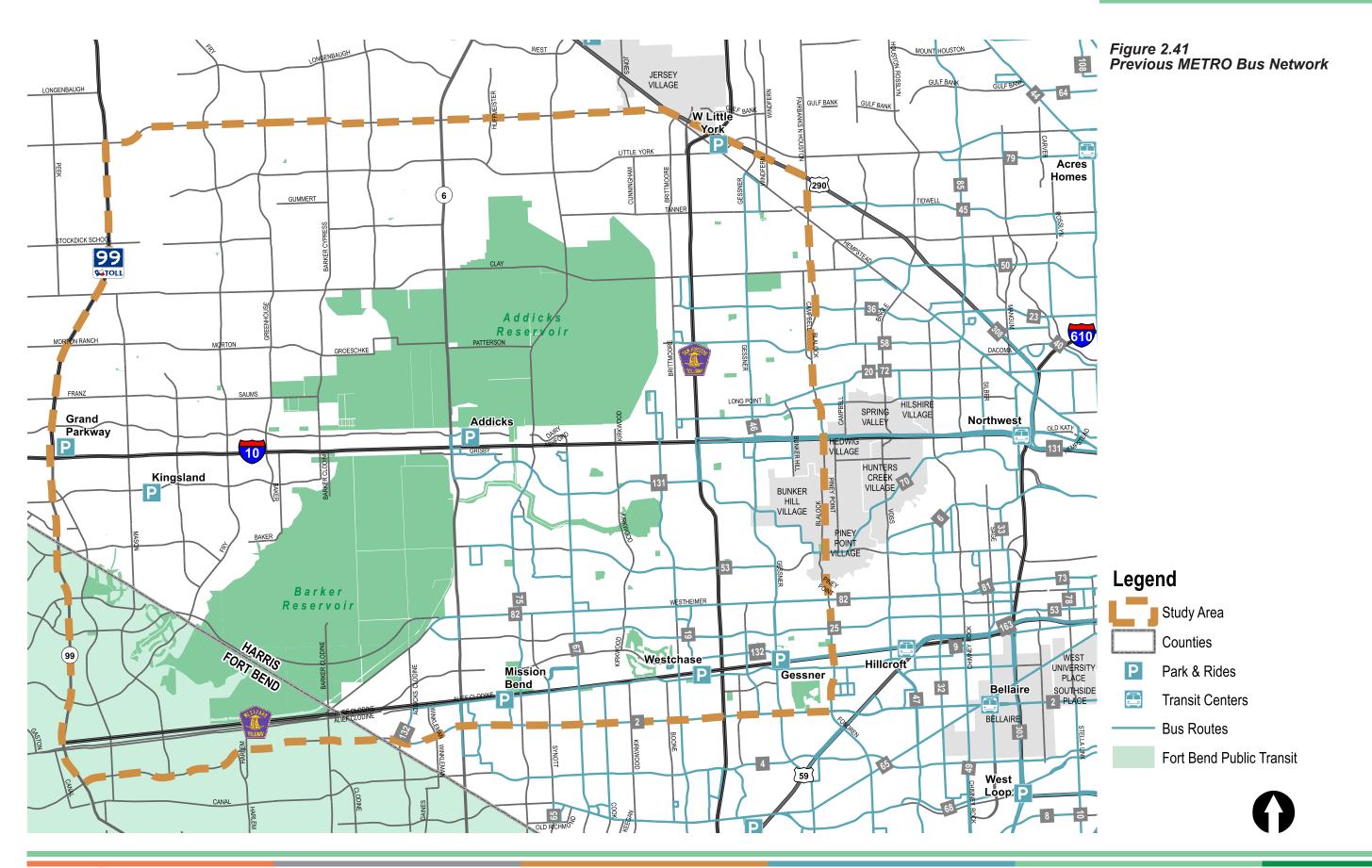




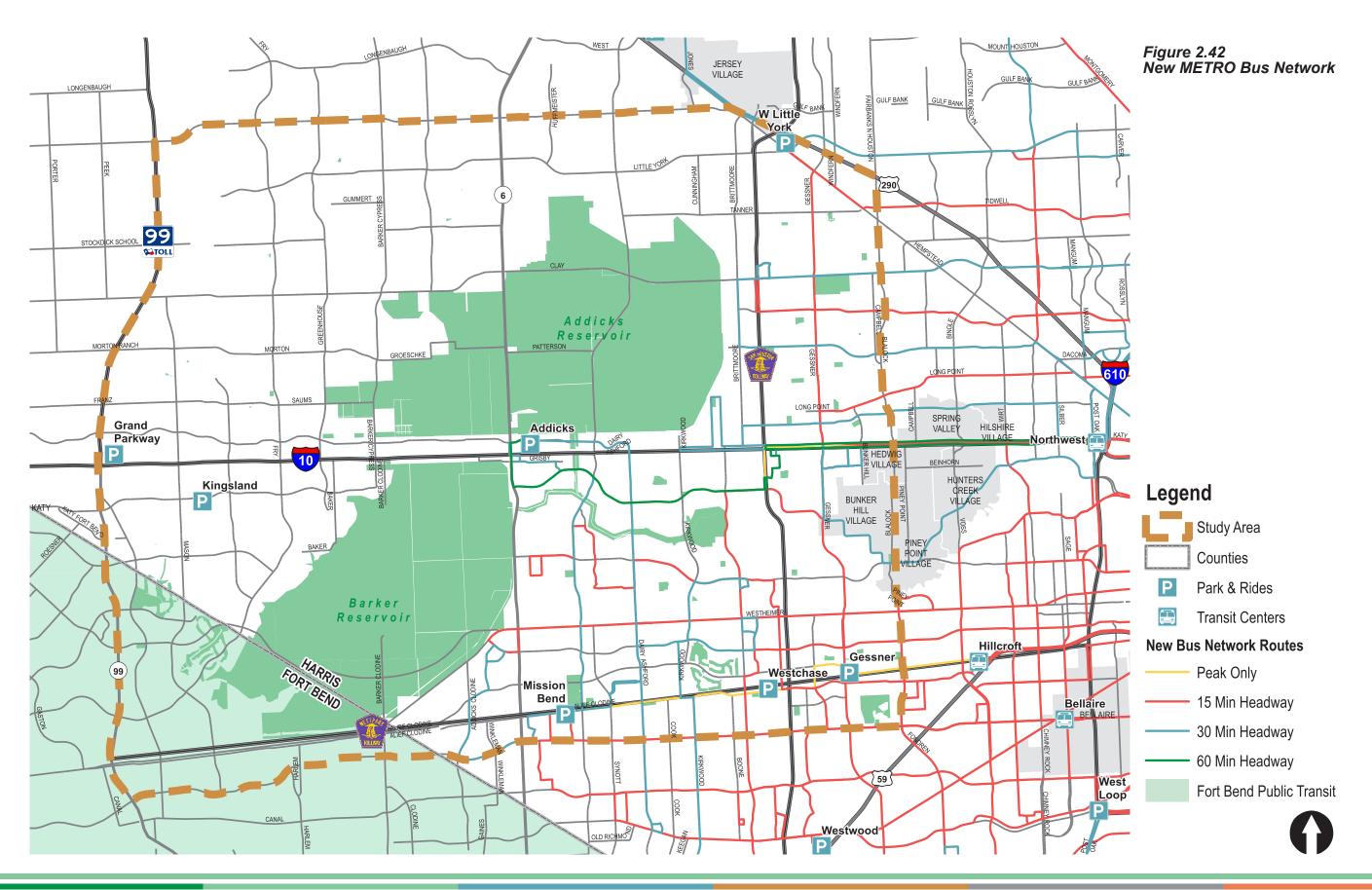








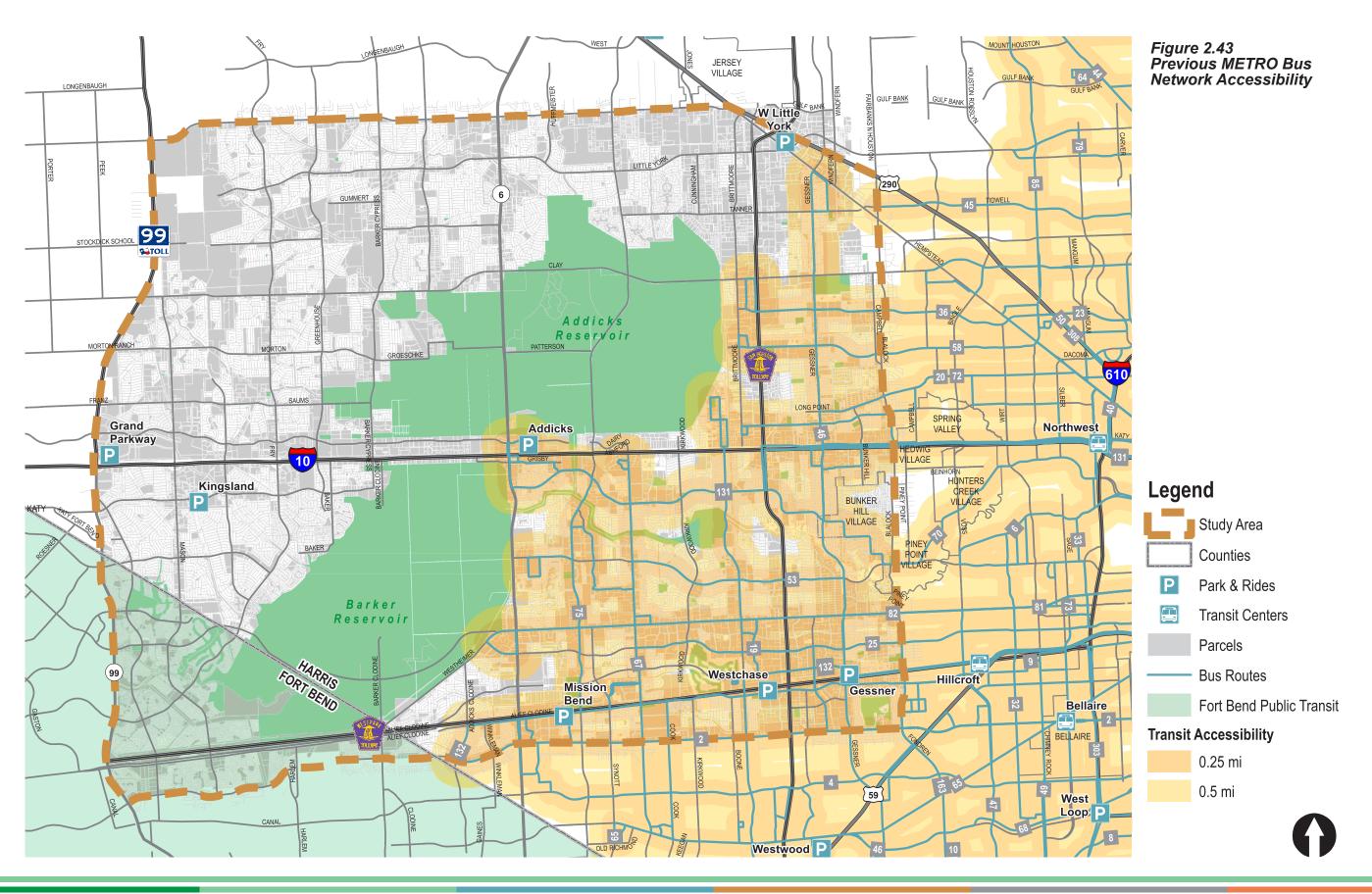


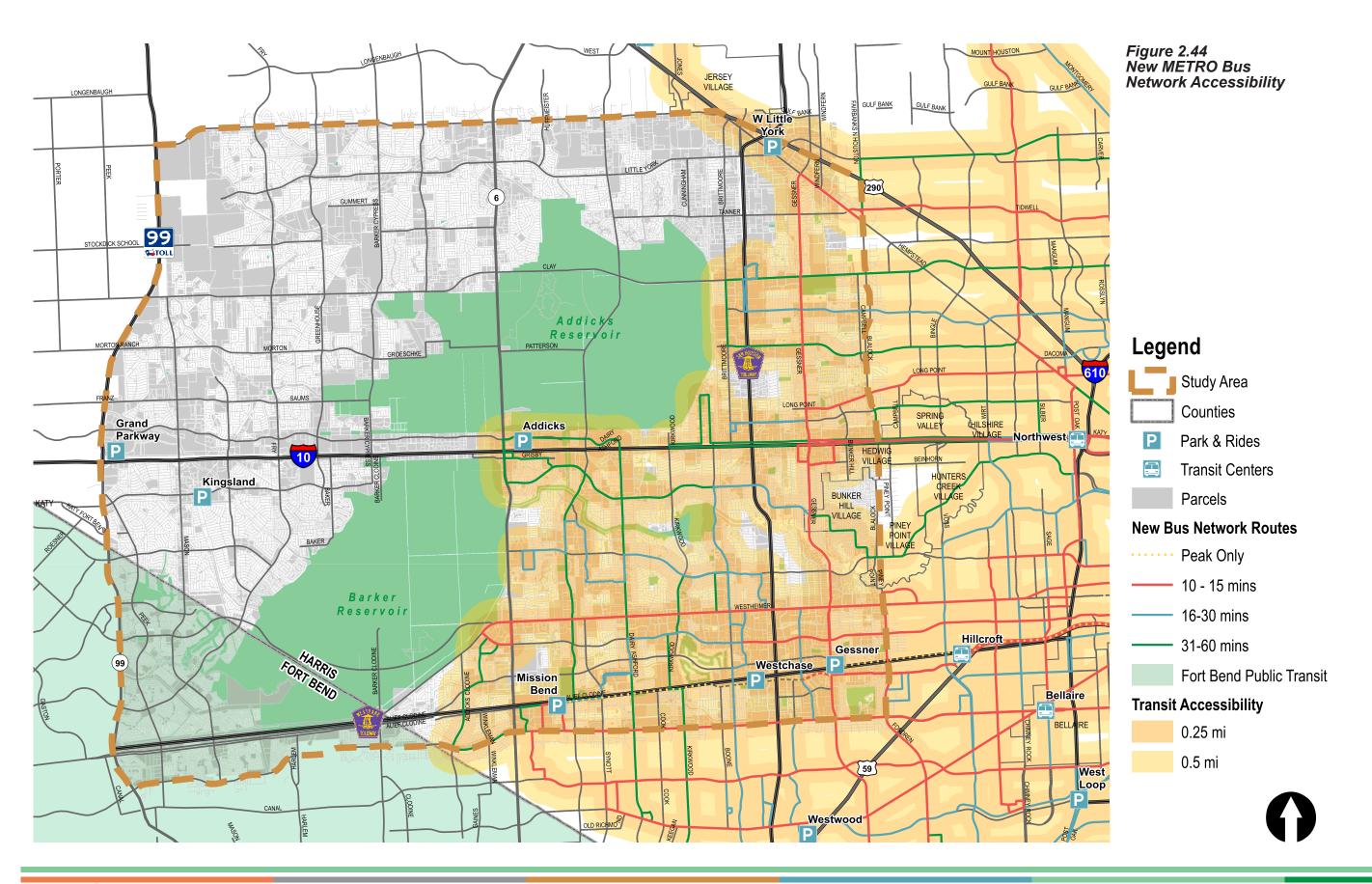


			Productivity Metrics (W				TION AND PERFO		Productivity Metrics (Wee	<u> </u>	Performance	Metrics	
		AVG Daily	Floductivity Metrics (W	Boardings per	Boardings per			AVG Subsidy per	Saturday Boardings per	Sunday Boardings per	renomiance	Metrics	
Route	Туре	Ridership	AVG Daily Ridership	Revenue Mile	Revenue Hour	AVG Fare	Operating Ratio	Boarding	Revenue Hour	Revenue Hour	AVG Speed	On-Time Performance	Notes
303-WEST SHUTTLE	Employee Shuttle	238											FY 2012 METRO Ridership Repor
2-BELLAIRE†	Local	7,354	•										
4-BEECHNUT	Local	4,469			•				•				
9-GULFTON LIMITED	Local	1,402											
19-WILCREST	Local	1,126											
20-LONG POINT LIMITED	Local	2,391									•		
25-RICHMOND	Local	5,360	•										
36-KEMPWOOD	Local	1,563											
46-GESSNER CROSSTOWN	Local	4,983	•	•	•		•		•	•			
53-BRIARFOREST LIMITED	Local	3,802											
58-HAMMERLY	Local	818				•		•					
67-DAIRY ASHFORD CROSSTOWN	Local	758											
70-MEMORIAL	Local	429						•					
72-WESTVIEW CIRCULATOR	Local	806											
75-ELDRIDGE CROSSTOWN	Local	381					•	•					
81-WESTHEIMER SHARPSTOWN	Local	4,946	•	•									
82-WESTHEIMER WEST OAKS	Local	6,523	•	•	•		•		•	•			
131-MEMORIAL	Local	1,694									•		
132-HARWIN	Local	2,251									•		
214-NORTHWEST STATION	Park & Ride	2,334		•	•	•	•				•		
216-PINEMONT / W LITTLE YORK	Park & Ride	687											
217-CYPRESS	Park & Ride	1,502				•	•				•		
219-PINEMONT W LITTLE YORK NORTHWEST STATION	Park & Ride	257											
221-KINGSLAND	Park & Ride	2,307											
222-GRAND PARKWAY	Park & Ride	713				•	•				•	•	
228-ADDICKS	Park & Ride	1,960				•						•	
229-ADDICKS KINGSLAND MIDDAY	Park & Ride	468					•						
274-WESTCHASE / GESSNER	Park & Ride	431										•	
285-KINGSLAND UPTOWN	Park & Ride	179									•	•	
298-KINGSLAND / ADDICKS / TMC	Park & Ride	1,117											
402-QUICKLINE BELLAIRE	Signature	719											

Marker (•) indicates that route is in the top 10 among local bus routes or the top 5 among Park & Ride routes for the indicated productivity or performance metric // † – Highest Average Daily Ridership among local routes in the METRO Service Area









On August 16, 2015, METRO launched its new local bus service throughout the region. Under METRO's New Bus Network, West Houston is serviced by 24 routes, including 11 High Frequency routes (Headways of 15 minutes or less), 2 Ridership routes (30 minute headways), 9 Coverage routes (60 minute headways), 2 Peak-Hour Service routes, plus all 11 Park & Ride routes<sup>†</sup>. Figure 2.42 and Table 2.16 provide information on these local routes. The proposed routes would address some of the suggestions mentioned above.

A portion of the southwest corner of the study area is in Fort Bend County. Roughly half of this area is within METRO's Service Area. However, all of this area has access to transit services offered by Fort Bend County. All the services offered by the Fort Bend County Public Transportation Department, with the exception of demand response, operate outside the study area.

Fort Bend County provides demand response and commuter services through its Public Transportation (hereafter referred to as FBCT) that was formed in 2005. A total of 37 vehicles are used to provide these services Monday through Friday (excluding County Holidays). All services are open to the general public and all vehicles are handicap accessible. Demand Response service is provided within the County, and to medical facilities in Harris County.

The commuter services offer trips in to the Greenway Plaza, Galleria and Texas Medical Center areas of Houston. Figure 2.45 shows the annual Demand Response and Commuter Service Trips since 2005.

The Demand Response service allows riders to schedule service by phone (tollfree) Monday through Friday from 8 AM to 5 PM. Reservations can be made from one to 30 days in advance. Repeat trips may also be scheduled in advance. However, reservations are accepted on a "time and space" available basis. Service is curb-tocurb, although persons with disabilities may request door-to-door service. Passengers 12 years or younger must be accompanied by another person 18 years or older. (Fort Bend County Westpark Corridor Park and Ride Advance Planning Report, IDC, Inc., June 2011)

#### TABLE 2.18 - METRO NEW BUS NETWORK **ROUTES (OCTOBER 2014)**

Route#	Route Name	Network
2	Bellaire	Frequent
4	Beechnut	Frequent
25	Richmond	Frequent
26	Long Point Cavalcade	Frequent
46	Gessner	Frequent
63	Fondren	Frequent
82	Westheimer	Frequent
152	HarwinExpress-Westwood	Frequent
153	HarwinExpress-Briar Forest	Frequent
160	Memorial City Express	Frequent
161	Wilcrest Express	Frequent
23	Clay W 43rd	Coverage
39	Katy Freeway	Coverage
58	Hammerly	Coverage
67	Dairy Ashford	Coverage
70	Memorial	Coverage
72	Westview	Coverage
75	Eldridge	Coverage
162	Memorial Express	Coverage
9	Gulfton Holman	Ridership
36	Kempwood W 34th	Ridership
151	Westpark Express	Peak Only
402	Bellaire Quickline	Peak Only

Frequent routes are high ridership routes. They generally operate in high density areas of the city, are anchored by major origins and destinations, and provide connections to many other bus routes and rail stations.

Coverage routes are designed to provide access to the transit system for transit riders and locations that cannot support frequent service. In general, these routes service low density areas, and typically have 60 minute headways all day, with the potential for 30 minute service in the peak periods.

Ridership routes have strong ridership potential but without the current demand to support all-day frequent service. Service is generally scheduled every 30 minutes in the off-peak, midday, evening, late night, and weekend periods, and some routes may include more frequent peak period service of every 15 to 20 minutes

Peak Period express routes operate a portion of the same route as local service (regularly spaced stops) and sometimes a portion of the route is non-stop on a freeway. Average speed is, therefore, higher than other local routes but still lower than commuter routes. These routes are peak-period, weekday only service. Peak periods are typically 6 AM to 9AM and 3 PM to 6 PM.

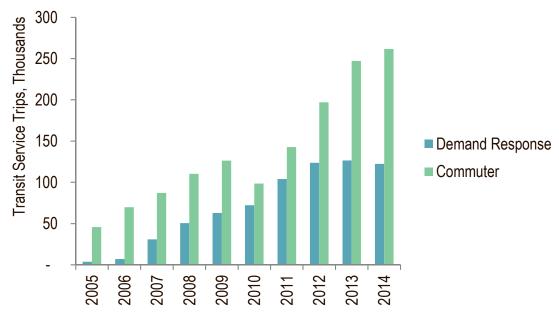


Figure 2.45 Fort Bend County Transit Service Trips

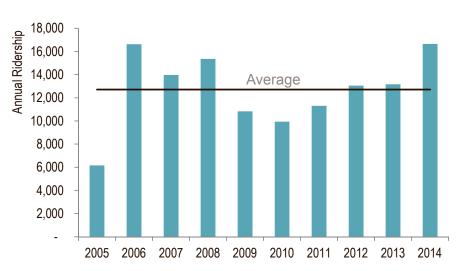


Figure 2.46 Annual Memorial City Shuttle Service Ridership





FBCT offers two commuter services known as TREKEXPRESS and FORT BEND EXPRESS. TREKEXPRESS provides direct bus services into the Greenway Plaza and Uptown Galleria area of Houston from two Park & Ride locations in Sugarland. TREKEXPRESS routes also stop at METRO's West Bellfort Park & Ride lot to allow passengers to transfer to other METRO routes, if desired. FORT BEND EXPRESS provides commuter service to the Texas Medical Center. The service originated at the Fort Bend County Fairgrounds and stops at both Sugarland Park & Ride locations before continuing the Texas Medical Center. (Fort Bend County Westpark Corridor Park and Ride Advance Planning Report, IDC, Inc., June 2011)

FBCT is projected to begin construct its first permanent Park & Ride facility in the Westpark Corridor in 2016. The facility will offer commuter services to locations in Houston, and could become an important transit hub for commuter shuttles and local bus service in the future. Additional information about the new FBCT Park & Ride is in Section 5.2.

The Energy Corridor partnered with METRO to create the 75-Eldridge Crosstown. The route operates along Eldridge Parkway, and provides connections with other METRO routes and Park & Rides. Memorial City has a complimentary shuttle service (Figure 2.45) operated by Metro National, Inc, the Memorial Management District's largest property owner.

The shuttle currently operates from 11AM to 2 PM Monday thru Friday, and takes riders from several locations within the Management District to and from the food court at Memorial City Mall. From 2005 to 2014 the average annual ridership has been over 12,000 persons. Figure 2.46 provides annual ridership information on the Memorial City Shuttle.

In addition to public transit, vanpools, and circulator shuttles residents and commuters in West Houston can utilize other means of getting around. There are numerous private and employer-sponsored carpools, as well as ridematching services like NuRide and Carma, taxi services like Yellow Cab and Uber, and vehicle sharing services like Enterprise CarShare.

Enterprise CarShare gives commuters access to a shared vehicle throughout the day so they can run personal or work errands. Vehicles can be rented 24 hours a day, seven days a week with fuel, physical damage/liability protection, vehicle maintenance and 24/7 roadside and member assistance for nominal hourly fees. Currently, Enterprise CarShare and the Energy Corridor have partnered to provide this service at two locations within the Study Area.

West Houston employers can also participate in other alternative commuting solutions such as telecommuting, alternate work schedule and parking management to allow their employees greater work flexibility. These solutions are offered by H–GAC's Transportation Department as incentives to help improve air quality in the Region. Bicycle and pedestrian-related commute solutions will be discussed in the next section.

TABLE	2.19 - TRANS	SIT ACCESS	SIBILITY
	MET	FBCT	
Land Use	Previous Network	New Bus Network	Parcel Service
Agricultural	71	84	
Commercial	2,776	3,035	13
Government/ Institutional	878	955	1,33
Industrial	25	36	
Multi-Family	442	478	1
Other	1,254	1,401	23
Parks & Open Space Residential	139 50,181	147 52,409	52 12,58
Vacant	1,986	2,165	19
TOTAL	57,752	60,710	15,02
Percentage of Study Area Parcels	35%	37%	99



## BICYCLE PEDESTRIAN **SAFETY**

As stated in the Energy Corridor District's Bicycle Master Plan, "Bicycling and walking are integral components of an efficient transportation network, along with public transit and the use of private motor vehicles. Therefore it is important that appropriate bicycle and pedestrian accommodations be made available to the public." The existence, condition, and connectivity of bicycle and pedestrian facilities vary considerably throughout the West Houston Study Area. Bicycle and pedestrian facilities will be discussed in relation to the Study Area subregions described in Section 2.1

The West Houston Study Area has an extensive collection of bicycle and shared use facilities (See Figure 2.47). The Study Area contains 13 percent of the 1,254.5 miles of bicycle and shared use facilities in the Region. As shown in Table 2.20, the Study Area has over 160 miles of existing public facilities, with another 113 miles of proposed public facilities planned for construction in the next 10 years. These planned public facilities are in addition to any facilities planned by private interests. All of the bicycle lanes and signed bicycle routes are located in the Inner Study Area, within the Houston city limits. The inner

Study Area also contains an extensive network of shared use trails (approximately 10 miles) in Terry Hershey Park along Buffalo Bayou.

Both reservoirs contain shared use trails. George Bush Park located in Barker Reservoir has more than 11 miles of trails. The trails in George Bush Park also connect to the trails in Terry Hershey Park to create nearly 22 miles of connected trails. Bear Creek and Cullen Parks are located in Addicks Reservoir and together these parks have 5.5 miles of trails.

The Outer Study Area has numerous shared use trails. However, many of these trails are off-street along waterways and are generally not connected. Exceptions include the 6.8 mile signed bicycle lane along FM 529 from US 290 to Barker Cypress Road, and the extensive network of shared use trails in the Cinco Ranch community.

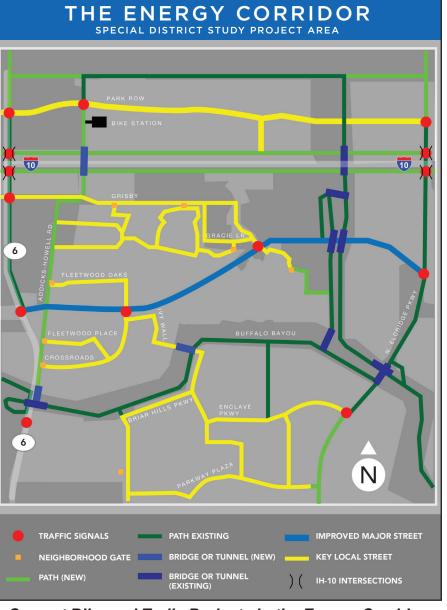
Though many exceptions exist especially along arterial streets, large portions of the inner Study Area are either connected with sidewalks for pedestrian travel, or composed of very low traffic streets within subdivisions on which walking in the street is sufficiently safe and comfortable. Pedestrians can cross major streets relatively easily at signalized intersections, but large distances between controlled crosswalks locations lead many to cross at mid-block (as Study Area crash data shows) where motorists may not expect them.

Few state-of-the-practice pedestrianactivated enhanced crosswalks are in place. These include active warning devices and Pedestrian Hybrid Beacons, which stop traffic with a solid red indication during the "WALK" phase then permit stop-and-proceed with flashing red while pedestrians finish crossing.

In the outer Study Area, conditions for pedestrians vary widely. Typically the walking environment is pedestrian-friendly within subdivisions (sidewalks, or verylow-traffic internal streets without them) but pedestrian-hostile outside them (no sidewalks along arterials and collectors, and major gaps where sidewalks do exist). Within some subdivisions there are sidewalk gaps across utility corridors such as power line rights of way. Although the trails system is well developed in the area it may be difficult for pedestrians and cyclists to access their final destinations as there are few dedicated on-street or other connecting facilities for the "last mile" of the trip. Many retail strips, commercial centers, and big box and superstore developments throughout the Study Area have no protected walkways between streets and storefronts, and are walled off from adjacent neighborhoods that would otherwise be an easy walk or bike ride away.

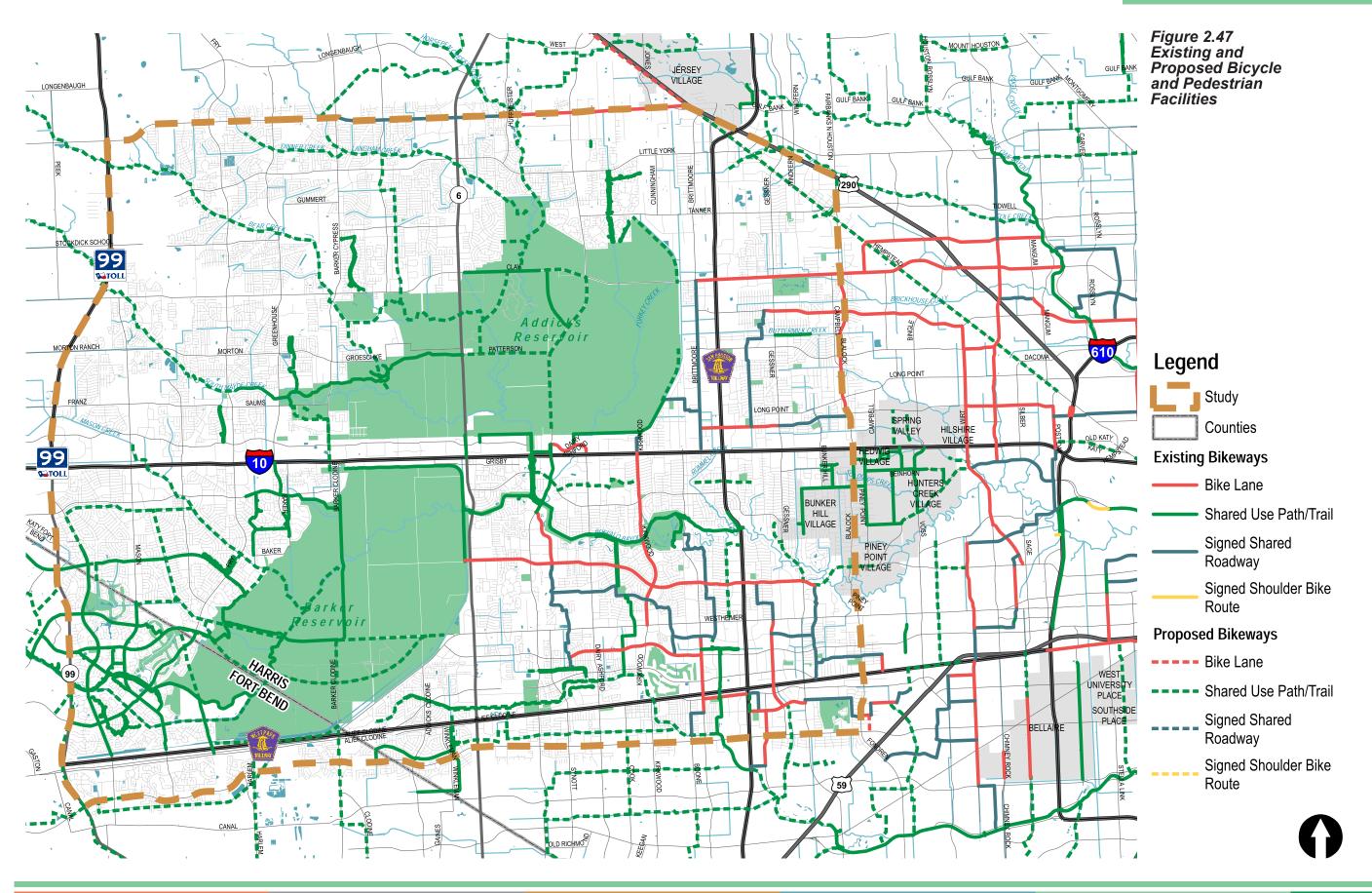
TABLE 2.20 - WEST HOUSTON BICYCLE & PEDESTRIAN FACILITIES						
	Existing	Proposed		Grand Totals		
Facility Type	Facilities	Length (mi)	Projects	Length (mi)	Facilities	Length (mi)
Bike Lane	18	31			18	31
Pedestrian Walkway*	1	0.05			1	0.05
Shared Use Path/Trail	155	105.1	72	113.8	227	218.9
Signed Shared Roadway	39	28.6			39	28.6
Total	213	164.7	72	113.8	285	278.5

<sup>\*</sup>Length of City of Houston Pedestrian Walkway is approximately 258 feet



Current Bike and Trails Projects in the Energy Corridor







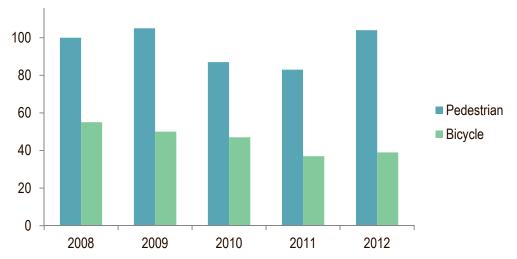


Figure 2.48 Annual Bicycle and Pedestrian Crashes

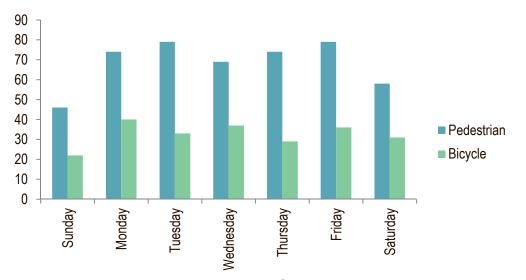


Figure 2.49 Bicycle and Pedestrian Crash Frequency by Weekday

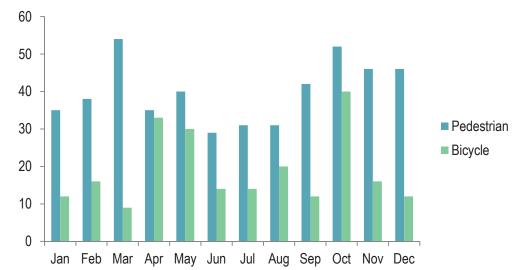


Figure 2.50 Bicycle and Pedestrian Crash Frequency by Month

The safety experience for bicyclists and pedestrians in West Houston has been mixed. Bicycle and pedestrian crashes respectively averaged eight and nine percent of all crashes in the Region (Tables 2.21 and 2.22, respectively).

TABLE 2.21 - ANNUAL BICYCLE CRASHES				
Year	Region	City of Houston	West Houston	Regional Pct
2008	579	323	55	9%
2009	612	350	50	8%
2010	479	234	47	10%
2011	455	193	37	8%
2012	677	370	39	6%
5 YR AVG	560.4	294	45.6	8%

TABLE 2.22- ANNUAL PEDESTRIAN CRASHES				
Year	Region	City of Houston	West Houston	Regional Pct
2008	1239	871	100	8%
2009	1125	824	105	9%
2010	911	528	87	10%
2011	890	498	83	9%
2012	1269	894	104	8%
5 YR AVG	1,086.80	723	95.8	9%

From 2008 to 2012, 228 bicyclists and 479 pedestrians were involved in collisions with motor vehicles. Tables 2.23 and 2.24 provide more detail on crashes, injuries, and fatalities for bicyclists and pedestrians in the Study Area. Crash characteristics are shown in Figures 2.48-2.56. Annual crashes (Figure 2.48) have fluctuated over the five year period for both bicyclists and pedestrians. From 2011 to 2012, crashes increased by 25 percent for pedestrians, and 5 percent for bicyclists.

Similarly, crashes vary by weekday for both bicyclist and pedestrians. For pedestrians, Tuesdays and Fridays were days with the highest crashes, while it was Mondays for bicyclists (Figure 2.49). An analysis of crashes by month of the year (Figure 2.50) revealed that March and October were the worst months for pedestrians, while April and October were the worst months for bicyclists. The time of day (Figure 2.51) bicycle and pedestrian crashes occurred was similar to the general crash pattern for the Study Area (See Figure 2.34). For pedestrians, nearly half of all crashes occurred during peak traffic hours (6AM-9AM and 4PM-7PM). Likewise, over half (53 percent) of all bicycle crashes in the Study Area occurred during these times. The age of bicyclist and pedestrians involved in crashes (Figure 2.52) was interesting. For pedestrians, the largest age group of crash victims were 25-44 year olds, followed by those 18 years and under. For bicyclists, those 18 years and younger were the largest groups of victims, followed by those 25-44 years old.

As mentioned above, varied pedestrian environment in the Study Area may cause pedestrians to cross streets at mid-block creating a safety hazard. Crash data confirms this phenomenon, as 53 percent of pedestrian crashes in the Study Area do not occur at intersections (Figure 2.53).

TABLE 2.23 - BICYCLE CRASH SEVERITY					
Year	Crashes	Injuries*	Fatalities		
2008	55	55	0		
2009	50	50	0		
2010	47	42	2		
2011	37	33	2		
2012	39	40	0		
TOTAL	228	220	4		

TABLE 2.24 - PEDESTRIAN CRASH SEVERITY					
Year	Crashes	Injuries*	Fatalities		
2008	100	111	9		
2009	105	107	6		
2010	87	99	6		
2011	83	85	9		
2012	104	105	15		
TOTAL	479	507	45		

<sup>\*</sup> Some crashes involve multiple pedestrians

Interestingly, the opposite is true for bicyclists, as 56 percent of bicycle crashes occurred at intersections (Figure 2.54). 90 percent of pedestrian crashes and 95 percent of bicycle crashes resulted in injuries. 9 percent of pedestrian crashes and 2 percent of bicycle crashes were fatal (Figures 2.55 and 2.56).

Spatially, 83 percent of pedestrian crashes and 72 percent of bicycle crashes occurred east of State Highway 6, and 84 of the 228 bicycle crashes occurred with one-quarter mile of an existing bicycle facility, resulting in 81 injuries and 2 deaths (Figures 2.57 and 2.58).



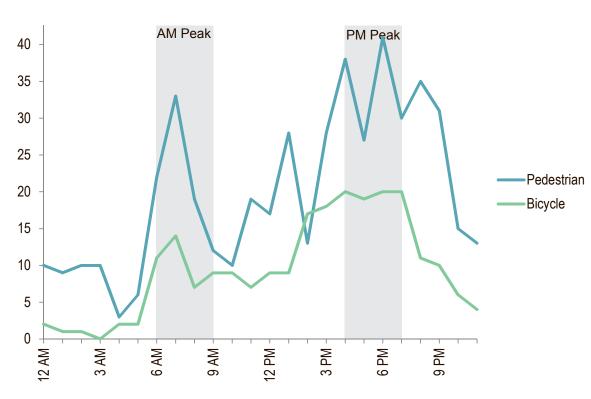


Figure 2.51 Bicycle and Pedestrian Crash Frequency by Hour\*
\*AM Peak 6 AM to 9 AM; PM Peak 4 PM to 7 PM

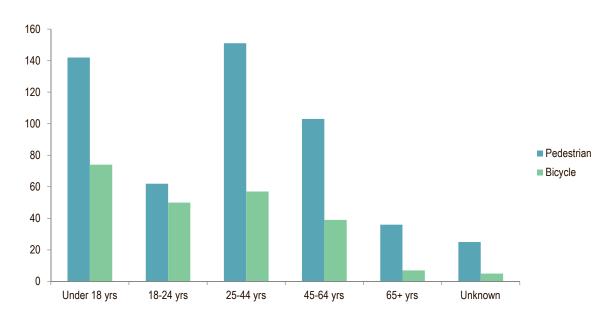


Figure 2.52 Bicycle and Pedestrian Crash Frequency by Age Group





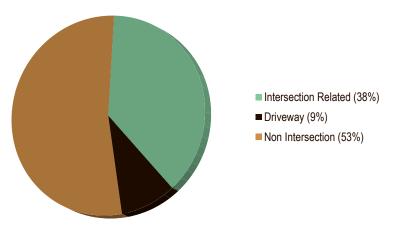


Figure 2.53 Pedestrian Crash Frequency by Roadway Location

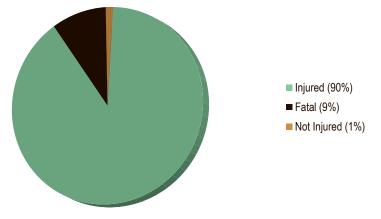


Figure 2.55 Pedestrian Crash Severity

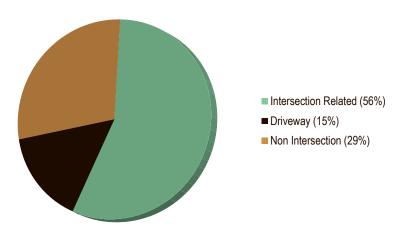


Figure 2.54 Bicycle Crash Frequency by Roadway Location

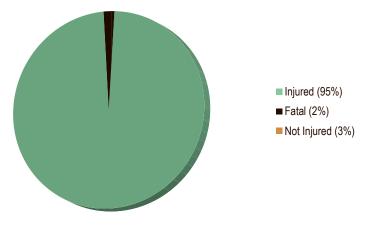
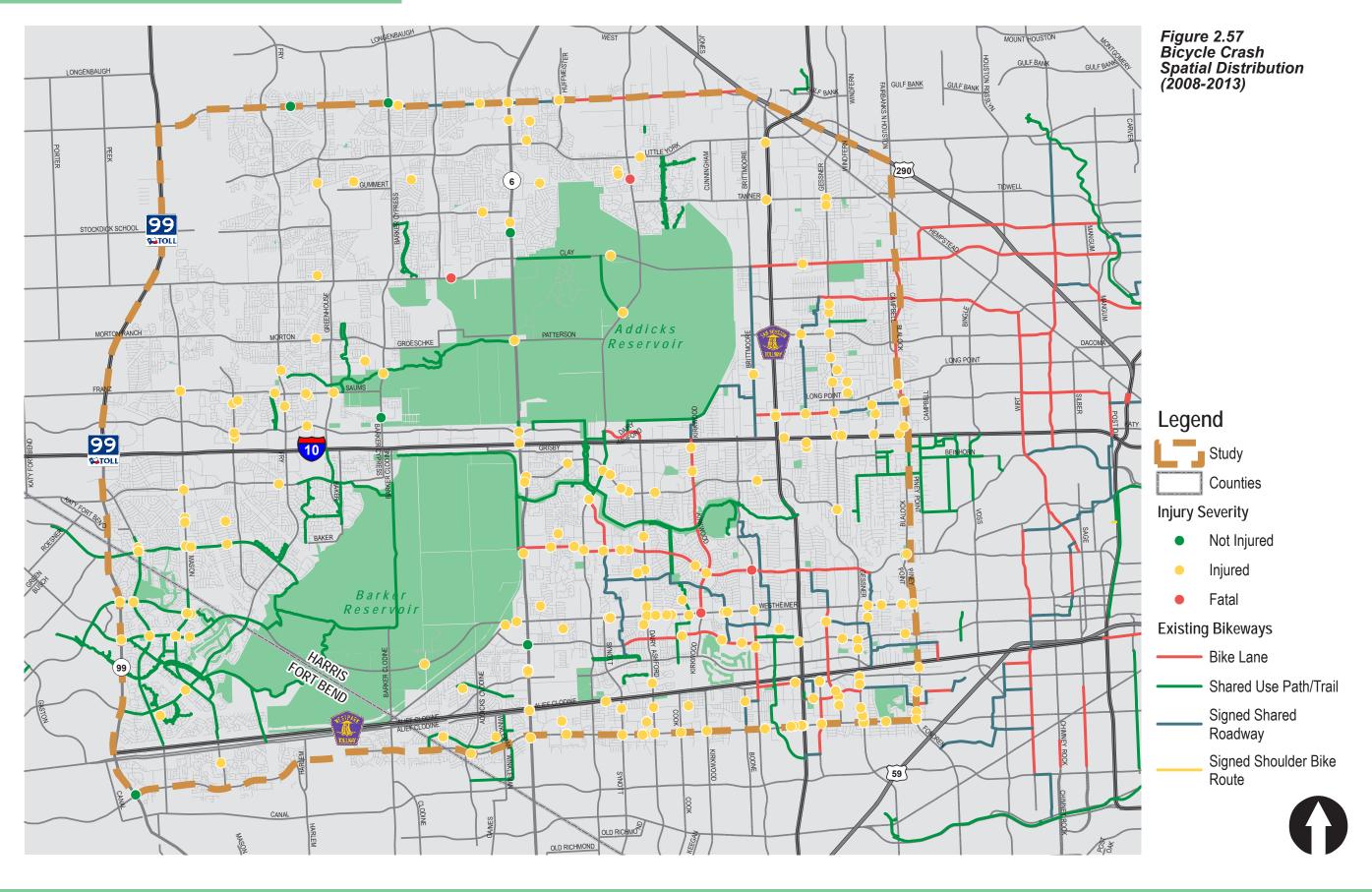
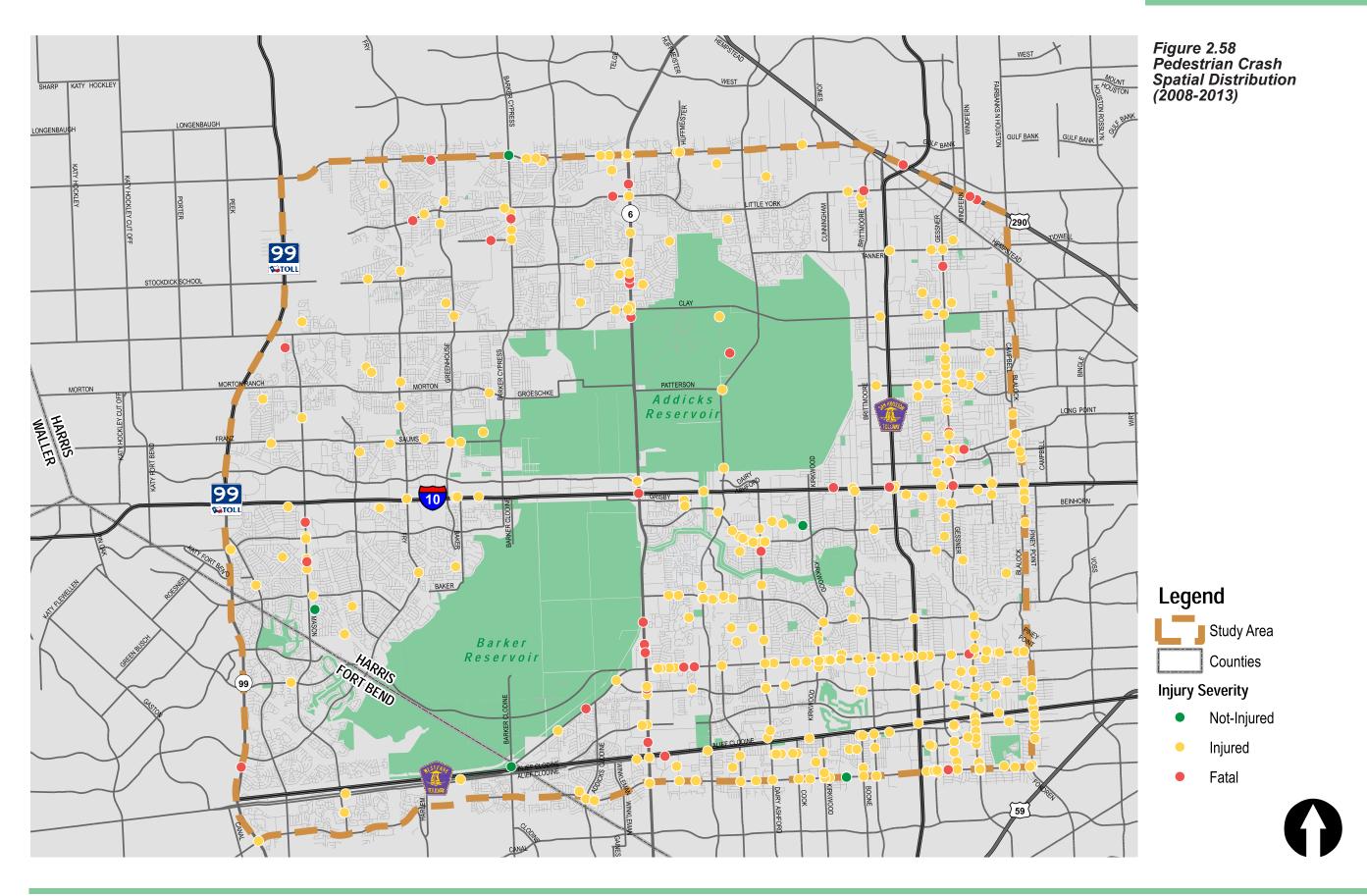


Figure 2.56 Bicycle Crash Severity









# 2.9 RAIL FACILITIES

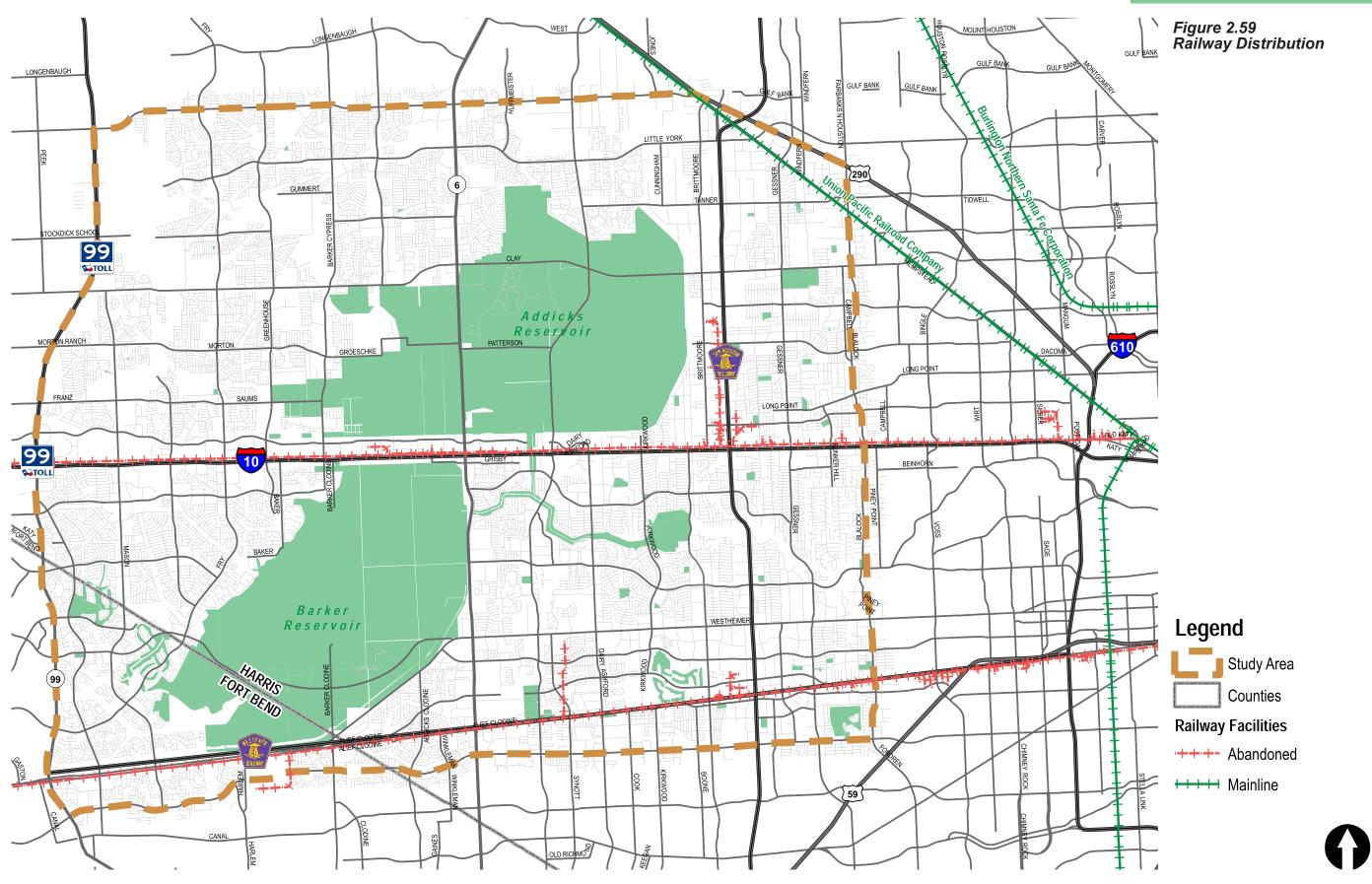
There is only one active rail facility in the Study Area. Union Pacific Railroad has an active rail line adjacent to Hempstead Road and US 290. As Shown in Figure 2.59, approximately 3.5 miles of this rail line pass through the Study Area. However, there are two abandoned rail line right-of-way corridors in the Study Area. One corridor is adjacent to Interstate 10, and the other runs along the Westpark Tollroad.

The railroad line along Interstate 10, first built in 1893, was abandoned in 1997 when Union Pacific sold the right-of-way to TxDOT for the expansion of Interstate 10. The line was approximately 23 miles long, and extended from Harris–Fort Bend County line in Katy, TX to the Eureka yard just inside Loop 610. The Westpark rail line, formerly the Bellaire Subdivision, extended for approximately 38 miles from US 59 and Montrose Blvd. to the Fort Bend-Wharton County line. The rail line was abandoned in 1992 when Southern Pacific Railroad sold the 100 feet of right-of-way to METRO. In 1999, METRO sold half of the right-of-way to the Harris County Toll Road Authority to construct the Westpark Tollway. METRO currently has plans to use the remaining portion of right-of-way for construction of a portion of the University Lightrail line.

In 2008, H–GAC commissioned the Regional Commuter Rail Connectivity Study that took an unconstrained long range look at commuter rail options in the Houston area. The study examined the Westpark corridor and four others as potential commuter rail corridors. It concluded that the Westpark Rail Corridor could potential have over 6,800 passengers per week. The study did not consider the Interstate 10 corridor as a commuter rail route because the right-of-way had already been sold to expand the Katy Freeway.

Recently, METRO sold additional portions of the Westpark Corridor right-of-way to the Fort Bend County Toll Road Authority for expansion of the Westpark Tollway from the Grand Parkway to Jones Lane in Fulshear,







## REGULATIONS, POLICIES AND **STRATEGIC PLANS**

The land development regulatory framework of political entities in West Houston is diverse. Lack of land use zoning regulations throughout the area presents unique challenges and opportunities for developers. However, local governments and special districts have addressed this issue with a wide range of statutes and policies. Peter Coy states that, "Houston is well known as the only major U.S. city with no formal zoning code. Such a seeming lack of order is difficult to grasp by those unfamiliar with the area.

The absence of a comprehensive land use code conjures up images of a disjointed landscape where oil derricks sit next to mansions and auto salvage yards abut churches" (2007). But, Teddy M. Kapur says that "...contrary to its free market reputation, the [C]ity of Houston has directed land use

#### ABLE 2.25 - CITY OF HOUSTON DEVELOPMENT ORDINANCES

#### Ordinance

Chapter 10 - Buildings and Neighborhood Protection

Chapter 19 - Flood Plain

Chapter 26 – Parking

Chapter 33 - Planning and Development

Chapter 38 - Railroads

Chapter 40 - Streets and Sidewalks

Chapter 42 - Subdivisions, Developments and Platting

Chapter 45 - Traffic

allocations by intervening in private deed restrictions and enacting land management controls such as subdivision regulations, street design standards, tax increment reinvestment zones, and prevailing lot size requirements" (2004).

Indeed the City of Houston has a wide array of ordinances (Table 2.25) and policies that give the City the ability to effectively manage land uses. In addition to enforcing deed restrictions in residential areas, the City has a detailed Infrastructure Design Manual and the following ordinances at its deposal to regulate the built environment.

- 1. Chapter 10 Buildings and Neighborhood Protection: establishes regulations to protect neighborhoods against blight and outlines various building standards. Buildings on utility easements, deed restrictions, abatement of unauthorized blight, abatement of junked vehicles, Houston multi-family habitability codes, and hoarding and related behaviors provide a few examples of articles defined under this Chapter.
- 2. Chapter 19-Flood Plain: The purpose of this chapter is to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas. This chapter provides a regulatory system to monitor the issuance of plats and permits to reduce the likelihood that development within the City of Houston will increase the dangers of flooding
- 3. Chapter 26 Parking: Establish parking regulations for on and off street facilities within the City of Houston. Parking meters, commercial vehicle loading zones, booting/ towing, valet parking services, parking benefit districts and residential parking

4. **Chapter 33** – Planning and Development: establishes regulations associated with planning and development within the City of Houston. This chapter relates to regulations

permits are outlined in this Chapter.

regarding the Planning Commission, tree planting, historic preservation, super neighborhoods, and landscape unit costs

among others.

5. Chapter 38 - Railroads: establishes regulations for the City's interactions with rail throughout Houston inclusive of permit to lay tracks, crossings of right-of-way by city water and sewer lines, separation of railroad from street grade, closing of crossing gates and guards, speed limit for trains, blowing whistle, as well as the City authorization to participate in certain costs relating to street and railroad intersections are example articles within this Chapter.

6. Chapter 40 - Streets and Sidewalks: establishes regulations for streets and sidewalks within the City of Houston. Articles examples associated with this Chapter include the construction of sidewalks, driveways, curbs and gutters, excavation of the public way, bus shelters, paving assessments, sidewalk sales and

#### TABLE 2.26 - SELECT STATE OF TEXAS **ECONOMIC DEVELOPMENT PROGRAMS**

#	Program	Statute	Tax Type
1	Tax Increment Financing	Chapter 311, Tax Code	Property Tax
2	Tax Abatement Agreements	Chapter 312, Tax Code	Property Tax
3	Value Limitation and Tax Credit	Chapter 313, Tax Code	Property Tax
4	Development Corporation Act of 1979,	Chapters 501 - 505,	Local Sales & Use Tax
	Type A/B Sales Tax for Economic Development	Local Government Code	
5	County Assistance Districts	Chapter 387, Local Government Code	Local Sales & Use Tax
6	Enterprise Zones	Chapter 2303, Government Code	Sales and Use
7	Chapter 380/381 Agreements	Chapters 380-381, Local Government Code	Sales and Use, Property Tax, Other
8	Municipal & County Hotel Occupancy Tax	Chapters 351- 352, Tax Code	Local Hotel Occupancy Tax
9	Public Improvement Districts (PIDs)	Chapter 372, Local Government Code	Special Assessment
10	Neighborhood Empowerment Zones	Chapter 378, Local Government Code	Property Tax, Sales Tax and Local Fee Waivers
Source: Texas State Comptroller, 2012			





performances, alleys, sidewalk and roadway obstructions and impairments.

7. Chapter 42 – Subdivisions,

Developments and Platting: establishes regulations for the platting, subdividing and development of land within Houston's Corporate City Limits to ensure that development and redevelopment efforts in Houston occur in a safe and healthy manner. Planning standards and development associated with the City's transit corridors are outlined in this Chapter.

8. Chapter 45 – Traffic: establishes regulations associated with traffic inclusive of the vehicle, pedestrian and bicycle.

Articles associated with this Chapter include pedestrian, bicycles, etc. upon limited or controlled-access highways, boarding and alighting moving vehicles, application of chapter to persons propelling push carts, riding animals, etc., use of coasters, toy vehicles and similar toy devices on the roadway.

In 2013, the City of Houston amended Chapter 42 and Chapter 10. Chapter 42 was amended to allow increased housing density outside of Loop 610 by eliminating the distinction between "urban" (inside Loop 610) and "suburban" (outside Loop 610). The Chapter 10 amendment provides neighborhoods with greater protection from incompatible land uses and ensures access to single-family residences.

The City says the ordinance changes will eliminate confusion and discrepancies contained within the codes, provide additional resources for neighborhoods to manage their future; make the City competitive with suburban development, improve development standards and increase single-family residential construction within the city limits.

In addition to the aforementioned ordinances, the City also has an Infrastructure Design Manual (IDM). The IDM contains detailed standards for project submittals, including plat drawings, streets, utilities, and traffic controls. The IDM also governs street classification, including designation of transit corridors.

All of the Management Districts, TIRZs, and Super Neighborhoods in the Study Area work with the City of Houston to develop capital improvement projects in their areas, and some have their own capital improvement programs that are incorporated into the City's Capital Improvement Program. In addition, some of these groups develop long-range strategic plans that inform and guide development in their areas. These plans outline broad goals and in some cases include conceptual depictions of future infrastructure and building projects.

Harris County annually adopts Appendix A of the City of Houston's Major Thoroughfare Plan (See Section 4.2). Appendix A contains street cross section geometries that Harris County enforces in the unincorporated areas of the county. Harris County does not utilize the City's Complete Streets Program.

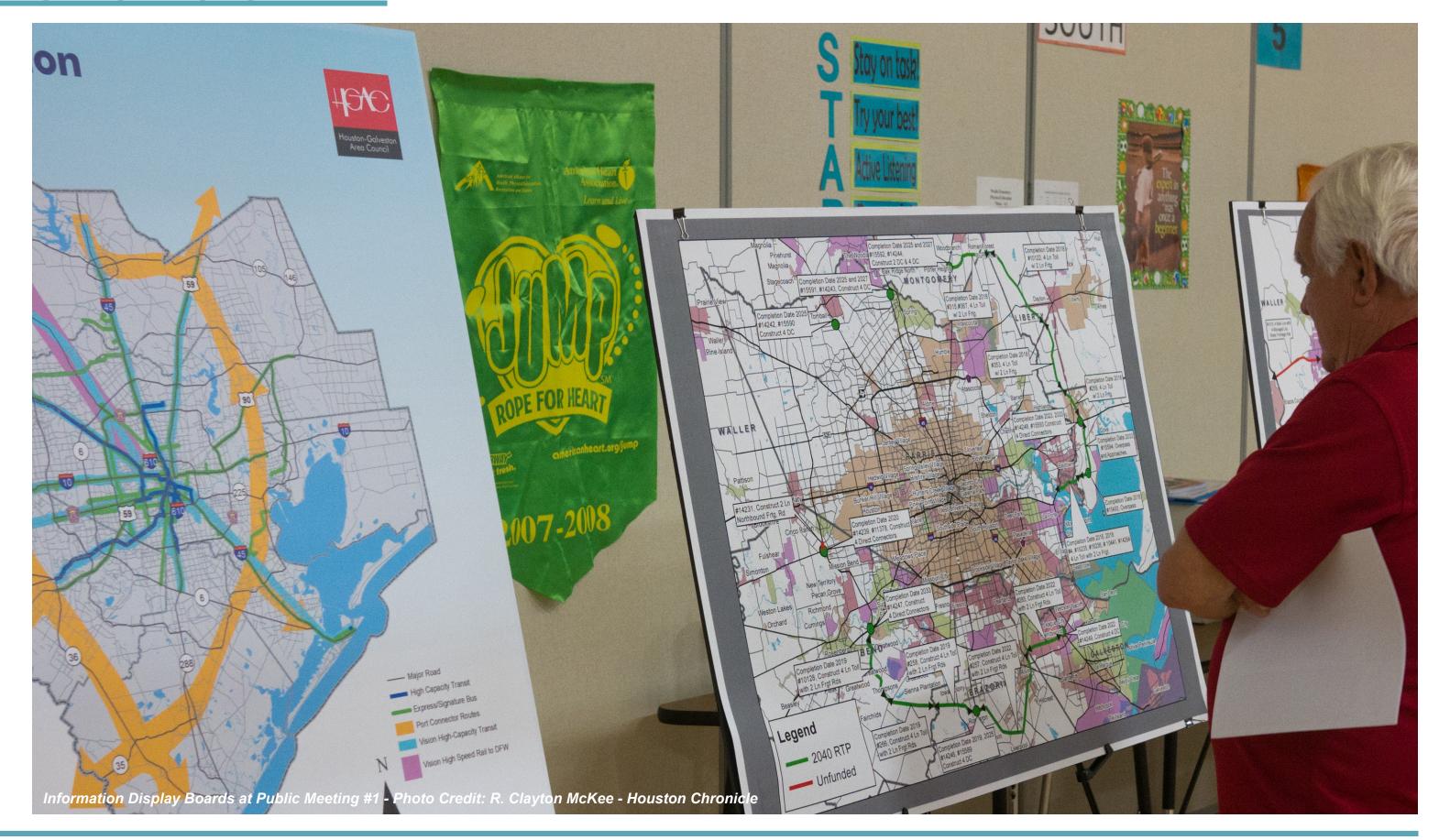
Unlike Harris County, Fort Bend County (FBC) does not adopt the City of Houston's MTFP Appendix A. FBC developed its own street cross section geometries and ROW requirements. The County does not endorse the City's Complete Streets program, although its development regulations contain many elements of the program.

FBC adopted a revised MTFP in February 2015. FBC is currently revising its Subdivision regulations. The revisions should be completed by December 2015.

The State of Texas provides a rich array of economic development tools to help local and county governments encourage and maintain the economic vitality of their jurisdictions. Tools applicable to the Study Area are listed in Table 2.26, and described below. Many of these incentives and assessments are currently being utilized in the Study Area. Details regarding each of these development tools can be found in Appendix G.









## **PUBLIC INVOLVEMENT**

Stakeholder participation and community involvement were a major area of focus for H-GAC and the project team during the development of the West Houston Mobility Plan. No plan of this nature can be complete without the input and review of the public, as such, there has been an important effort on part of the West Houston Mobility Plan to gather and incorporate the public's input and feedback.

Throughout the course of the study, there have been numerous opportunities for the public to give their input and be heard. Outreach was accomplished through a variety of methods including a Steering Committee, public meetings, a project website, crowd sourced mapping application, online survey, and stakeholder meetings. Each of the outreach efforts and data gathered from those efforts is outlined in this chapter.

#### **FUNDING PARTNERS**

The City of Houston, the Energy Corridor District, Memorial Management District and the Westchase Management District all contributed funds for the local match portion of this study. The funding partners also served on the Steering Committee.



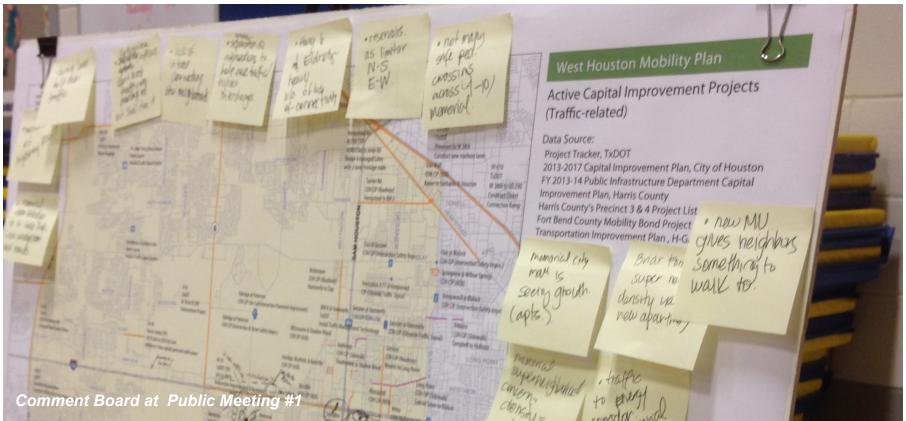


#### energycorridor













#### 3.2 STEERING COMMITTEE

Key Study Area stakeholders and groups were identified and recruited for involvement in the study process. A steering committee was formed from this group to assist in identifying key areas of focus for the study effort, as well as to guide the development of the final report and recommendations. The Steering Committee was made up of representatives from the following organizations.

- Houston–Galveston Area Council
- City of Houston
- The Energy Corridor
- The Westchase Management District
- West Houston Association
- Memorial Management District
- METRO
- Harris County
- Gulf Coast Rail District
- TxDOT

The Steering Committee met six times throughout the course of the project, reviewing work and providing guidance to ensure that the goals and desired outcomes for the study were met. All steering committee meetings were held at H-GAC offices (3555 Timmons Lane, Houston, TX 77027) and at Houston TranStar (6922 Old Katy Road, Houston, TX 77024). The dates of the steering committee meetings are listed below:

- Steering Committee Meeting #1: June 26, 2013
- Steering Committee Meeting #2: October 10, 2013
- Steering Committee Meeting #3:
   December 11, 2014
- Steering Committee Meeting #4: April 30, 2014
- Steering Committee Meeting #5: June 24, 2014
- Steering Committee Meeting #6: November 5, 2014
- Steering Committee Meeting #7: April 21, 2015
- Steering Committee Meeting #8: April 29, 2015



#### 3.3 PROJECT **WEBSITE**

A project website (Figure 3.1) was created and launched in August 2013, as a method to gather input from those that could not or chose not to attend the public meetings. The website was named My West Houston (http://mywesthouston.com) and featured information about the study, a Study Area map, meeting materials, a crowd sourced mapping application that allowed users to geographically locate their comments and view project contact information.

The website was maintained by H-GAC. Over the course of the study, the website saw 6,575 visitors who provided 35 comments.



#### Final Public Meeting on December 18, 2014!

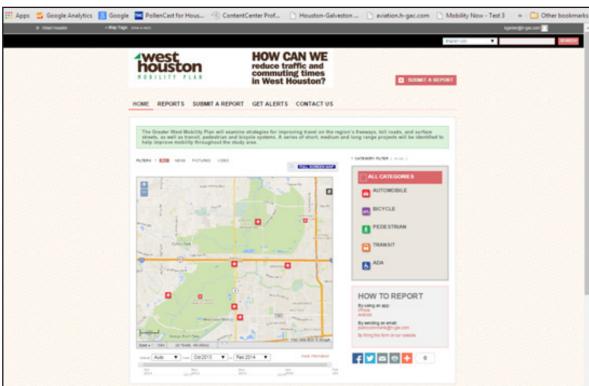
Posted on December 2, 2014

The Houston-Galveston Area Council will hold the fourth and final public meeting for the Greater West Houston Mobility Study will be held on Thursday December 18, 2014 at Maurice Wolfe Elementary School starting at 6:00 PM. During this meeting the proposed study recommendations will be presented for public review and comment. Recommendations will cover changes to the City of Houston Major Thoroughfare Plan, addition and/or expansion of transit services and other alternative transportation modes, bicycle and pedestrian improvements, and government policy changes needed to facilitate implementation.

WHEN: 6:00 - 8:00 PM

This is a free event open to the public.

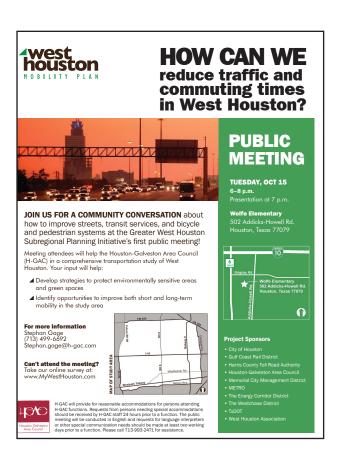
Figure 3.1 Project Website

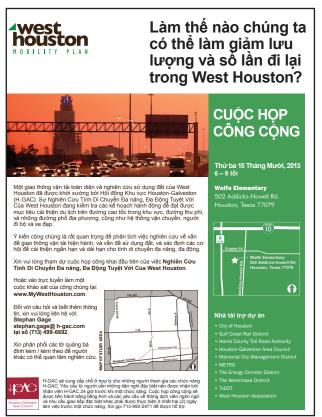


**Project Website Crowdmap** 











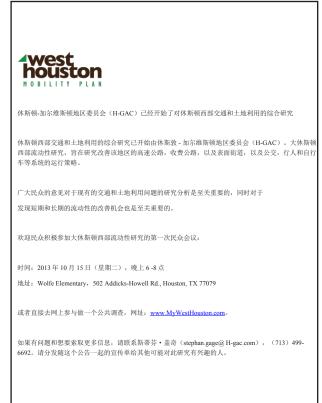


Figure 3.2 Multi-lingual Public Meeting Flyers/Annuncios de Reuniones Publicos



# 3.4 PUBLIC MEETINGS

There were four public meetings held throughout the course of the study. These meetings took place during the evenings at locations across the Study Area to try to provide the opportunity for as many people as possible to participate. Figure 3.3 is a map of the public meeting locations. Over 200 people attended the public meetings.

#### STAKEHOLDER AND PUBLIC MEETING NUMBER 1

October 15, 2013

The first stakeholder and public meetings were held at Wolfe Elementary School, located in the Energy Corridor District. The stakeholder meeting was held from 4:30-5:30 PM and the public meeting was held from 6-8 PM. Each meeting followed a similar format where there was a short presentation to introduce the study, followed by an open house where attendees were encouraged to give their input regarding existing problems and conditions in the Study Area and what transportation improvements or services they would like to see in the future. The room was divided into four broad topics of interest:

- Vehicles/Roadways
- Bicycles
- Transit
- General Mobility

Representative for each topic gathered information about that topic on maps located in each area.

#### **PUBLIC MEETING NUMBER 2**

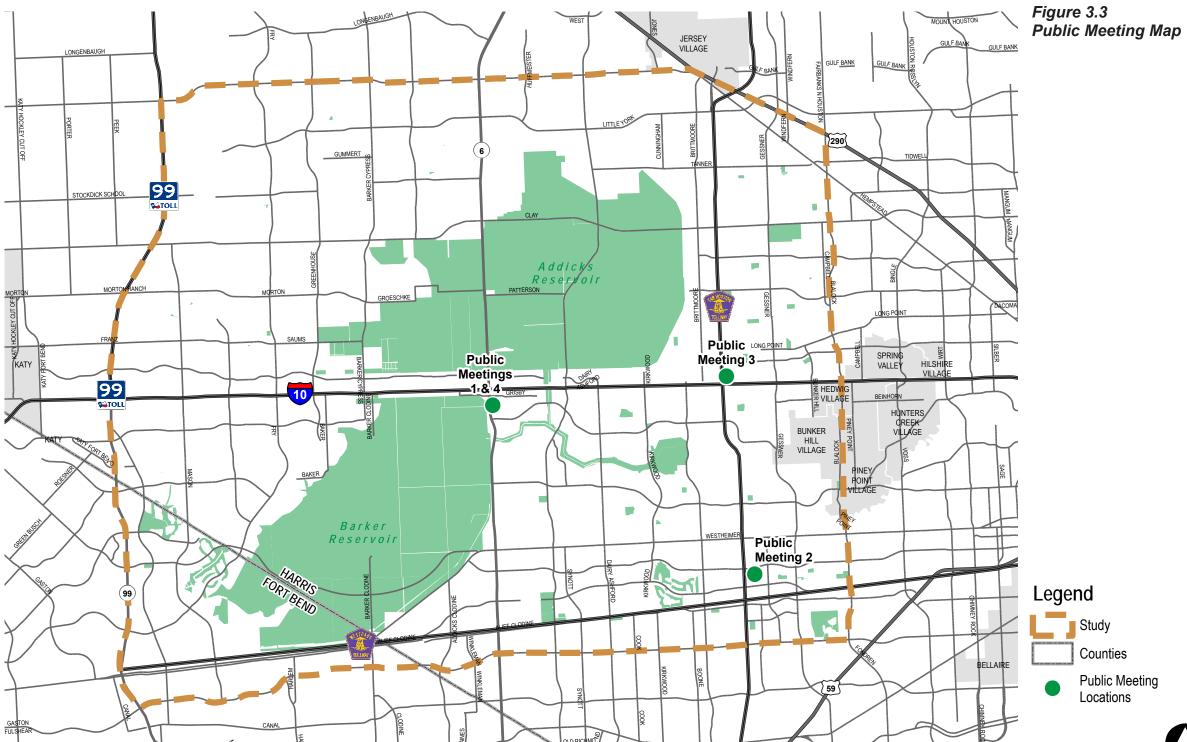
January 15, 2014

The second public meeting was held at the Tracy Gee Community Center, located in the Westchase District. At this meeting the stakeholders and public were presented with information about the proposed toolbox, intersections to be analyzed, and the expected development scenarios. During the presentation, feedback was encouraged through the use of interactive polling regarding existing travel behaviors and desired mobility options. The questions and a summary of the results are listed in Appendix B.





## PUBLIC ENGAGEMENT



#### **PUBLIC MEETING NUMBER 3**

July 22, 2014

A third public meeting was held at the Houston Community College – Spring Branch Campus, in the Memorial Management District. Attendees viewed a presentation that recapped the results of the study, including traffic projections, example projects, and traffic analysis.











# PUBLIC ENGAGEMENT

#### **PUBLIC MEETING NUMBER 4**

December 18, 2014

A fourth public meeting was held once more at Wolfe Elementary School. Attendees were presented with all the study's major findings and recommendations.





# PUBLIC ENGAGEMENT













# **GROWTH SCENARIOS**

In order to better understand future conditions and needs in the Study Area, four demographic and land development scenarios were developed for comparison. These scenarios used different parameters and methods to project population and employment growth, as well as land development trends through the year 2040. Each of the scenarios is briefly described below, and depicted in Figures 4.1-4.16.

#### **SCENARIO 1-BASE SCENARIO**

The Scenario 1 forecast is H-GAC's most recent projections (2014, 3rd quarter) by Travel Analysis Zone (TAZ)†, from 2010 through 2040. H-GAC's parcellevel forecasting model generates these projections, which H-GAC aggregates into TAZ geographies. This model tends to produce results that indicate considerable regional centralization of growth, especially for employment. In the West Houston Study Area, this means that locations along the Sam Houston Tollway / Beltway 8 redevelop into much denser employment centers over time, likely via new office development. This forecast is based on the transportation projects in the 2035 Regional Transportation Plan (RTP).

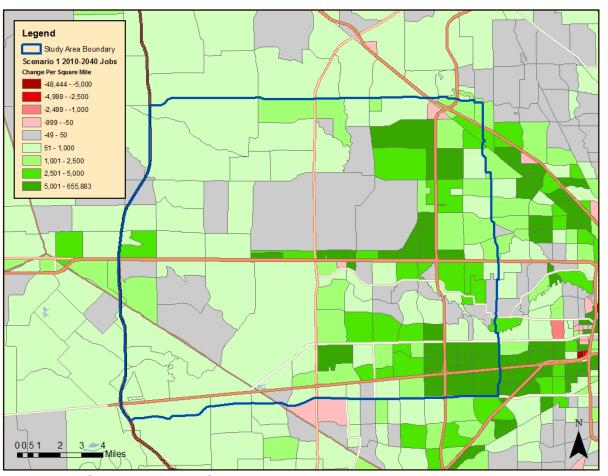


Figure 4.1 Scenario 1 Job Growth

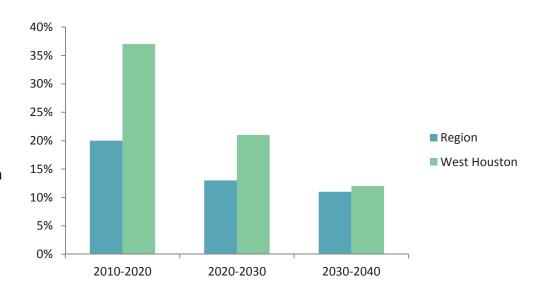


Figure 4.3 Scenario 1 Job Growth

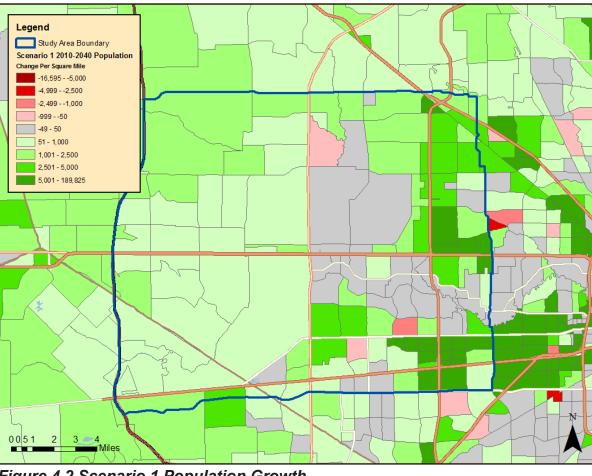


Figure 4.2 Scenario 1 Population Growth

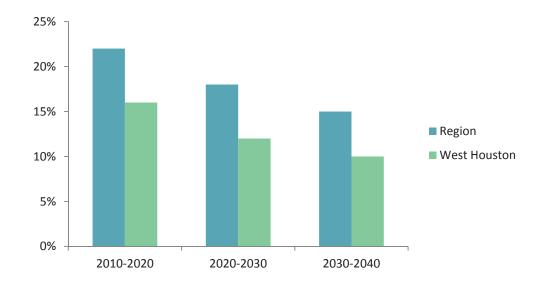


Figure 4.4 Scenario 1 Population Growth



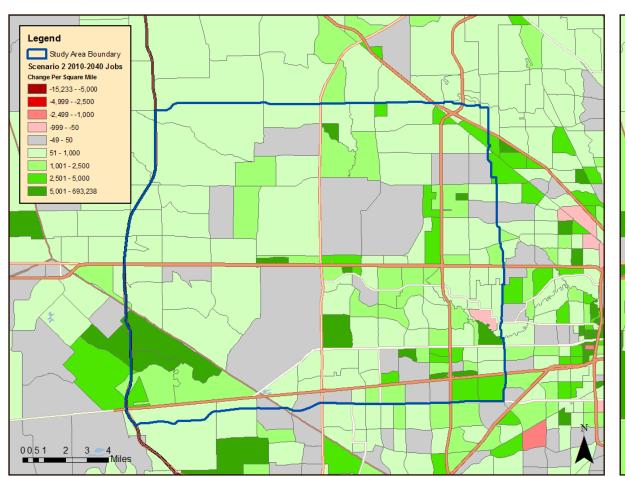


Figure 4.5 Scenario 2 Job Growth

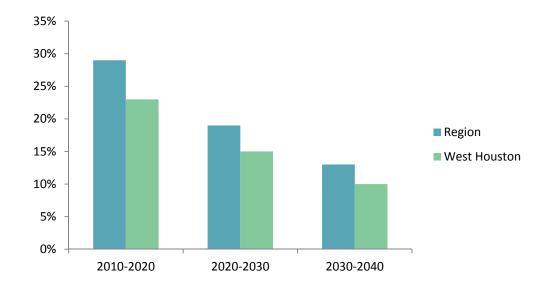


Figure 4.7 Scenario 2 Job Growth

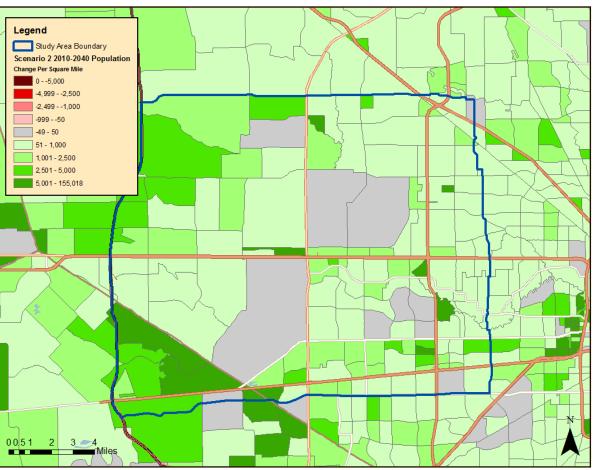


Figure 4.6 Scenario 2 Population Growth

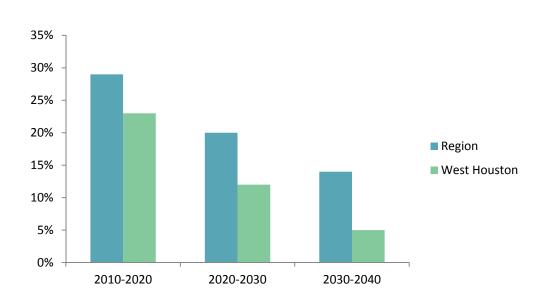


Figure 4.8 Scenario 2 Population Growth

#### SCENARIO 2 – DISTRIBUTED JOB GROWTH

Scenario 2 is the first forecast to employ the shift-share methodology. As with Scenario 1, Scenario 2 uses H-GAC figures as the baseline for its projections. The region and county-level control totals for 2040 are calculated by applying the growth rates from CDS' 2012 regional forecast to the 2010 baseline totals given by H-GAC. From these new control totals, the shift-share method calculates the forecast to the TAZ level using growth shares established in the most recent toll road forecast issued by CDS.

These growth shares are based on CDS' assessment of current development patterns for housing and commercial uses, take into account both planned and underway development projects, and consider the market forces which are likely to generate new development or redevelopment in the future. Employment category shares are also adjusted and TAZ level employment category figures are calculated by applying each category's share to the total employment figure in each TAZ. The results of the Scenario 2 model generally produce more decentralization, particularly of employment, than the Scenario 1 model, meaning less intense commercial redevelopment along the Sam Houston Tollway / Beltway 8 corridor. More future growth is also distributed to outlying locations outside of the Study Area compared to the growth in Scenario 1. This forecast is also based on projects which are in the current RTP. A comparison between the Scenario 1 and 2 forecasts can be seen on these pages.



#### **SCENARIO 3 – URBAN FRAMEWORK**

Scenario 3 considers the land use impacts of potential local government policies and investments, demonstrating the sensitivity of the transportation system to a specific growth pattern. The development policies are assumed to reflect the recommendations of the Urban Houston Framework Case Study, an effort by H-GAC included in the process of creating the agency's Our Great Region 2040 Plan. These recommendations are included as an Appendix to this report. In CDS' forecast modeling, the effects of these policies and investments include the following:

- Make localized density of multiple land uses more economically and practically attractive in selected locations.
- Enable a more walkable neighborhood environment through changes to street design and operation, investments in pedestrian and bicycle infrastructure, and differently provided and managed parking supply.
- Provide enhance transportation facilities tailored to serving densely developed areas, most notably public transit.
- Potential changes to land use (and population / employment) growth patterns from these measures could include:
  - Redistribution of land use growth within a small area to cluster more densely within the area governed by the Urban Framework policies, with less development outside the Urban Framework area. This would

be associated with changes in use; e.g., single family and/or one-story retail less likely and multi-story office and multifamily more likely within an Urban Framework area. The reverse would be true in locations outside of Urban Framework application. These changes may not necessarily entail changes in growth between one TAZ and another, but might occur primarily within single TAZs, depending on where TAZ boundaries fall.

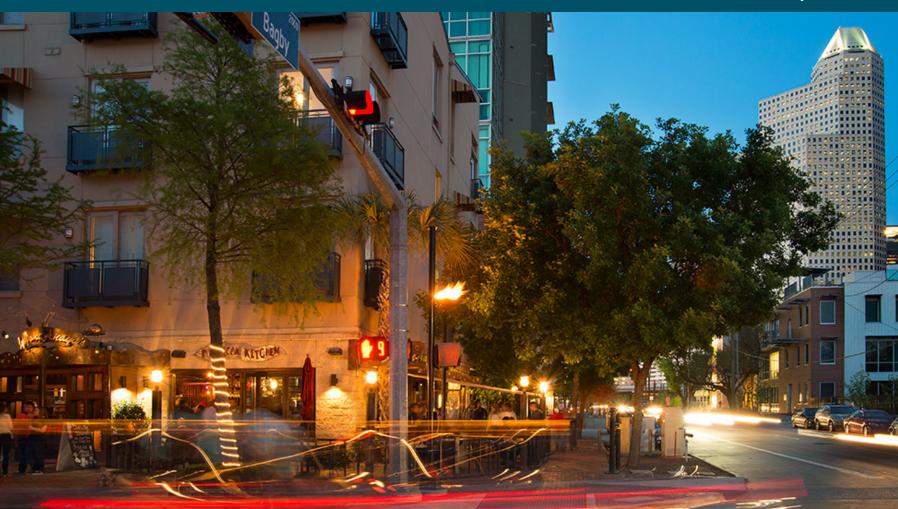
- Redistribution of land use (and population and employment) growth patterns from one regional location to another because of:
- Improved regional-level transportation infrastructure (most likely commuter transit) that results in significant differences in travel time or other relevant metrics related to travel convenience and cost and/or
- A significant difference in regional market appeal due to development of a notable "urban center" that, by virtue of its "quality of place" and image, attracts an above-average level of denser development from around the region.
- These changes would likely result in an alteration of projected growth allocation from one TAZ to another. This scenario will demonstrate the sensitivity of the transportation system to a specific growth pattern. The team recognizes that the actual growth patterns that take place by 2040 will likely be a hybrid of several of the patterns considered in this study.



#### **URBAN HOUSTON FRAMEWORK**

Houston, Texas

A CASE STUDY FOR THE H-GAC REGIONAL PLAN FOR SUSTAINABLE DEVELOPMENT May 2013



City of Houston's Urban Houston Framework



While still employing a version of the

shift-share methodology, Scenario 3's

2040 forecast is built upon the numbers in

1 in most TAZs. The regional and county-

level forecast numbers for Scenario 3 are

identical to those in Scenario 1, and used

as control totals for the shift-share method.

Shift-share is employed in this scenario only to make adjustments in the TAZs that would be effected by specific transportation improvements. The employment category forecast was also adjusted for Scenario 3, and the TAZ level numbers calculated using

the same method used in Scenario 2.

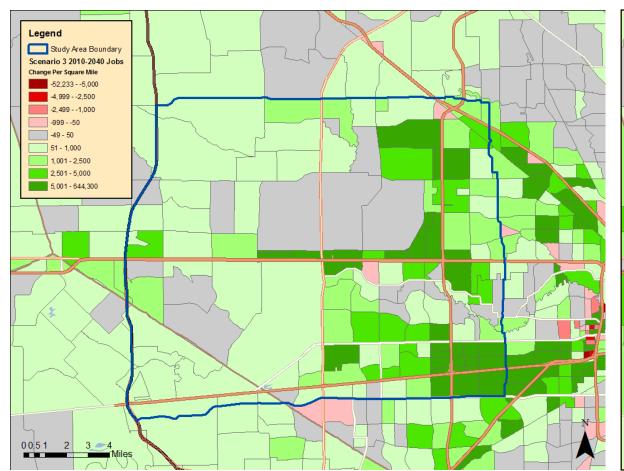


Figure 4.9 Scenario 3 Job Growth

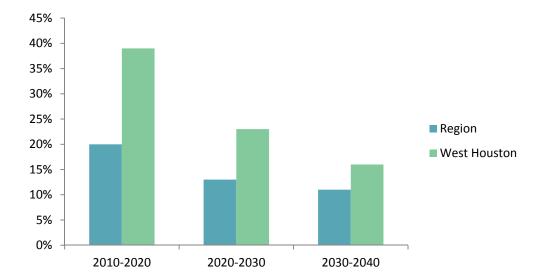


Figure 4.11 Scenario 3 Job Growth

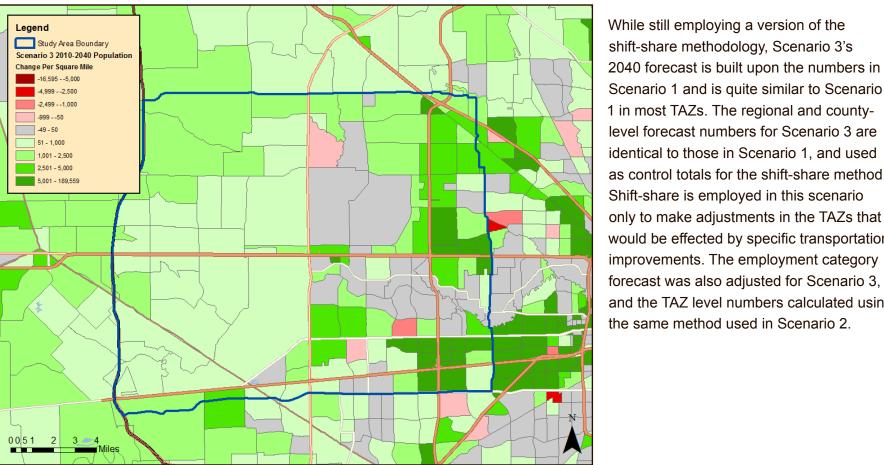


Figure 4.10 Scenario 3 Population Growth

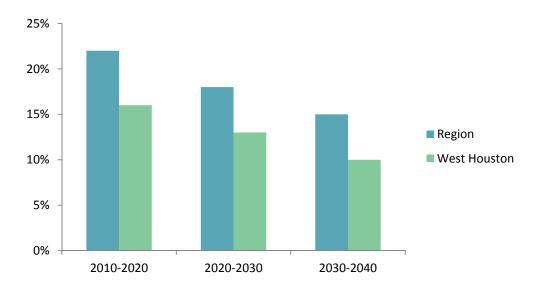


Figure 4.12 Scenario 3 Population Growth



#### **SCENARIO 4 – SLOWER GROWTH**

Scenario 4 is intended to provide an alternative look at Houston's growth potential. It is possible that due to fluctuations in the national or international economy, or a downturn or slowing of the oil and gas industry locally, the Houston region could experience slower growth than H-GAC and CDS have forecast.

In method, Scenario 4 is quite similar to Scenario 2. Using the 2010 base numbers from H-GAC, new region and county control totals are calculated, applying slower growth rates from a Scenario 4 - specific adjusted version of CDS' 2012 regional and county forecast. The shift-share method is again employed to calculate the forecast at the TAZ level and uses the same TAZ growth shares used in Scenario 2. Employment category calculations use the same shares as well.

This scenario considers what the land use impacts of slower growth may be and how that would translate to a different population and employment forecast:

- · Given the existing program of transportation improvements planned in West Houston, would slower growth of traffic congestion lead to less pressure either to develop denser housing closer to employment centers, or to distribute employment further to the west to be closer to employee residences?
- A more generally moderate economy could lower pressures to create more

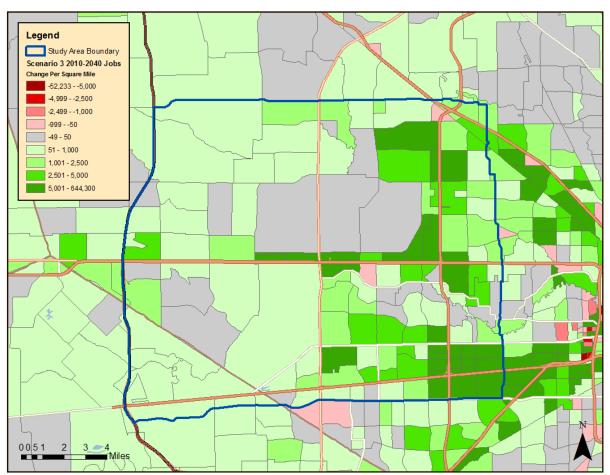


Figure 4.13 Scenario 4 Job Growth

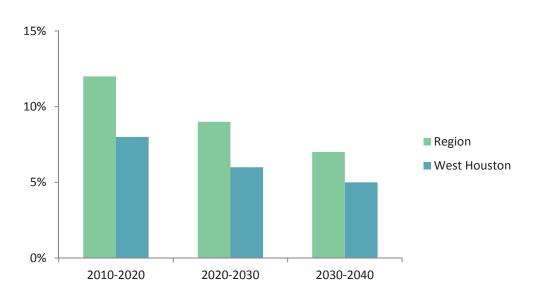


Figure 4.15 Scenario 4 Job Growth

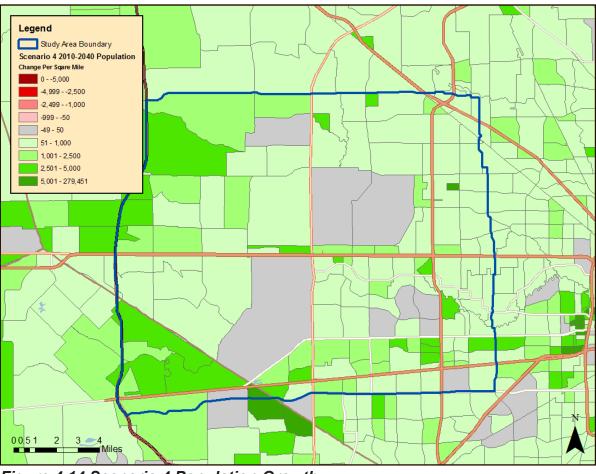


Figure 4.14 Scenario 4 Population Growth

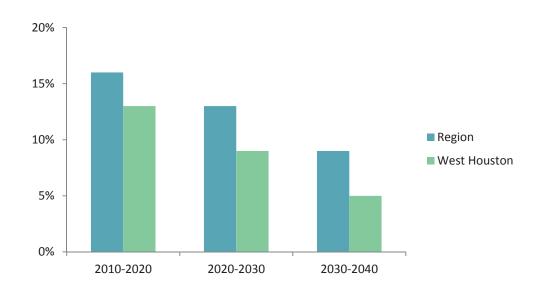


Figure 4.16 Scenario 4 Population Growth



vertical, denser projects because land values will not rise as rapidly. Furthermore a slower economy would give developers and financial partners less confidence to undertake costly and risky projects. However, existing centers of population and employment might continue to fill in and thus become denser overall, just perhaps not with rising intensity at the individual project level.

 Scenario 4 explores the possibility that slower economic growth may mean (1) less development overall, either for infill/ redevelopment or for outward greenfield growth; (2) less tendency to develop in higher value, higher density "urban centers"; and (3) a resulting pattern of lower density, non-centralized growth, albeit of a total volume less than the other three scenarios.

t Traffic analysis zones (TAZs) are the basic geographic units (areas) used for inventorying demographic data and land use in transportation planning models (Federal Highway Works Administration (FHWA)).

th Shift-share analysis is a method of decomposing regional income or employment growth patterns into expected (share) and differential (shift) components (A.C. Selting and S. Loveridge, 1992)

#### SELECTED SCENARIO – URBAN HOUSTON FRAMEWORK

The scope of this study requires that a single scenario from the four alternatives be selected for all subsequent modeling and forecasting of traffic volumes, traffic operating conditions and recommendations for improvement projects. The Urban Houston Framework scenario was selected as the preferred scenario by the steering committee.

The demographics of the Urban Houston Framework Scenario are the same as those used by H-GAC for all other forecasting and modeling purposes. This consistency of demographics is important to avoid disputes regarding the fundamentals of the forecast. The Urban Framework has been adopted by the City of Houston and is more likely to be implemented than the development patterns that have prevailed over the past several decades.

The Urban Framework is more conducive to transportation solutions, particularly transit that may be the most practical manner to provide a mobility system that can effectively address forecast travel demand. Land development recommendations in the Urban Houston Framework, by nature, will generate shorter trips and a higher proportion of trips by alternative modes, resulting in lower demand on the roadway network than current and historic development patterns.

Tables 4.1 and 4.2 summarize some of the tenets of the Urban Houston Framework. All three Funding Partner Management Districts are included in that study. Additional information about the Urban Houston Framework is available online at http://www.houstontx.gov/planning/DevelopRegs/urbanhoustonframework/PDFs/FullReport\_UrbanHoustonFramework.pdf.

The model forecasts for the Urban Houston Framework Scenario are also shown in the following figures. Figure 4.17 shows the level of service, (LOS) for select intersections in the Study Area in 2040. An unacceptable amount of delay is projected for all intersections. Table 4.3 provides details of individual intersection LOS. Figures 4.18 and 4.19 show the level of mobility (LOM) for the roadways in the Study Area in 2025 and 2040, respectively. As shown in each figure, the LOM on freeways, tollways, and major arterials will deteriorate substantially between 2025 and 2040, especially east of State Highway 6.

ttt Level of Service is the quantitative range of a performance measure that represents quality of service. Quality of service describes how well a transportation facility or service operates from the traveler's perspective (Highway Capacity Manual, 2010).

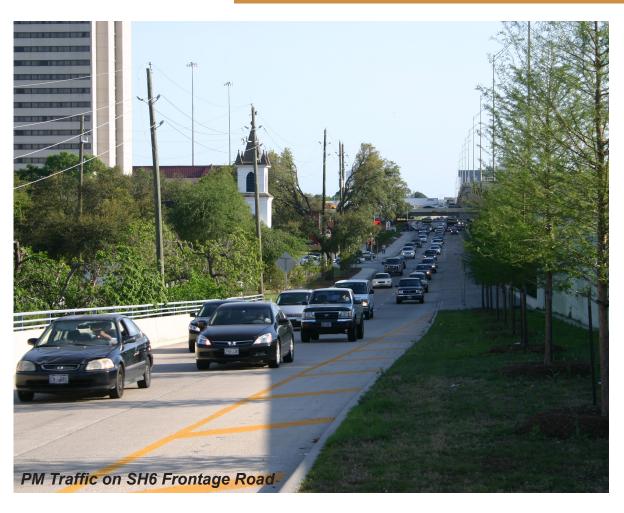




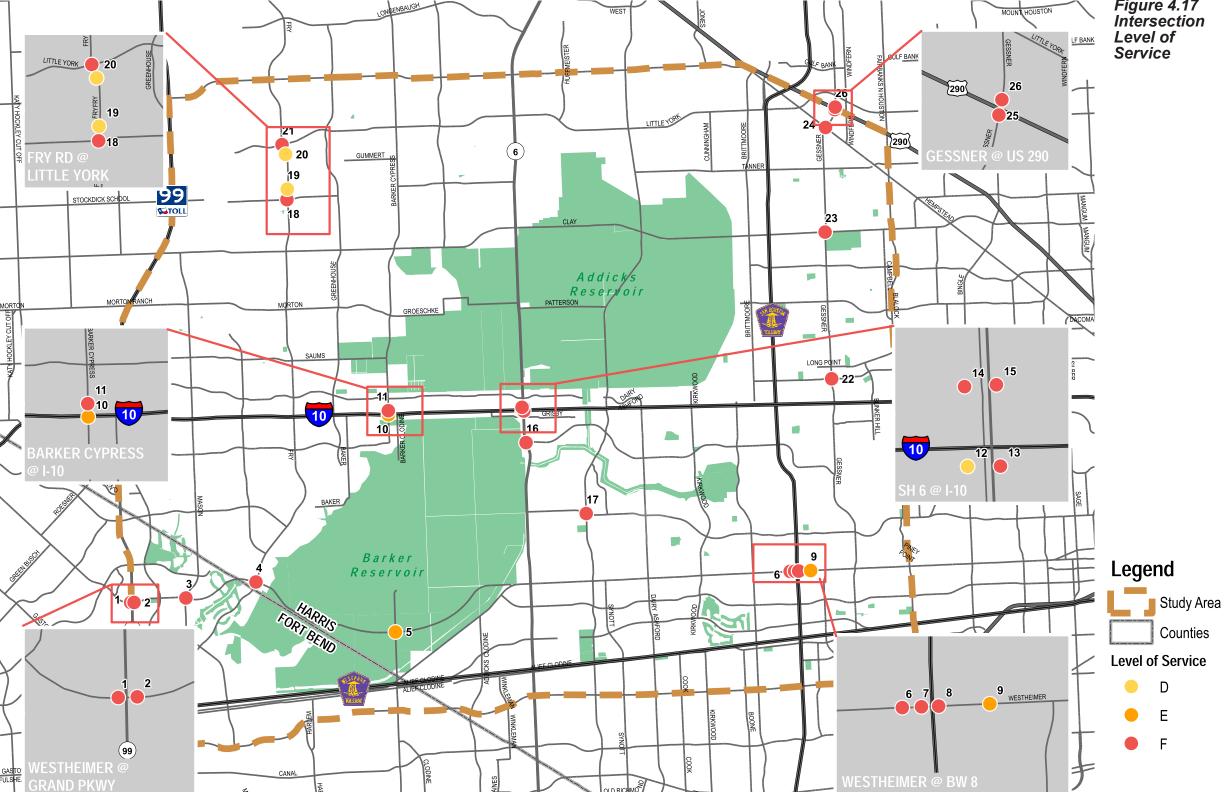


					TABLE 4.1 - UF	RBAN CENTER CR	ITERIA							
			PREREQUISITE			OPTIONAL CRITERIA								
Urban Center Size + Criteria Threshold	Name	Boundary Used	Average Population + Job Density	Funding Mechanism	Infill Redevelopment Potential (Residential)	Infill Redevelopment Potential (Com., Office, Ind.)	Major Thoroughfare (w/in 1/2 mile)	Major Thoroughfare (w/in 1/4 mile)	Amenities	Food Amenities	Amenity Density	Intersection Density	Bikeways	METRO Transit Stops
	Central Business	Management	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
	District	District	139.34	-	0.32	4.42	-	-	359	7	0.32	0.81	-	-
	Texas Medical	Super	-	Yes	-	-	Yes	Yes	Yes	No	-	Yes	Yes	Yes
	Center	Neighborhood	68.19	-	2.38	1.63	-	-	64	1	0.05	0.26	-	-
LARGE CENTER THRESHOLD	Greater Uptown	Management	-	Yes	-	-	Yes	Yes	Yes	No	-	Yes	Yes	Yes
Population	Greater Optown	District	62.37	-	2.91	1.57	-	-	154	3	0.19	0.27	-	-
+ Job Density > 25	Midtown	Management	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
	Wildtowii	District	37.36	-	2.05	0.36	-	-	122	6	0.17	1.02	-	-
	Westchase	Management	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
	Westchase	District	29.24	-	1.43	1.69	-	-	138	7	0.05	0.1	-	-
	Fourth Ward	TIRZ	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
	T Out till VValu	1111/2	20.57	-	1.7	1.02	-	-	23	0	0.16	1.12	-	-
	Energy Corridor	Management District	-	Yes	-	-	Yes	Yes	Yes	No	-	Yes	Yes	Yes
			18.73	-	2.77	3.5	-	-	63	0	0.03	0.29	-	-
MEDIUM OFNITED	Third Ward	Super Neighborhood	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
MEDIUM CENTER THRESHOLD			17.30	-	0.64	0.78	-	-	59	14	0.04	0.63	-	-
Population	Rice Village	Super Neighborhood	-	No	-	-	Yes	Yes	Yes	No	-	Yes	Yes	Yes
+ Job Density >12 < 25			16.77	-	0.49	0.67	-	-	116	4	0.07	0.4	-	-
	City Centre/ Memorial City	Proposed Management	-	Yes	-	-	Yes	No	Yes	No	-	Yes	Yes	Yes
	Memorial City	District	12.51	-	2.71	0.48	-	-	32	2	0.05	0.32	-	-
	Greater East	Management	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
	End	District	10.44	-	1.54	1.37	-	-	224	34	0.02	0.47	-	-
	Greater	Management	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
SMALL CENTER	Greenspoint	District	5.33	-	2.54	2.73	-	-	127	12	0.02	0.16	-	-
THRESHOLD	Palm Center	Super	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Population + Job Density	331101	Neighborhood	8.85	-	1.98	1.21	-	-	67	13	0.03	0.4	-	-
< 12	Greater	Management	-	Yes	-	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
	Greenspoint	District	5.33	-	2.54	2.73	-	-	127	12	0.02	0.16	-	-

TABLE 4.2 - URBAN CENTER CHARACTERISTICS
1. Reduced Setbacks
2. Connectivity
3. Short Block Lengths
4. Increased Building Height
5. Greater Number of Businesses
6. Civic Amenities
7. Population Density
8. Diversity of Housing
9. Higher Floor to Area Ratio
10. Historic Structures/Landmarks
11. Increased Number of Jobs
12. Management Entity
13. Access from Major Roads
14. Access from Minor Roads
15. Park Once, But Do Many Things
16. Parks and Open Space
17. Higher Density of Students
18. Street Intersection Density
19. Reduced Street Width
20. Air Transportation
21. Automobile Transportation
22. Bicycle Transportation
23. Bus Transportation
24. Rail Transportation
25. Pedestrian Options
26. Reduced Vacancy Rates

27. Quality Education 28. Security

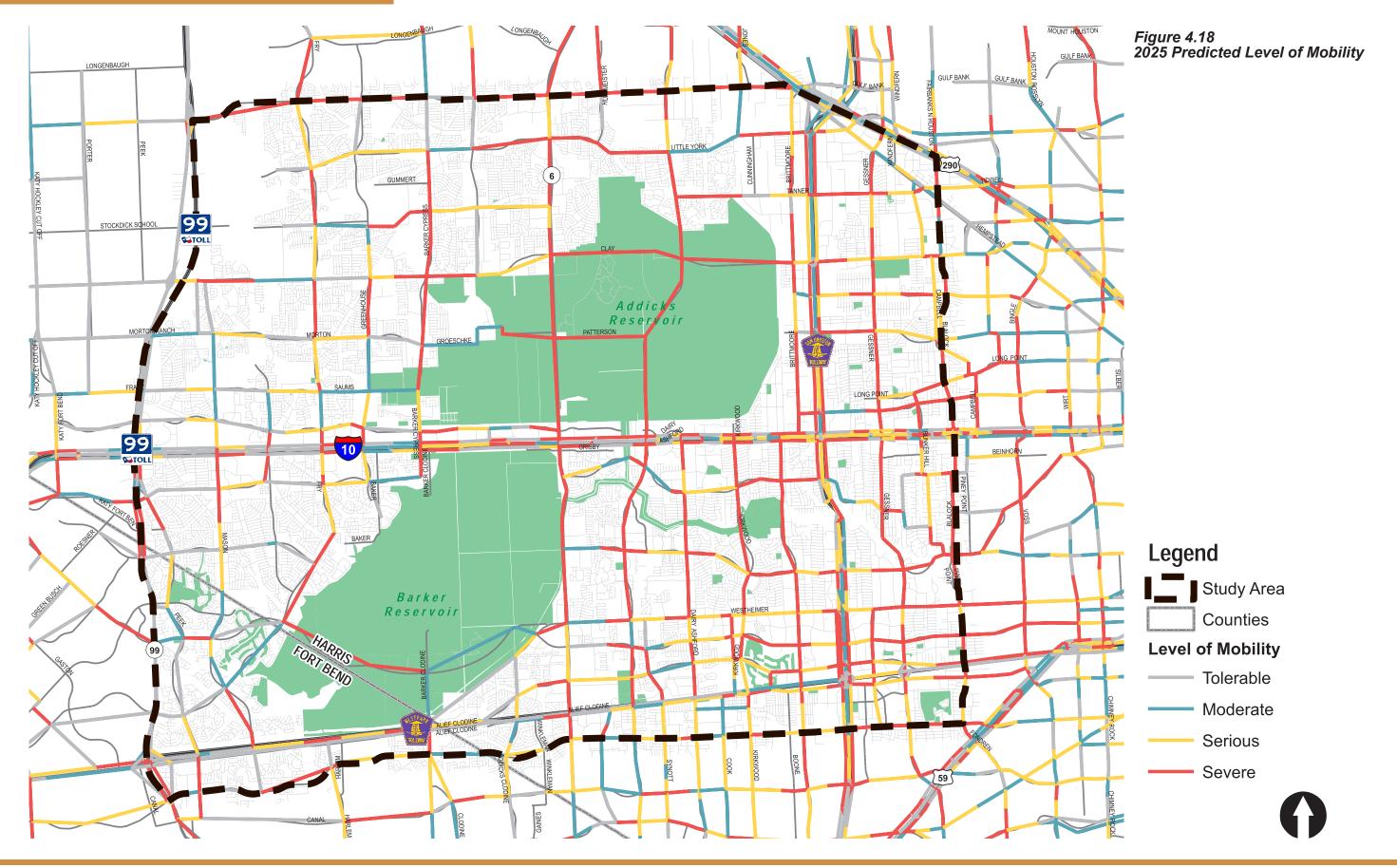
29. Residential Amenities

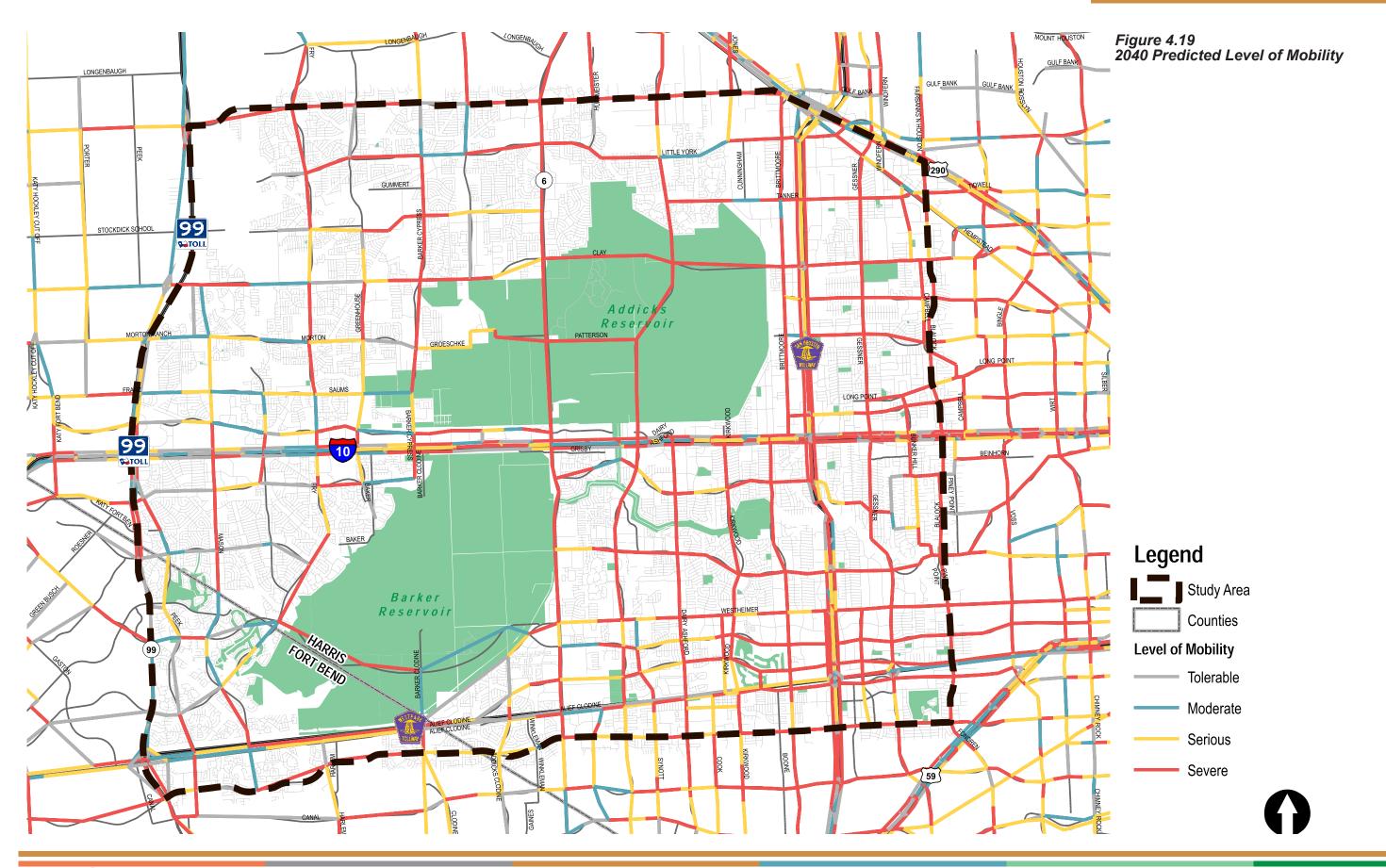


TABI	LE 4.3 - INTERSECTION LE	EVEL OF S	ERVICE	
Map Ref#	Intersection	2013 (seconds of delay)	2040 (seconds of delay)	
1	Westheimer Pkwy at SB SH 99	177.0	333.2	
2	Westheimer Pkwy at NB SH 99	119.5	341.4	
3	Westheimer Pkwy at Mason	76.4	143.1	
4	Fry at Westheimer Pkwy	89.1	184.2	
5	Westheimer Pkwy at Barker Cypress	64.8	64.9	
6	Westheimer at Rogerdale	58.1	119.1	
7	Westheimer at Beltway 8 Southbound	53.8	237.8	
8	Westheimer at Beltway 8 Northbound	129.5	393.1	
9	Westheimer at Seagler	21.7	59.0	
10	IH 10 EB at Barker Cypress	33.5	74.1	
11	IH 10 WB at Barker Cypress	170.7	317.7	
12	IH 10 EB at SH 6 Southbound	32.0	51.6	
13	IH 10 EB at SH 6 Northbound	112.6	256.0	
14	IH 10 WB at SH 6 Southbound	58.0	212.2	
15	IH 10 WB at SH 6 Northbound	142.2	460.3	
16	SH 6 at Memorial	110.5	257.2	
17	Eldridge at Briar Forest	90.5	188.8	
18	Fry at Keith Harrow	45.9	90.3	
19	Fry at Bear Hunters	28.1	53.1	
20	Fry at Plantation Grove	24.7	38.0	
21	Fry at West Little York	67.7	341.7	
22	Westview at Gessner	33.8	81.0	
23	Gessner at Clay	78.8	130.2	
24	Gessner at Hempstead	59.6	97.5	
25	Gessner at US 290 Eastbound	169.0	214.4	
26	Gessner at US 290 Westbound	300.1	323.1	











#### LAND USE

With limited undeveloped land available in most of the Study Area, redevelopment is the likely course for construction of new commercial buildings and housing of all types. Moreover, various factors are prompting developers to consider higher density and mixed-use development for new projects. Two of these factors include recent changes to the City of Houston Development Ordinances and changing opinions towards urban living and commuting.

In 2013, the City of Houston amended Chapter 42 of its code of ordinances to allow greater housing density outside of Loop 610. Under the old provisions of the ordinance, the "urban" area inside Loop 610 allowed 27 units per acre, while the "suburban" area outside of Loop 610 was limited to 16 units per acre. The revision is intended to extend the residential density of the Inner Loop throughout the city while providing protections for neighborhoods concerned about incompatible development (Houston Chronicle, 2013).

More interestingly, Houston area residents opinions towards urban lifestyles are beginning to change. Rice University's Houston Area Survey states:

"The Houston region ... is one of the most sprawling, least dense, most automobiledependent metropolitan areas in the county. It is particularly interesting therefore to find in these surveys continued evidence across a variety of questions that area residents now are evenly divided in their support for

improved transit or expanded highways and for living in single-family residential areas or in more urbanized neighborhoods with a mix of developments." (2014)

In the 2014 survey, 51 percent of respondents said they preferred a singlefamily home with a big yard, while 47 percent would like a smaller home in a more urbanized area, within walking distance of shops and workplaces (Houston Area Survey, 2014). Ryan Holeywell notes, "The [survey] results, which are also reflected in recent development patterns, have city leaders, developers and advocates for density buzzing" (Governing, October 2013). Figure 4.20 illustrates the contrasting trends in housing preferences. Prominent examples of mixed-use developments in the Houston area include Hanover Rice Village, West Ave, at Kirby and Westheimer, Pearland Town Center, and City Centre in the Memorial Management District (Houston Chronicle, David Kaplan, 2014).

The Market and Development Density Index developed for METRO as part of their System Reimagining process visually and quantitatively illustrates the locations with the greatest potential for higher density development, especially if served by high quality transit options.

The Index is the weighted average of five demographic and market factors that influence transit-oriented development. These factors include population density, change in population density, transitsupportive employment density, change in employment density, and assessed property value density. A full description of Index methodology is provided in Appendix E. The Index shows that neighborhoods in and around Houston's major employment centers had relatively high index scores. That is true of all the major employment centers (i.e.-Management Districts) in the Study Area, particularly Westchase and Memorial Management Districts.

The Index also illustrates in a general way those areas within West Houston that are good candidates for further densification and/or redevelopment. The planned developments listed in Section 2.5 validate this proposition.

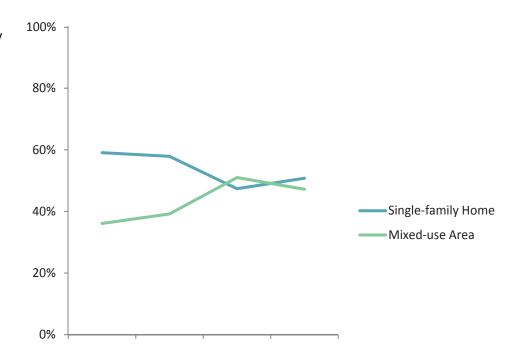


Figure 4.20 Houston Residential Preferences (Source: Rice University)







Mixed Use Center Examples - Hannover Center and Renderings of West Ave and City Centre







#### 4.2 PLANNED IMPROVEMENTS

There are many transportation—related capital improvement projects that are planned for the West Houston area. Figures on the following pages show both short-term and long-term Study Area transportation projects currently slated for implementation. These projects include automotive, bicycle and pedestrian improvements. The projects are included on one or more of the transportation plans described below.

#### H-GAC Transportation Improvement Program (TIP)

The TIP is a short-range transportation plan developed and maintained by H-GAC. The planning horizon of the current TIP is 2015-2018. The TIP is a fiscally constrained plan that has a 4 year time frame. It is updated frequently to capture new transportation projects that are being implemented by local jurisdictions within the H-GAC region. The TIP shows a combination of federally funded and locally funded projects. H-GAC has a call-for-projects every two to three years to program projects for inclusion in the TIP.

#### H–GAC Regional Transportation Plan (RTP)

The RTP is a long-range (2040) transportation plan developed and maintained by H-GAC. The RTP typically has a 20-25 year horizon for all large-scale transportation projects in the H-GAC region. The RTP is not fiscally constrained, meaning that not all projects included in the RTP have designated funding for implementation. The RTP is typically updated every five years. Current TIP and RTP Projects are shown in Figure 4.21 and listed in Tables 4.4 and 4.5.

#### City of Houston Capital Improvement Program (CIP)

The CIP is a short-range transportation plan of projects slated for construction within the City of Houston. The City's CIP is updated annually and approved by the City Council. The projects in the CIP are not limited to transportation projects, and also include buildings, water and sewer infrastructure and similar capital projects.

#### Fort Bend County Mobility Bond Projects (FBCMB)

FBCMB is a list of transportation projects in Fort Bend County designated for near-term implementation. The bond program was passed in 2013 by Fort Bend County voters to provide funding for significant roadway projects across the Fort Bend County area. City of Houston CIP and Fort Bend County Mobility Bond Projects are shown in Figure 4.22 and listed in Table 4.6.

It should be noted that the TIRZs and Management Districts in the Study Area develop CIPs in conjunction with the City of Houston. The projects developed by these entities are included in the City's CIP plan. The projects presented on the following pages are not intended to represent a complete list of projects that will occur in the Study Area. All of these projects may not be built in the short term, but are likely to move forward at some point. There will likely be other projects added to this list as growth and redevelopment continue in the Study Area.

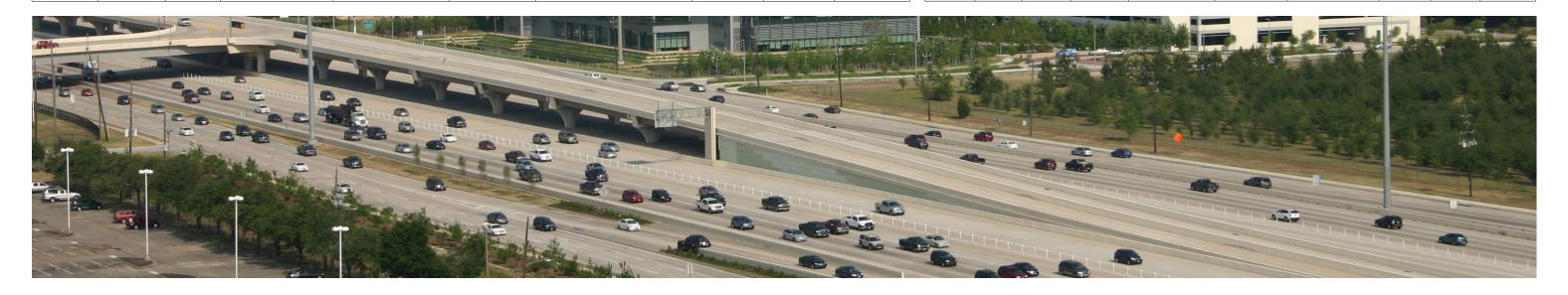
#### PREVIOUS RECOMMENDATIONS

More than a dozen transportation studies (Table 4.7) have been conducted in the Study Area over the last 13 years by various entities. The scopes of these studies varied from specific corridor segments to 1,000 square mile regions. All the studies put forth transportation and policy recommendations for improving mobility in Study Area. As part of this study, these previous studies were reviewed to determine the status and validity of their recommendations. Where appropriate, previous study recommendations are reiterated in this study to indicate their continued importance. Table 4.8 summarizes the recommendations of these previous studies.



				TABLE 4.4 - CU	RRENT RTP PR	OJECTS			
Project#	MPOID	CSJ Number	Street	From Limit	To Limit	Project Description	Length (mi)	Existing Lanes	Proposed Lanes
1 10,000#	WII OID	TAUTIDO	Olicci	Trom Limit	10 Ellillit	CONSTRUCT NEW 4-LANE	Longui (iiii)	Lancs	Lanco
	6		BELLAIRE BLVD	FM 1464	SAN PABLO DR	ROAD	0.75	0	4
2	77		GESSNER DR S	N OF BRIAR FOREST	RICHMOND AVE	WIDEN TO 6-LANES	1.67	4	6
3	111		LITTLE YORK RD W	US 290	HOUSTON CITY LIMITS	WIDEN TO 6-LANE DIVIDED	2.99	4	6
4	2977		BELLAIRE BLVD	BW 8	FONDREN RD	WIDEN TO 8-LANES	2.10	6	8
5	134		RICHMOND AVE	W OF ROGERDALE	WILCREST	WIDEN TO 6-LANES	0.70	4	6
6	2978		DAIRY ASHFORD RD	MEMORIAL DR	BRIAR FOREST	WIDEN TO 6-LANES	1.00	4	6
7	6016		GREENHOUSE RD	HANSTON CT	GREENWIND CHASE DR	CONSTRUCT 4-LANE CONCRETE W/ STORM SEWERS	0.50	0	4
8	7		BELLAIRE BLVD	SH 99	FM 1464	CONSTRUCT 4-LANE BLVD (IN SECTIONS)	4.69	0	4
9	162		BOONE RD	ALIEF CLODINE	WESTPARK	CONSTRUCT 4-LANE ROAD	0.40	0	4
10	165		WILCREST DR	MEMORIAL DR	BELLAIRE BLVD	WIDEN TO 6-LANES	4.74	4	6
11	11547	0912-72- 924	HEMPSTEAD RD	JONES RD	GESSNER	CONSTRUCT 4 MANAGED LANES WITH TWO 2-LANE FRONTAGE ROADS & DC to BW 8 (TOLL)	1.01	4	4
12	11372	0912-72- 923	HEMPSTEAD RD	GESSNER DR	43RD ST/CLAY RD	CONSTRUCT 4 MANAGED LANES WITH TWO 2-LANE FRONTAGE ROADS (TOLL)	3.84	4	4
13	7762		PARK ROW BLVD	SUMMITRY CIRCLE	WESTGREEN BLVD	WIDEN TO 4-LANE UNDIVIDED ASPHALT	0.75	2	4
14	7898		FAIRBANKS-N HOUSTON ST	BW 8	US 290	WIDEN 4-LANE TO 6 LANE CONCRETE BLVD	5.78	4	6
15	7792		LITTLE YORK RD W	ELDRIDGE PKWY N	BRITTMORE RD	WIDEN FROM 2 TO 3-LANES IN EACH DIRECTION	2.50	4	6
16	16019	0050-09- 902	US 290	E OF LITTLE YORK RD W	W OF PINEMONT DR	RESTRIPE TO 10 MAIN LANES WITH AUXILIARY LANES	4.00	11	10
17	16020	0050-09- 903	US 290	W OF FM 529	W OF LITTLE YORK RD W	RESTRIPE TO 10 MAIN LANES WITH AUXILIARY LANES	1.75	11	10

	TABLE 4.5 - CURRENT TIP PROJECTS											
CSJ Project# MPOID Number Street			From Limit	To Limit	Project Description	Length (mi)	Existing Lanes	Proposed Lanes				
	1	W OF HCFD UNIT U101- SAUMS 02-00 (W OF 1 7649 RD GREENHOUSE)		HOUSTON CITY LIMITS	WIDEN TO 5-LANE ASPHALT PAVEMENT SECTION W/ STORM SEWER	0.45	2	5				
	2	5007	0912- 71-695	TANNER RD	TRIWAY LN	HEMPSTEAD	WIDEN TO 4-LANE DIVIDED	1.25	2	4		
3 15571 07-305 IH 10 W W OF SH 6		W OF SH 6	BW 8	RESTRIPE IN SECTIONS TO ADD LANES TO PROVIDE 10 MAIN LANES THROUGHOUT THE PROJECT	4.66	8	10					
	4	487	1258- 03-043	FM 1093	FM 1463/FM 359	W OF KATY GASTON RD	CONSTRUCT TWO 2-LN FRONTAGE RDS WITH PARTIAL 4 TOLL LANES FROM W OF SPRING GREEN TO W OF KATY- GASTON	2.75	2	4		
	5	11864		TANNER RD	CAMPBELL RD	TRIWAY LN	WIDEN TO 4-LANE DIVIDED ROAD WITH CURBS AND SIDEWALKS AND NECESSARY UNDERGROUND UTILITIES	1.00	2	4		
	1258- W. OF KATY		SH 99	CONSTRUCT 4 TOLL LANES WITH TWO 2-LANE FRONTAGE ROADS	1.38	2	4					



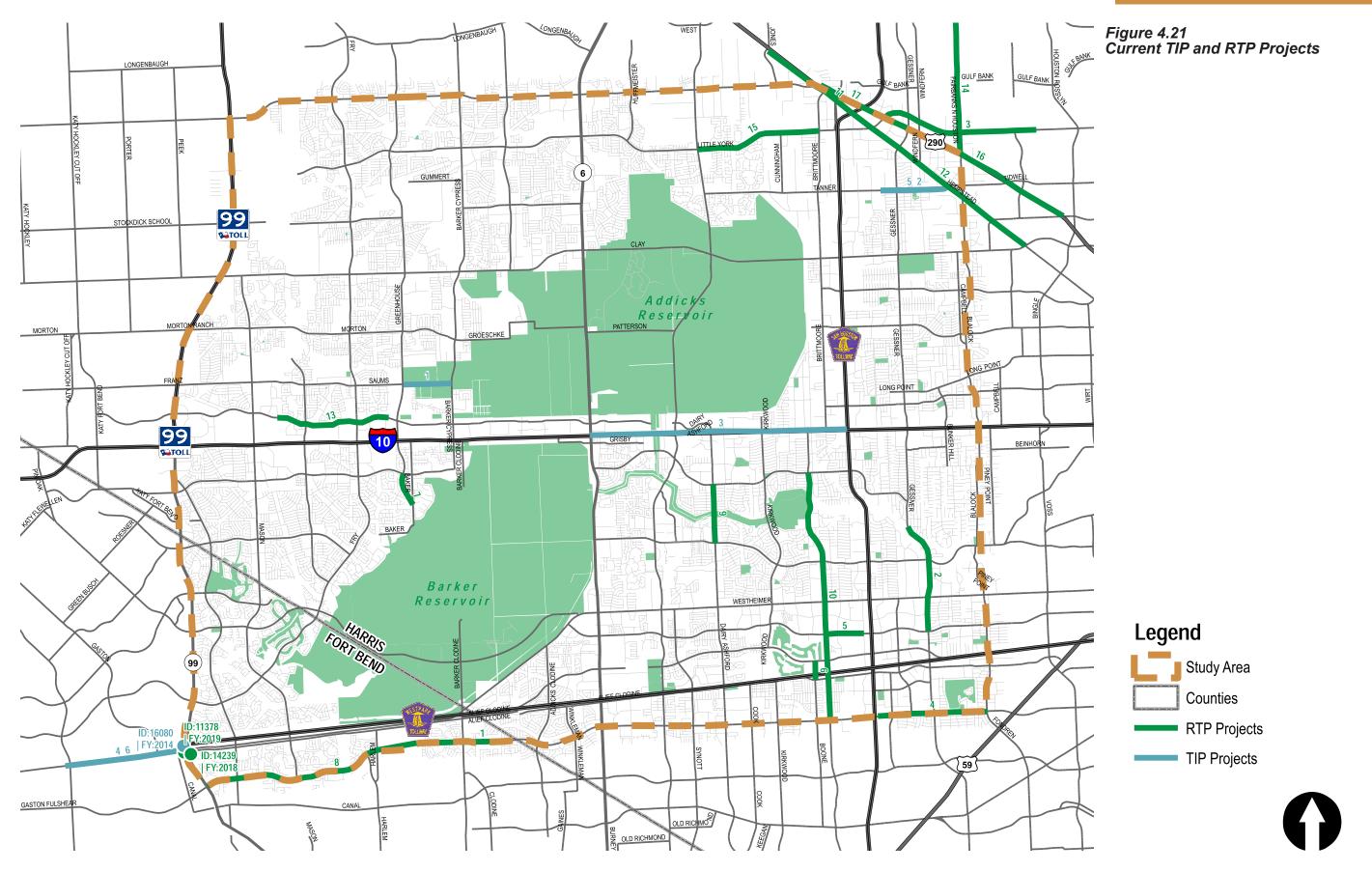
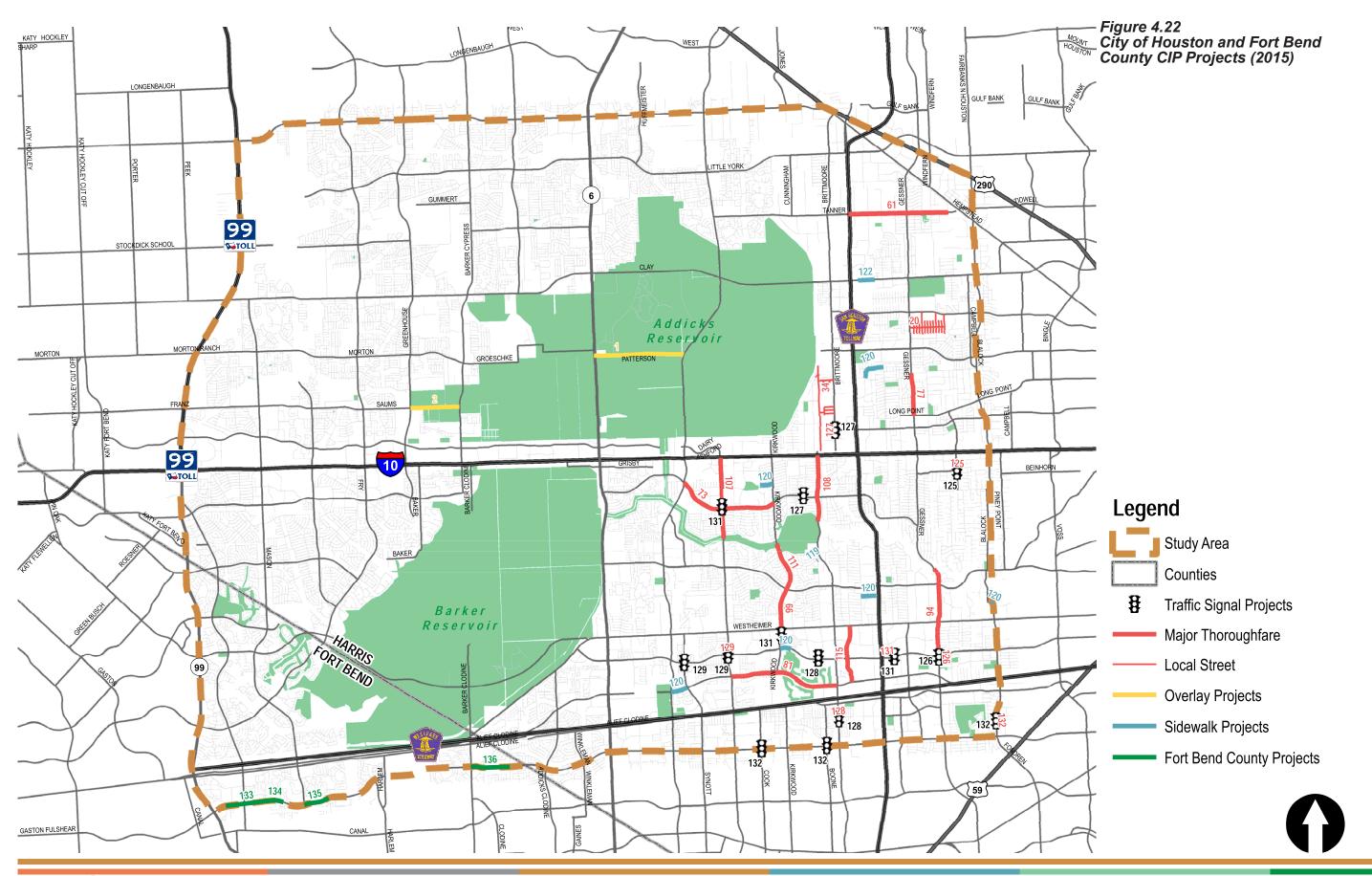




		TABLE 4.6 COH CIP PROJECTS						
Map Ref#	CIP_NO	Project Description						
1	N-001037-0053	Patterson: Sh 6 To N Eldridge Pkwy						
2	N-321037-0069	Saums Rd: Barker Cypress To Greenhouse						
Roadway Re	econstruction Projects							
Map Ref#	CIP Number	Project Description						
77	N-000809-0001	Gessner: Neuens To Long Point						
20	M-410005-0001	Pomeran: Westray To N D/E & S D/E						
20	M-410005-0001	Moss Hill: Westray To N D/E & S D/E						
81	N-000815-0001	Westpark: Dairy Ashford To Wilcrest						
34	N-000388-0001	Brittway: Shadow Wood to Shadow Wood / Nsr 456						
34	N-000388-0001	Mayfield: Buescher To Wycliffe Dr / Nsr 456						
129	N-310650-0083	Dairy Ashford @ Richmond: Traffic Signal Rebuild						
108	N-100026-0001	Wilcrest: Ih 10 To Buffalo Bayou						
20	M-410005-0001	Bandelier: Westray To N D/E & S D/E						
34	N-000388-0001	Wycliffe Dr: 228' North Of Day Rd To North D/E/ Nsr 456						
20	M-410005-0001	Palo Pinto: Westray To N D/E & S D/E						
128	N-310650-0079	Fire Station #83 @ 3350 Breezewood: Traffic Signal Construction						
131	N-310662-0047	Dairy Ashford North Of Memorial / Roadway Modification						
126	N-000650-0071	Gessner @ Richmond: Traffic Signal Management Program						
111	N-100029-0002	Kirkwood Paving and Drainage: Buffalo Bayou to Briar Forest						
115	N-100033-0001	Walnut Bend: Westheimer to Westpark						
94	N-100017-0001	Gessner Paving and Drainage: Westheimer To Richmond-Sub Project 2						
20	M-410005-0001	Rosefield: Westray To Kempwood & S D/E						
131	N-310662-0047	Kirkwood @ Meadow Glenn / Left Turn Lane - North						
107	N-100023-0001	Dairy Ashford: IH10 To Buffalo Bayou						
73	N-000798-0001	Memorial: Eldridge To Kirkwood						
94	N-100017-0001	Gessner Paving and Drainage: Buffalo Bayou towards Westheimer-Sub Project 1						
20	M-410005-0001	Anniston: Westray To N D/E & S D/E						
34	N-000388-0001	Metronome: Shadow Wood To D/E / Nsr 456						
34	N-000388-0001	Wycliffe Dr: 228' South Of Day Rd To South D/E / Nsr 456						
20	M-410005-0001	Parana: Westray To N D/E & S D/E						
132	N-000650-0067	Fondren @ Clarewood: Traffic Signal Rebuild						
128	N-310650-0079	High Star @ Wilcrest: Traffic Signal Construction						
34	N-000388-0001	Mayfield: Buescher To Brittmoore / Nsr 456						
20	M-410005-0001	Southwick: Westray To N D/E & S D/E						
131	N-310662-0047	Richmond (BW8 To Briarpark) / Roadway Modification By Arkk						
129	N-310650-0083	Synott @ Richmond: Traffic Signal Rebuild						
34	N-000388-0001	Hazelhurst: Buescher To Brittmoore / Nsr 456						
132	N-000650-0067	Bellaire @ Boone: Traffic Signal Rebuild						
20	M-410005-0001	Talina: Westray To N D/E & S D/E						
20	M-410005-0001	Teague: Westray To Kempwood & S D/E						
20	M-410005-0001	Pine Village: Westray To N D/E & S D/E						
99	N-100029-0001	Kirkwood Paving and Drainage: Briar Forest to Westheimer						
	1	1						

		TABLE 4.6 COH CIP PROJECTS (CONTINUED)
61	N-000589-0001	Tanner Road: Hempstead To Bw8
127	N-310650-0078	Fire Station #57 @ 13602 Memorial: Traffic Signal Construction
34	N-000388-0001	Buescher: Hazelhurst To 126' South Of Mayfield To S/De / Nsr 456
132	N-000650-0067	Bellaire @ Cook: Traffic Signal Rebuild
94	N-100017-0001	Gessner Paving and Drainage: Sub Project 3
125	N-000650-0070	Barry Knoll @ Bunkerhill: Traffic Signal Management Program
20	M-410005-0001	Westray: Gessner To Palo Pinto
127	N-310650-0078	Brittmore @ Westview: Traffic Signal Construction
34	N-000388-0001	Ivyridge: Buescher To Brittmoore / Nsr 456
20	M-410005-0001	Hollow Hook: Westray To N D/E & S D/E
34	N-000388-0001	Shadow Wood: Brittmoore To Wycliffe / Nsr 456
Sidewalk P	Projects	
Map Ref#	CIP Number	Project Description
119	N-00610A-0113	Lakeside Place: 11306 Lakeside Place To Hayes
120	N-00610A-0125	Knoboak: Stebbins to Shadowdale
	N-00610A-0125	Stebbins: Knoboak to Shadow Wood
	N-00610A-0125	Del Monte: Blue Willow to W Sam Houston Pkwy
	N-00610A-0125	Fondren: S Piney Point To 8800 Woodway
	N-00610A-0125	Richmond: Kirkwood to 11910 Richmond
	N-00610A-0125	Kimberley: Kirkwood to Carlingford
	N-00610A-0125	Westpark: Eldridge Pkwy to Synott
122	N-320610-0002	Clay Rd: 10777 To 11197
Traffic Sign	nal Projects	
Map Ref#	CIP Number	Location
125	N-000650-0070	Barry Knoll @ Bunkerhill
126	N-000650-0071	Gessner @ Richmond
127	N-310650-0078	Fire Station #57 @ 13602 Memorial
	N-310650-0078	Brittmore @ Westview
128	N-310650-0079	Fire Station #83 @ 3350 Breezewood
	N-310650-0079	High Star @ Wilcrest
129	N-310650-0083	Dairy Ashford @ Richmond
	N-310650-0083	Synott @ Richmond
131	N-310662-0047	Dairy Ashford North Of Memorial
	N-310662-0047	Kirkwood @ Meadow Glenn
	N-310662-0047	Richmond: From BW8 To Briarpark
132	N-000650-0067	Fondren @ Clarewood
132	N-000650-0067 N-000650-0067	Fondren @ Clarewood  Bellaire @ Boone
132		
132	N-000650-0067	Bellaire @ Boone
	N-000650-0067 N-000650-0067	Bellaire @ Boone Bellaire @ Cook
133	N-000650-0067 N-000650-0067 13302	Bellaire @ Boone  Bellaire @ Cook  Bellaire Blvd. Drainage ditch (Sierra Bend) to Parkway Lakes Ln



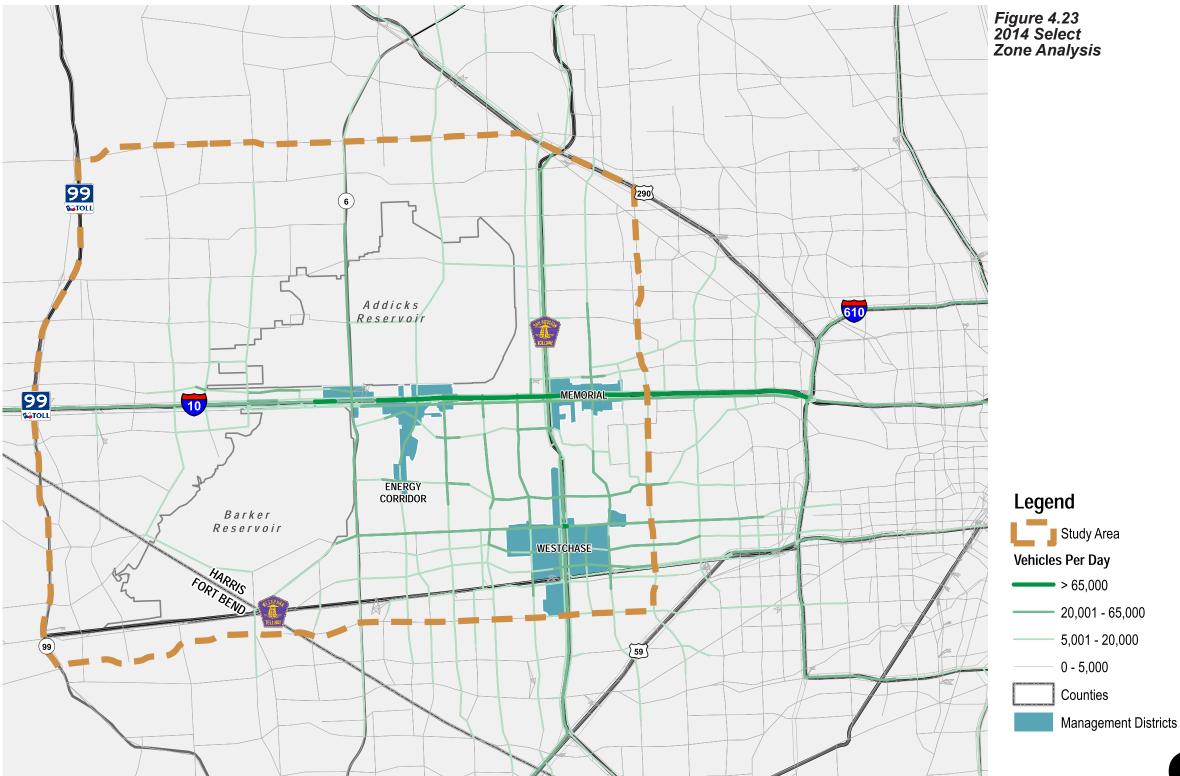




	OR TRANSPOR	
Study Name	Abbreviation	Publication Date
Westchase District Mobility Plan	WDMP	2001
H-GAC FM 1093 Access Management Study	1093AM	2002
Westchase Management District Long Range Plan	WDLRP	2006
West Houston Association West Houston 2050 Plan	WH2050	2007 & 2010
H-GAC Regional Commuter Rail Connectivity Study	RCRC	2008
H-GAC SH 6 Access Management Study	SH6AM	2008
Energy Corridor Livable Center Plan	ECLCP	2010
Energy Corridor District Bicycle Master Plan	ECBMP	2010
H-GAC Fort Bend Subregional Plan	FBSRP	2011
H-GAC SH 6 North Access Management Study	SH6NAM	2011
Westchase District Pedestrian/Transit Access Master Plan	WDPTM	2011
H-GAC 2040 Regional Pedestrian & Bicycle Plan	2040RPB	2012
City of Houston Urban Houston Framework	COHUHF	2013
METRO Bike & Ride	MBR	2014

			TABLE	4.8 - PRIOR	TRANSPOR	TATION STU	DY RECOMM	MENDATIONS	3					
Study Abbreviation	WDMP	1093AM	WDLRP	WH2050	RCRC	SH6AM	ECLCP	ECBMP	FBSRP	SH6NAM	WDPTM	2040RPB	COHUHF	MBR
Category/Recommendation														
Roadways														
Extend/Widen Roadway(s)	•	•	•	•					•					
Grade Separation(s)	•			•					•					
Right-of-Way Acquisition/Preservation				•										
Signal Synchronization	•			•										
Intersection Improvements	•	•				•			•	•	•			
Express/Super Street				•										
Transit														
Circulator Services	•		•				•							
Local Fixed Route Service	•			•						•				
High Frequency				•		•			•				•	
LRT/BRT		•	•			•								
Commuter Rail			•		•				•	•				
Park & Ride (Add/Expand/Improve)							•		•					
Transit Center/Hub		•	•		•		•		•		•			
Bicycle/Pedestrian														
Add/Extend Bicycle-Hike Trail/Lane	•		•			•	•	•	•	•	•	•		•
Add/Extend Sidewalks		•	•			•	•	•		•	•	•		•
Add/Expand Bicycle Facilities/Accommodations		•									•	•		•
Land Development														
Mixed-Use Development		•	•			•	•		•	•	•			
Green Space Conservation			•	•					•					
Urban Street Grid		•	•										•	
Parking		•	•				•		•				•	•
Policy														
Access Management		•								•				
Traffic Impact Analysis													•	
Residential Development Standards				•										
Commercial Development Standards				•										
Land Density Development Standards		•							•				•	
Create/Amend Ordinance/Regulation/Law												•	•	•
Public-Private Coordination/Partnerships		•							•	•			•	•
Incentives		•										•	•	•





#### 4.3 NATURE OF FUTURE GROWTH

Select zone and trip attraction analyses were performed as part of the examination of the current transportation system in the Study Area. These analyses revealed the extent to which West Houston has become a destination for work and non-work related trips, as shown in Figures 4.23–4.26.

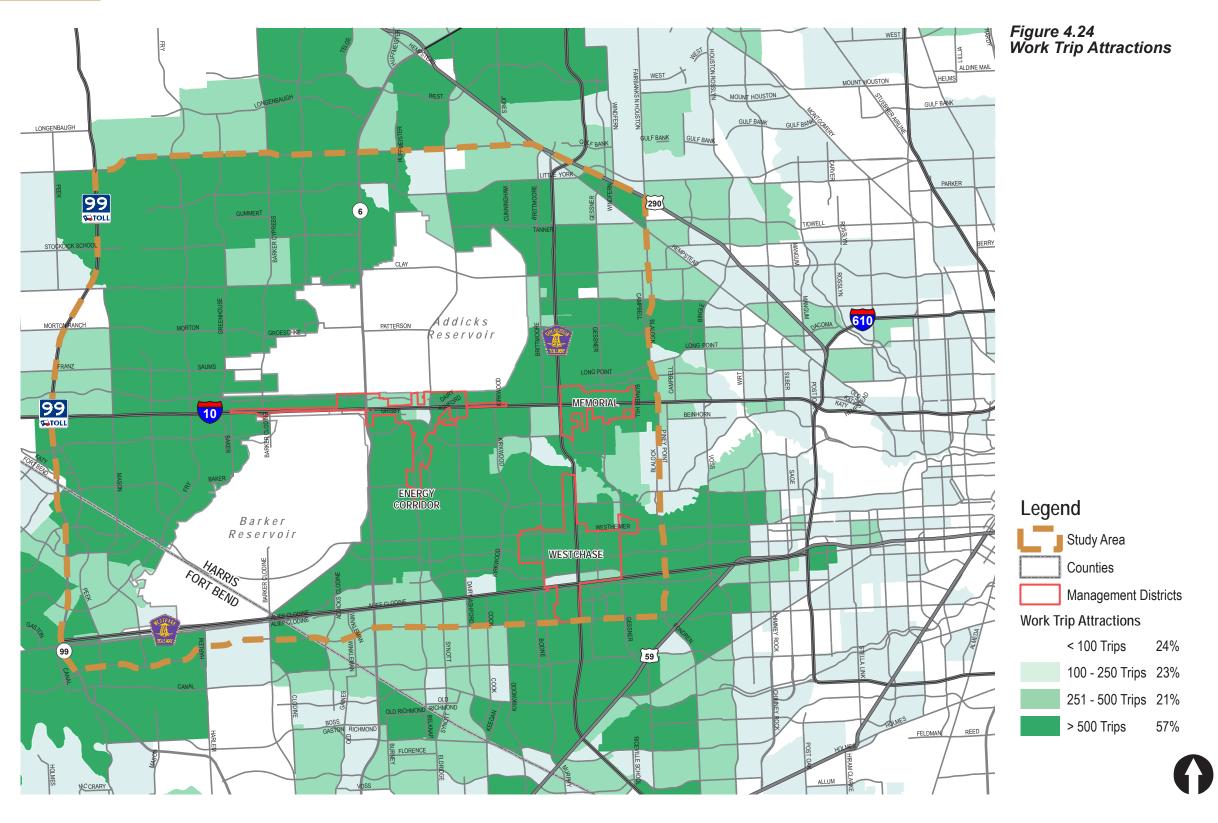
Select zone analysis is a transportation modeling technique that estimates the amount of traffic coming to and from a particular area or place. The goal of trip attraction analysis is to predict the number of trips attracted to an area or to a particular land use. Both techniques were employed on each Funding Partner Management District separately and as a whole to determine individual and combined effects on traffic flow in the Study Area. The combined traffic flows are illustrated in the figures on this page and the following pages.

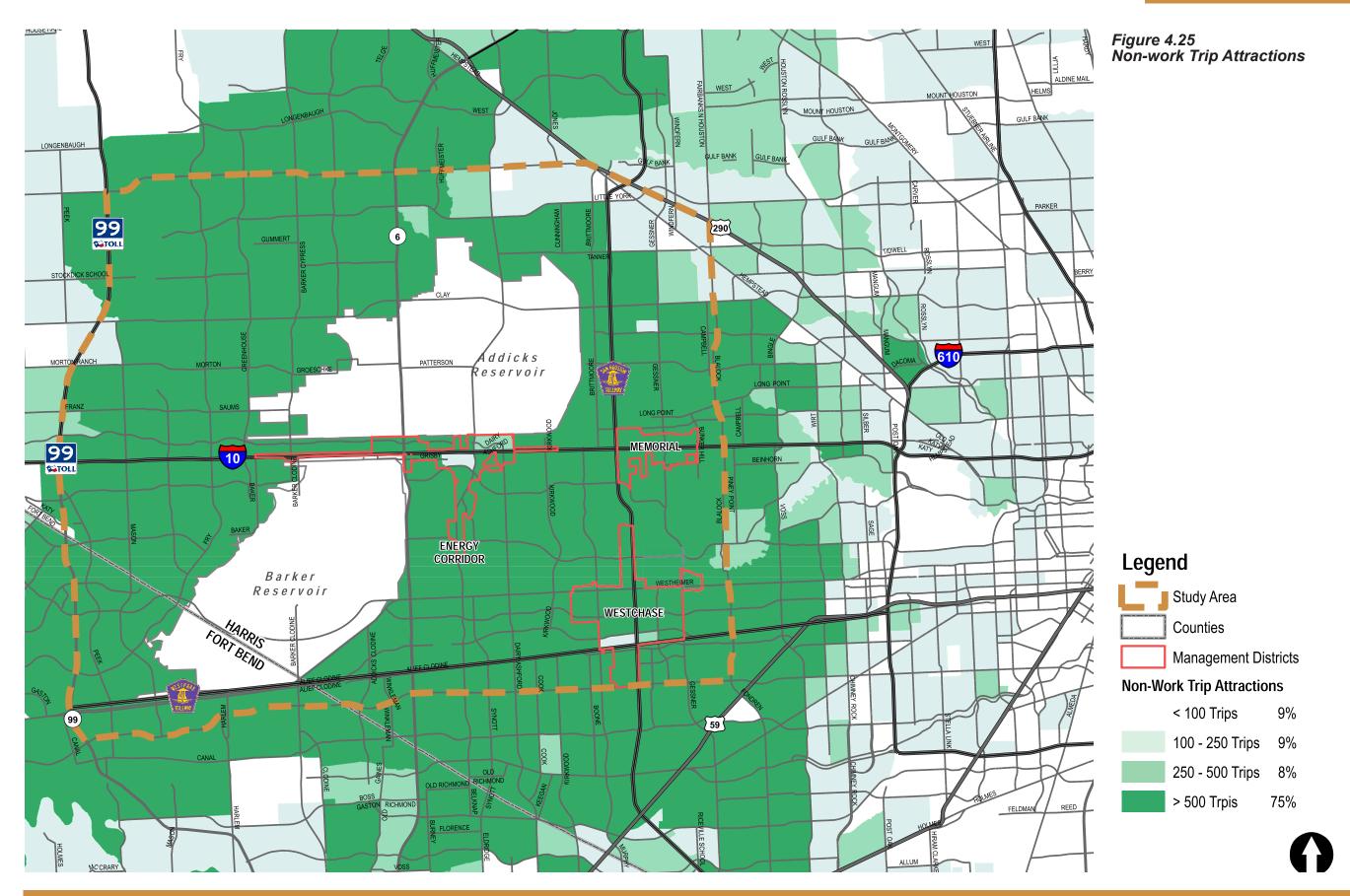
Figure 4.23 shows the combined select zone analysis for the three management districts. The results indicated heavy traffic flows coming from Fort Bend County, the US 290 corridor, inside Loop 610, and the Spring area. These traffic flows correspond almost identically with the Employee Home Zip Code Maps in Section 2.4.



Figure 4.24 and 4.25 illustrate the trip attraction analysis for all three management districts. There is significant attraction from Fort Bend County, the Cypress area along US 290, and areas West of State Hwy 6. The attractions hold true for non-work as well as work related trips. These analyses, and their information previously presented in this study, indicate that West Houston is a destination in its own right, and not a residential suburb of the City of Houston. West Houston a city within a city, and from a traffic perspective it functions as such.

Takeaways from the forecasting and analysis process include the realization and acceptance that there are very significant mobility challenges that cannot be overcome by continuation of past practices. Even small amounts of growth in the Study Area result in significant increases in delay to vehicle traffic. Participants in the public outreach process seem to be open to solutions other than traditional addition of capacity, including walking, cycling, ride sharing, and increased transit use. The most significant source of improvement in the person-carrying capacity of the street network would be increased vehicle occupancy. While this will require behavioral changes, the capital and operating costs of higher occupancy trips are insignificant compared to any other alternatives for all but the shortest trips.







# CONTEXT SENSITIVE DESIGN

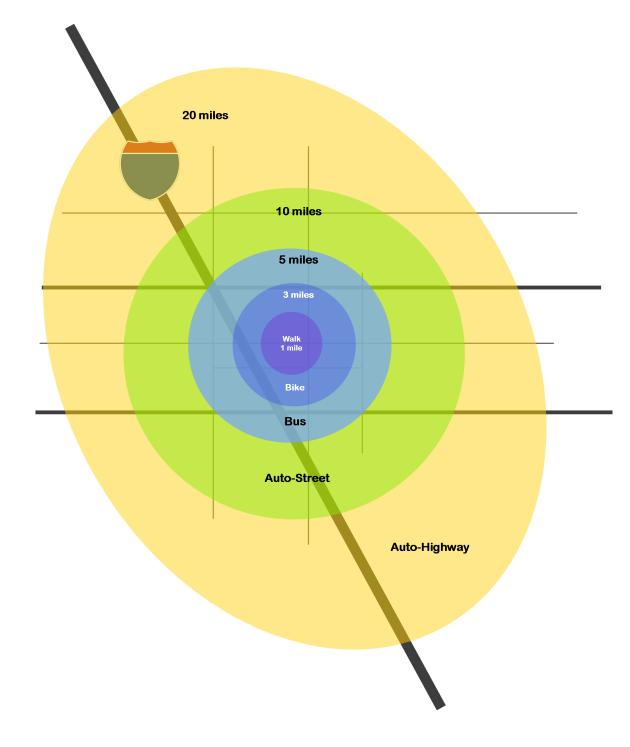
Recently, the City of Houston and TxDOT have acknowledged the need for a multimodal approach to transportation planning, and both have adopted policies to achieve this objective. On November 1, 2013, Houston Mayor Annise Parker issued an executive order establishing the Houston Complete Streets and Transportation Plan. The plan calls for the City to take a more comprehensive view of planning, designing, constructing and reconstructing all transportation improvements. The plan states that "[p] ublic roadways take into account all users, including people who are driving or riding in cars, using mass transit, using wheelchairs, driving or riding in trucks, driving or being transported by emergency vehicles, and being served at their residence or property by other users..." (COH Executive Order 1-15).



Shared Use Path in the Westchase District

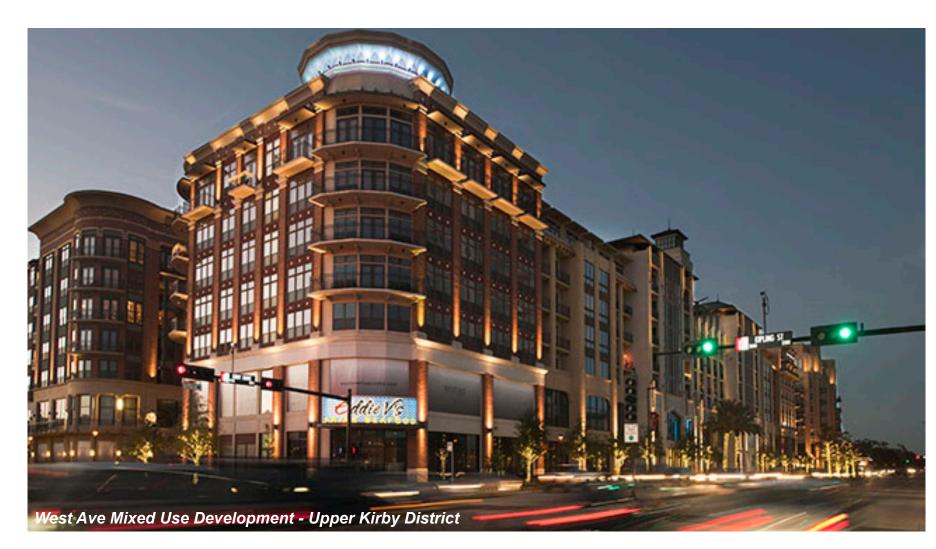


Mixed Use Streetscape



Human Scale Planning





Pearland Town Center



Similarly, TxDOT has adopted guidelines emphasizing bicycle and pedestrian accommodations in the construction and reconstruction of State roadway facilities. In a memorandum dated March 23, 2011, TxDOT Deputy Executive Director John Barton, P.E., stated "[w]ith this stronger emphasis for multimodal transportation facilities, TxDOT is committed to proactively plan, design, and construct facilities to safely accommodate bicyclists and pedestrians". (Memo, J. Barton, 3-23-2011).

The policies adopted by the City of Houston and TxDOT are examples of context sensitive design (CSD). CSD is a holistic approach to transportation facility design and construction. CSD is responsive to the environment in which the facility is built, as well as the characteristics of the current and future users of the facility. In contrast to long-standing practices in transportation design that place primary importance on moving traffic, CSD emphasizes that transportation facilities should fit their physical settings and preserve scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility.

The range of recommendations offered in this study should be designed and constructed using CSD principles, which include:

- Significant involvement of the public and continuous solicitation of input;
- Cooperation of highway agencies with a variety of resources and other public agencies throughout the development of the project;
- Willingness of the designers to accept and try alternative solutions as well as to deviate from standard designs;
- Inclusion of specialists other than highway designers in the design teams to provide different viewpoints; and
- Use of a variety of tools for communicating project alternatives and designs.

(CSD, Transportation Research Board Circular, 2004)









# 5.1 BUILT ENVIRONMENT

In addition to the current projects identified in the H-GAC RTP and TIP, as well as these Fort Bend County Bond projects within the Study Area (See Section 4.2), the following infrastructure projects should be considered to help further alleviate congestion and provide improved transportation choices in West Houston.

Recommendations presented in this study are intended to represent a vision of what the Study Area transportation system could look like. Recommendations are not representative of what can be built today. Furthermore, study recommendations do not obligate any public and/or private entity within the Study Area to construct said infrastructure, provide said services, or adopt or modify their current policies.

The following restrictions apply to infrastructure in unincorporated Harris County:

- Sidewalks are not encouraged along Major Thoroughfares, but are considered a priority within residential subdivisions and around schools
- Shared-use paths (as defined in the 2012 AASHTO Guide for the Development of Bicycle Facilities, the 2011 Texas Manual on Uniform Traffic

Control Device, and/or any local municipality ordinance or executive order) are constructed by the County. Where appropriate the County encourages partnership with other entities to build such facilities adjacent to the road right-of-way

Bike lanes, or variants thereof, are not constructed along roadways

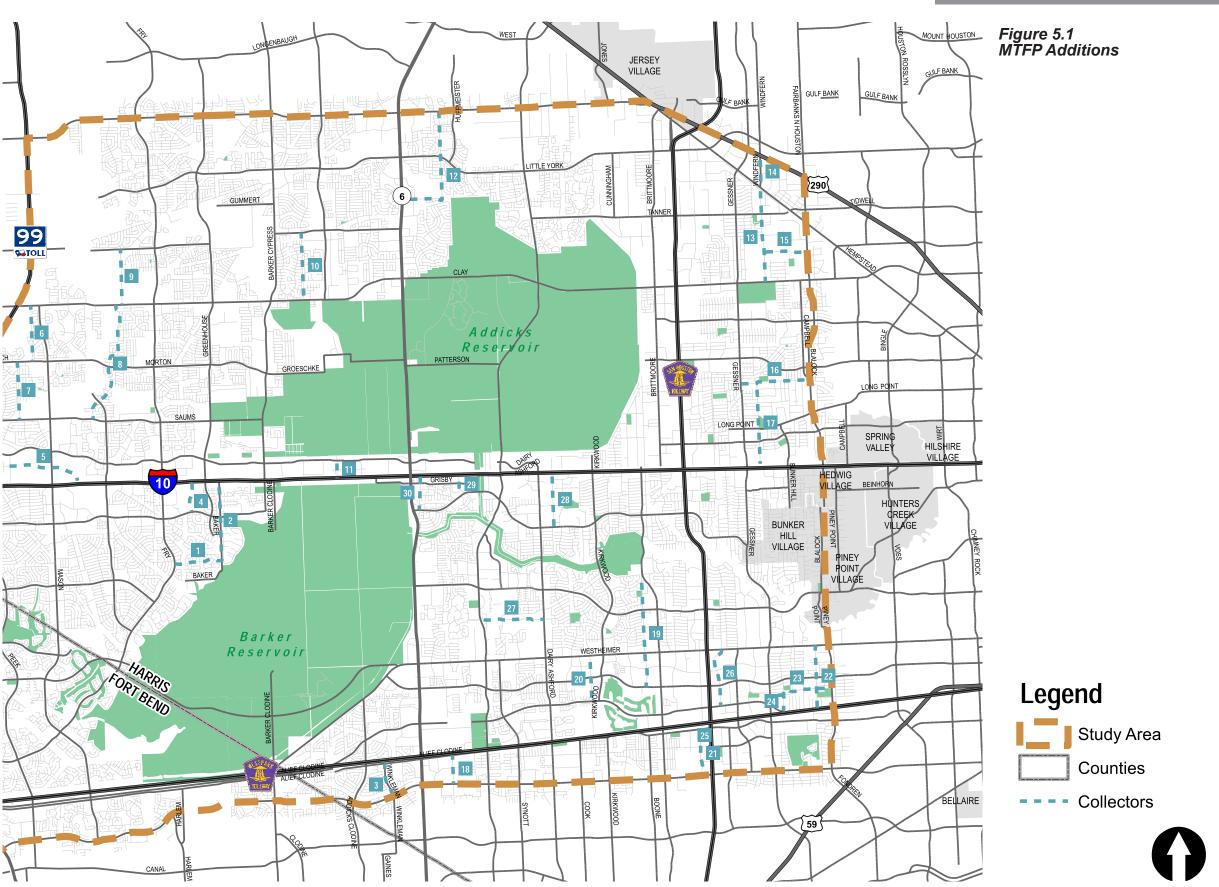
#### MTFP TABLE ADDITIONS

The roadway segments listed in Table 5.1 (and shown in Figure 5.1) are displayed on the City of Houston's MTFP map, but are not currently listed on the MTFP and Transit Corridor Street Hierarchy Classification Table (Table 5.2). Traditionally, roadway segments in the City of Houston's ETJ are not listed in the MTFP table because the City's street classifications cannot be enforced outside of its city limits. While the MTFP map provides the limits and corridor designation type (i.e. thoroughfare, collector, etc.), it does not provide the same level of detail as corridors listed on the MTFP table. including number of lanes and existing/ future right-of-way width. These roadway segments should be placed on the MTFP table to provide land developers and others with the same level of information on these corridors when making decisions regarding land use projects.













#### **COLLECTOR STREET NOMINATIONS**

The roadway segments listed in Table 5.2, and shown in Figure 5.2 are currently classified as local streets. The traffic flow patterns and volumes on these streets suggest that their classification should be upgraded. These roadways were selected after careful analysis because they (1) connect major thoroughfares already on the MTFP; (2) connect freeway frontage roads to major thoroughfares already on the MTFP; (3) are corridors that relieve traffic stress from existing major thoroughfares; and (4) typically avoid neighborhood streets as much as possible.

The City of Houston should consider adding these roadway segments to the MTFP map and MTFP table. Adding these roadway segments to the MTFP will help preserve the existing connectivity of the roadway network and aide in servicing future traffic demand in the West Houston. Below are a set of criteria that were utilized in developing these recommendations.









	TABLE 5.2 - CO	DLLECTOR STREET	NOMINAT	TIONS
Map Ref. #	Roadway	Segment	Location	Recommended MTFP Classification
1	Greenwind Chase	Barker Cypress to Fry Road	City	Minor Collector
2	Barker Road	I 10 to Greenwind Chase	City	Minor Collector
3	Winkelman Road	Bellaire to Alief Clodine	ETJ	Minor Collector
4	Chisel Point Dr.	Katy Freeway to Kingsland	City	Minor Collector
5	Mechants Way	Grand Circle Blvd to Katy Freeway	ETJ	Minor Collector
6 & 7	Elrod	Franz to Clay	ETJ	Minor Collector
8	Raintree Village Dr.	Franz to Clay	ETJ	Minor Collector
9	Westfield Village	Clay to Kieth Harrow	ETJ	Minor Collector
10	Windsong Trail	Clay to Kieth Harrow	ETJ	Minor Collector
11	Park Ten	Katy Freeway to Park Row	City	Major Collector
12	Addicks- Sastuma/Timber Creek	FM 529 to SH 6	ETJ	Major Collector
13+ 14	Windfern	US 290 to Clay	City	Minor Collector
15	Wingfoot	Blalock to Windfern	City	Minor Collector
16	Neuens	Blalock to Gessner	City	Minor Collector
17	Witte	Katy Freeway to Neuens	City	Minor Collector
18	Sugarland Howell	Bellaire to Alief Clodine	ETJ	Major Collector
19	Hayes Road	Richmond to Wilcrest	City	Major Collector
20	West Houston Center Blvd	Westheimer to Westpark Tollway	City	Major Collector
21	Rogerdale	Harwin to Bellaire	City	Major Collector
22	Jeanetta	Westheimer to Westpark Dr	City	Minor Collector
23	Pagewood/ Windswept	Fondren to Tanglewilde	City	Minor Collector
24	Tanglewilde	Pagewood to Westpark	City	Minor Collector
25	Town Park Dr.	Gessner to Bugle	City	Minor Collector
26	Seagler/ Westcenter	Westheimer to Westpark Dr	City	Minor Collector
27	Whittington	Dairy Ashford to Eldridge	City	Minor Collector
28	Tully	Katy Freeway to Memorial	City	Minor Collector
29	Westlake Park Blvd.	Katy Freeway to Memorial	City	Minor Collector
30	Addicks-Howell	SH 6 to Katy Freeway	City	Minor Collector



#### **ROADWAY PROJECTS**

Table 5.3 lists roadway project recommendations (Shown in Figure 5.3) for the West Houston Study Area in addition to those currently listed in H-GAC's RTP and TIP, or the City of Houston's CIP or Rebuild Houston Program (See Section 4.2). The proposed projects are only conceptual and each will require independent stakeholder collaboration, advanced planning, preliminary engineering, and final design. The purpose of these projects is to reduce traffic stress on corridors in West Houston that are already (or will soon be) congested by providing alternate connections within the Study Area. It is anticipated that all these projects will be completed in 5 to 15 year time frame.

Figure 5.4 is a map of the top 13 intersections in the Study Area that will experience the most traffic delay in the future due to excessive traffic demand. Candidate intersections were selected based on unmet demand in 2040 for each street of each intersection. Where unmet demand was a range of volumes, the midpoint (average) of the range was used. The sum of the unmet demand for the cross streets was used to select intersections with the most unmet demand. The list is based on demand only, not the availability of ROW or engineering considerations that would have to be resolved to advance a project. Improvements at these intersections could range from addition of dedicated turn lanes to grade separation of travel lanes.

Subsequent research on the selection of improvements for these intersections should include the following considerations:

- Development that would be affected on each approach
  - Driveways to be closed
  - Alternative access provided
  - Damages
  - Total takings
- Drainage considerations
- Underground utilities to be relocated
- Grade Separation decisions
- · Adjacent intersections and operating conditions
- Nature of the streets

Well-planned sidewalks, multi-use paths, and trail networks can complement existing mobility infrastructure and provide much needed multimodal travel opportunities. The thoughtful placement of pedestrian- and bicycle-friendly connections can improve access to parks and open space, promote walking and biking to neighborhood civic or retail destinations and garner a heightened sense of community. West Houston has an extensive network of sidewalks, multi-use trials, and on-street bicycle facilities (See Section 2.8). However, this network can be improved by building proposed facilities, connecting existing facilities, and linking facilities to other modes of travel.

The installation of sidewalks or multi-use trails along under utilized utility corridors and drainage channels is encouraged. Pedestrian bridges can improve connectivity across physical barriers such as drainage corridors. Communities should also partner with bayou greenway organizations to retrofit inactive spaces to accommodate more pedestrian connectivity.

Opportunities for intra-neighborhood, interneighborhood, and sub-regional trails often exist along edges and boundaries between adjacent subdivisions, between phases of a given subdivision, and between residential lots and utility areas and corridors (detention ponds, drainage channels, petrochemical pipeline easements, and electric power line easements). These opportunities should be identified corroboratively with developers early in subdivision plan development phase. Trail alignments, access easements, and future trail/street crossing locations should be designed into subdivision plans.

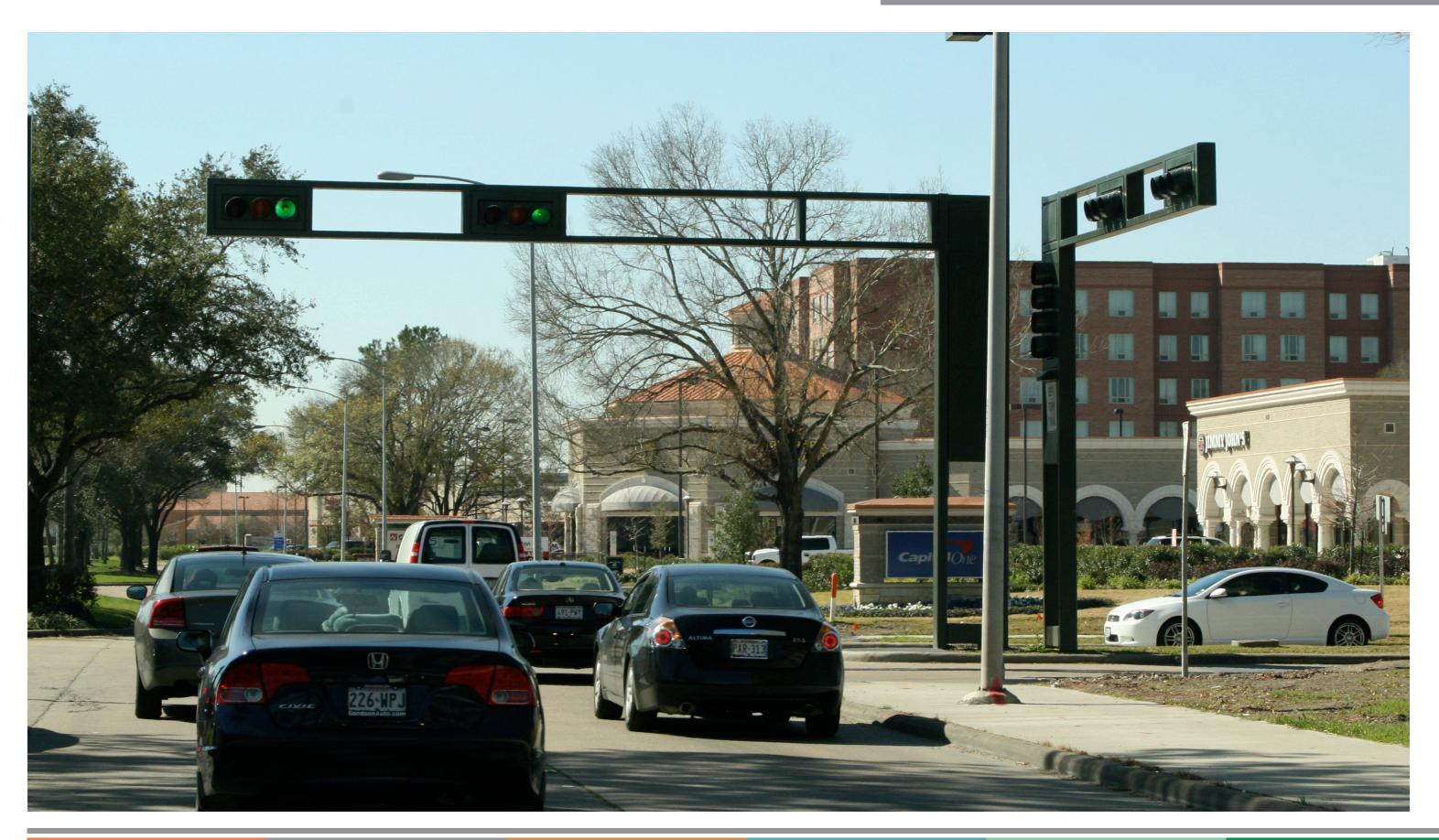
Previous studies have made numerous bicycle and pedestrian related recommendations. These recommendations should be implemented, where still applicable. The following statements in many ways summarize and echo the recommendations in these previous studies.

- Connect activity centers
- Connect facilities to transit and park and rides
- Cross barriers-creeks, drainage channels, reservoirs and highways
- Utilize utility corridors to enhance offstreet connections
- Continue to build-out the off-street trail network
- Complete system gaps
- Provide multimodal accommodations, where appropriate, as streets are constructed or rebuilt

To maximize safety, all network facilities should be implemented in conformance with crime prevention though environmental design principles and the American with Disabilities Act (ADA) Standards for Accessible Design. These standards help to ensure these facilities are safe and accessible for all users.

Figures 5.5 - 5.13 on the following pages are conceptual maps of potential bikeway and trail network segments and crossings in the Study Area. The locations of key civic and commercial amenities such as schools. churches, hospitals and major retail centers are identified to show the potential benefits of network segments. A map locator grid is on each map.







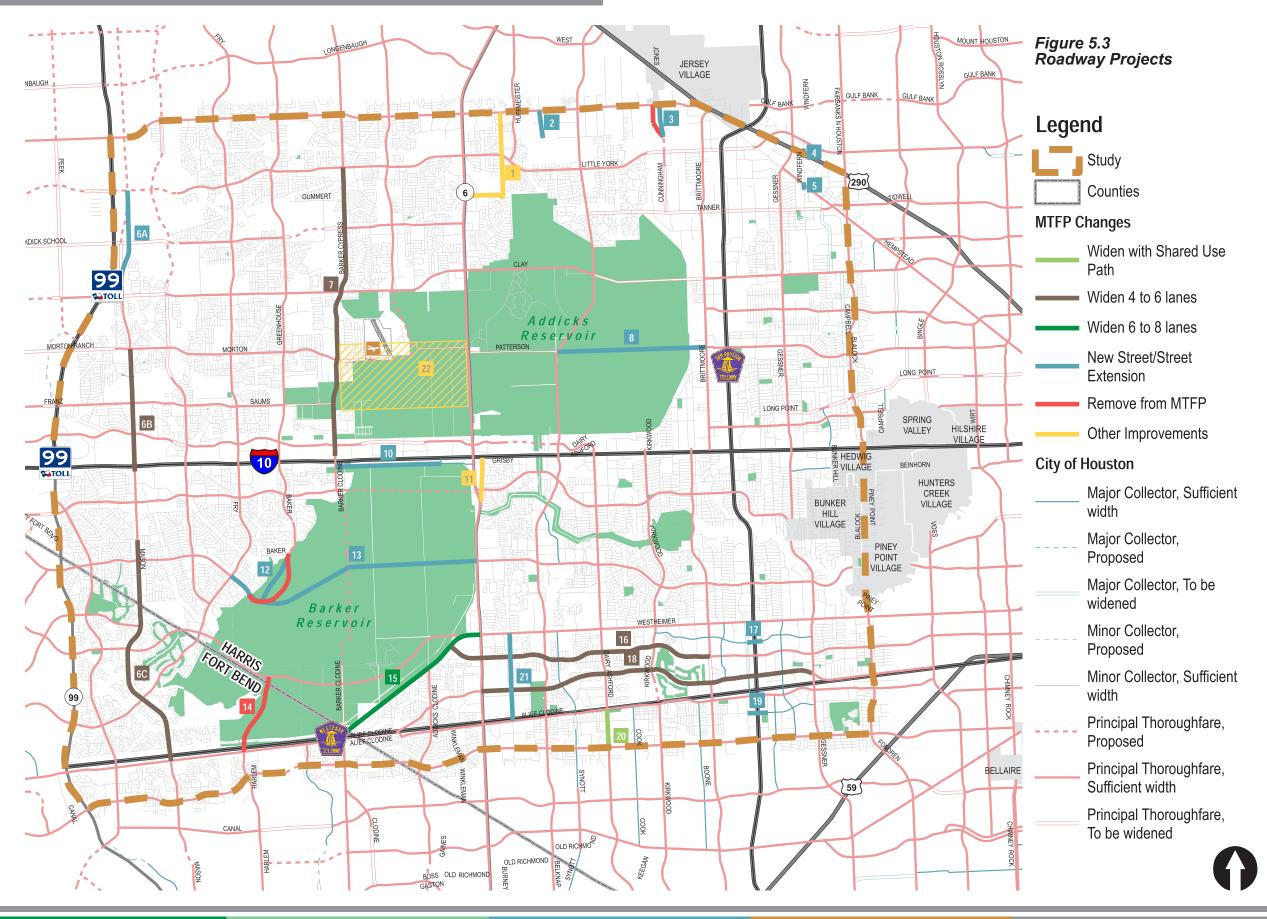


	TABLE 5.3 ROADWAY PROJECT RECOMMENDATIONS							
			_	On MTFP	On MTFP			
Map Ref. #	Roadway	Segment	Recommendation	Мар	Table	Location	Comments	
1	Addicks- Satsuma/Timber Creek	FM 529 to SH 6	Widen			ETJ	This corridor lies in the northern portion of the study area, between SH 6 and N Eldridge Parkway, both of which already have high traffic volumes and are projected to have significantly higher traffic volumes in the future. Addicks-Satsuma serves as a north/south connection between FM 529 and West Little York. South of West Little York, Addicks-Satsuma turns west and meets SH 6 at the northern edge of Addicks Reservoir. The current roadway configuration of Addicks-Satsuma is one traffic lane in each direction, with open ditches on either side. The proposed project would replace the open ditches with culverts and widen the roadway to two traffic lanes in each direction to help relieve traffic on the major thoroughfares in the immediate area.	
2	Jack Rabbit Road	FM 529 to Little York	Extend			ETJ	Jackrabbit Road currently exists from FM 1960 (near US 290) FM 529. The proposed project would extend Jackrabbit Road from FM 529 southward to West Little York and help to relieve SH 6 and N Eldridge Parkway from current and future traffic congestion. If extended, the corridor would effectively serve as a direct route from West Little York to US 290.	
3	Jones Road	FM 529 (Spencer Road) to Little York	Realign	•		ETJ	Jones Road was extended to FM 529 (Spencer Road) in 2011. The current MTFP should be amended to remove the Melendy/Cunningham alignment and extend and widen Northwinds Dr to Cunningham Road. This realignment would provide north-south connectivity from Tanner Road to SH 249.	
4	Windfern-US 290	US 290	Connect			City	Windfern Road is a north/south corridor that lies just east of Gessner Dr. in the eastern portion of the study area. It currently runs from Clay Rd. on the southern end to Fallbrook Dr. on the northern end, near Beltway 8. However,	
5	Windfern- Hempstead	Hempstead Rd.	Connect			City	there are two places where Windfern Rd. terminates, at Hempstead Rd. and again at US 290. The recommendation of this study is to consider grade separated connections at both Hempstead Rd. and US 290. This would assist in relieving traffic congestion along Gessner Dr.	
6A	Mason Road	Clay Rd. to Stockdick School Rd.	Realign	•		ETJ	Mason Road is a major north-south corridor, with segments extending from US 90A near Richmond, TX to US 290 in Cypress. When completely builtout, Mason Road will provide an excellent alternative route to the Grand	
6B	Mason Road	Morton Rd. to I-10	Widen	•		ETJ	Parkway. This study recommends the realignment and widening of several sections of Mason Road. (6A)Realignment of Mason Road from Stockdick School Rd to Clay Rd is recommended to allow adequate spacing between major intersections due to the alignment of the Grand Parkway. The currently alignment of Mason Road at Stockdick School Road would place the intersection within 700 feet of the intersection at Stockdick School Road and the Grand Parkway. Traffic Engineering standards state that major intersections should be at least one-quarter mile (1,320 feet) apart for good traffic progression. The proposed realignment would move the Mason Road-Stockdick School Road intersection at least one-quarter mile from the intersection at the Grand Parkway. (6B) Mason Road between Morton Ranch Road and Interstate 10 should be widened to 6 lanes to accommodate project traffic volumes. Likewise, (6C) Mason Road between Rock Canyon Drive and the Westpark Tollway should be widened to 6 lanes to meet traffic demands.	
6C	Mason Road	Rocky Canyon to FM 1093 (Westheimer Rd.)	Widen	•		ETJ		
7	Baker-Cypress Road	Little York Rd. to I-10	Widen	•		ETJ	Baker-Cypress is the first major north-south through route west of SH 6. The segment between I-10 and Little York Rd. currently carry from 25,000 to 30,000 vehicles per day. By 2040, traffic volume on this segement of Barker-Cypress is projected to increase 20%. Widening the roadway to 6 lanes will relieve congestion by adding the capacity needed for the projected traffic volumes.	
8	Patterson	Elderidge Pkwy to Hammerly (@ Brittmoore)	Extend			City	Patterson Road currently connects SH 6 to Elderidge Parkway through the Addicks Reservoir. Patterson is currently listed on the MTFP as a thoroughfare to be widened in the future. The extension of Patterson to Hannerly Blvd would provide additional east-west connectivity to meet project travel demands in 2040. When Patterson is aligned with Groeschke Road (See Number X), the combined corridors will provide east-west connectivity from US 290 to the Grand Parkway, and serve as a effective alternative route to the Katy Freeway.	
9	Wycliffe/Upland Drive	Hammerly to Katy Freeway	Connect			City	The northwest quadrant of the intersection of Beltway 8 and the Katy Freeway is currently underdeveloped and according to the growth projection models utilized in this study, will likely develop into higher density land uses in the future. The lack of connectivity in this particular area is likely to be a challenge as the redevelopment occurs. Currently, Brittmoore is the only corridor between Beltway 8 and Addicks Reservoir that extends from the Katy Freeway to US 290. As the density of land uses increases along this portion of the Beltway 8, Brittmoore is likely to exceed its traffic capacity according to the travel demand model. An additional connection that would relieve some traffic pressure from the southern end of Brittmoore could be Timberline Road. A connection could be made from Wycliffe Drive and aligned with Church Lane at Brittmoore. Church Lane could then be extended to Clarborough Place to provide connectivity to the Beltway 8 frontage road and Westview Drive.	
10	Grisby	SH 6 to Westlake Park Blvd.	Extend			City	Grisby Rd. is currently on the MTFP from its connection to the Katy Freeway frontage road (between Barker Cypress and SH 6) to SH 6. The recommendation of this study is to consider extending Grisby westward along its current alignment to Barker Cypress. If constructed, it would serve in a similar capacity to Park Row on the north side of the Katy Freeway. The proposed alignment is very close to the Barker Reservoir, so special attention would need to be given to avoiding conflicts with the protected reservoir.	
11	Addicks-Howell	SH 6 to Katy Freeway	Widen			City	Along SH 6, just south of Memorial Dr., Addicks-Howell Rd. diverges from the SH 6 alignment and continues to the Katy Freeway frontage road. The alignment is currently one traffic lane in each direction, with open ditches on both sides of the roadway. The recommendation is to consider widening the roadway to accommodate two traffic lanes in each direction from SH 6 to the Katy Freeway frontage road. It is possible that the overhead utilities would have to be moved as well. The benefit of this project is to relieve congestion along SH 6, particularly at the intersections of Memorial Dr. and the Katy Freeway frontage road.	
12	Baker Road	Barker Road to Highland Knolls	Abandon	•	•	City	Currently, the MTFP map recommends acquiring right-of-way through the Barker Reservoir for future connection between Baker and Highland Knolls, just south of IH 10. This alignment should be abandoned and realigned due to the recommended extension of Briar Forest to Highland Knolls (See Number X). However, to accommodate north-south traffic demand Greenhouse Road should be extended to Barker Rd and then down to the proposed extension of Briar Forest.	



	TABLE 5.3 ROADWAY PROJECT RECOMMENDATIONS						
Map Ref. #	Roadway	Segment	Recommendation	On MTFP Map	On MTFP Table	Location	Comments
13	Briar Forest	SH 6 to Highland Knolls	Extend			City	The MTFP currently shows Memorial Drive extending across the Barker Reservoir to Kingsland Drive. Projected traffic volumes necessitate adding an additional east-west corridor across Barker Reservoir to balance traffic demand and preserve the capacity of other roadways like Memorial Drive, FM 1093 (Westheimer Rd.), Richmond Ave, and Westpark Drive. It is therefore recommended that Briar Forest be extended across Barker Reservoir to Highland Knolls. Although the acquisition of right-of-way will require extensive local, state, and federal review, the traffic benefits derived from this corridor by 2040 will ultimately offset the prolong planning process and higher construction costs.
14	Grand Mission	Westpark Tollway to Westheimer Parkway	Abandon	•	•	ETJ	The MTFP map currently shows a planned roadway segment along the Grand Mission alignment between Westpark Tollway and Westheimer Parkway. The proposed alignment lies within the Barker Reservoir and requires a crossing of Buffalo Bayou. Since the proposed alignment lies within the Barker Reservoir, the proposed project must go through extensive evaluation and review by local, state and federal agencies before the project can move forward, causing the financial cost to be escalated. Since there is no development in the Barker Reservoir, there seems little gained from making the proposed connection along the Grand Mission alignment. The same connection can be made via Westheimer Rd. or Mason Rd. without having to acquire land and construct a roadway along the Grand Mission alignment.
15	FM 1093 (Westheimer Rd.)	SH 6 to Westpark Tollway	Widen	•	•	City	Westheimer Road between SH 6 and the Westpark Tollway is already one of the busiest arterial roadway segments in the Houston area. Currently traffic volumes on this segment of Westheimer are over 60,000 vehicles per day, which is the same capacity as a limited access freeway. Traffic volumes are projected to increase by 25% by 2040. Widening this segment of Westheimer Rd. to 8 lanes will provide the capacity needed for the additional traffic volumes.
16	Richmond Avenue	Wilcrest Dr. to FM 1093 (Westheimer Rd.)	Widen	•	•	City	Richmond Avenue is one of two major arterial roads between Westheimer and the Westpark Tollway. Widening Richmond will provide additional roadway capacity to handle the project traffic volumes by 2040.
17	Meadowglen	Cross BW 8	Connect			City	The Meadowglen Dr. corridor is an east/west alignment that lies between Richmond and Westheimer in the Westchase District area. The corridor extends from Kirkwood on the western end to Gessner on the eastern end, however it does not cross Beltway 8. The recommendation is to consider a grade separated connection spanning the Beltway 8 right-of-way to Rogerdale on the western side. This proposed connection of Meadowglen would alleviate some of the current and future traffic demand on Richmond and Westheimer.
18	Westpark Drive	Gessner Rd. to SH 6	Widen	•	•	City	Westpark Drive is the other major east-west arterial roadway between Westheimer and the Westpark Tollway. Varies segments of Westpark has been fully or partial completed. It is recommended that Westpark be fully built out and widened to 6 lanes to accommodate projected traffic volumes and service to relieve traffic demand on Westheimer Rd., Richmond Ave, and the Westpark Tollway.
19	Town Park Drive	Cross BW 8 and utility ROW	Connect			City	The Town Park Dr. corridor is an east/west alignment that lies between Harwin and Bellaire, just south of the intersection of the Westpark Tollway and Beltway 8. Currently, the Town Park Dr. corridor extends from Gessner to Synott, changing names to High Star Dr. near Wilcrest. However the corridor does not currently extend across Beltway 8 or a drainage way between Rogerdale and Wilcrest. The recommendation of this study is to consider a grade separation along the Town Park Dr. alignment at Beltway 8 and a bridge over the drainage way between Rogerdale and Wilcrest.
20	Dairy Ashford Drive	Westpark Tollway to Bellaire Blvd.	Widen	•	•	City	It is recommended that Dairy Ashford be widened to 6 lanes with a shared use path between Westpark Tollway and Bellaire to accommodate projected traffic volumes and to service the pedestrian traffic around the public schools and other facilities along this segment of the roadway.
21	Sugarland Howell	Alief Clodine to Richmond	Connect			ETJ	Sugarland-Howell Rd. is a north/south corridor in the southern portion of the study area that lies between Eldridge Pkwy. and SH 6. Sugarland-Howell Rd. currently terminates on the southern end at Old Richmond Rd. (south of Bissonnet St.) and terminates on the northern end at Alief Clodine, near the Westpark Tollway. The proposed project would require an elevated roadway to be constructed across Westpark Tollway and an existing pond before coming down to grade near Westpark Dr. From that point, a connection could be made to the existing Westhollow Dr. which continues all the way to Westheimer. The proposed project would relieve congestion from both Eldridge Pkwy. and SH 6, while providing connectivity to Westpark Dr., Richmond Ave. and Westheimer.
22	Groeschke	Barker-Cypress Rd to SH 6	Realign	•	•	City	Preliminary design concepts have been developed for the West Houston Airport to extend the main runway from 3,953 feet to 5,000 feet. The proposed extension would necessitate the realignment of Groeschke Road. Final alignment would depend upon the airport receiving approval for the runway extension. The realignment of Groeschke Road should be coordinated with the extension of Patterson Road to ensure that the two roads align.



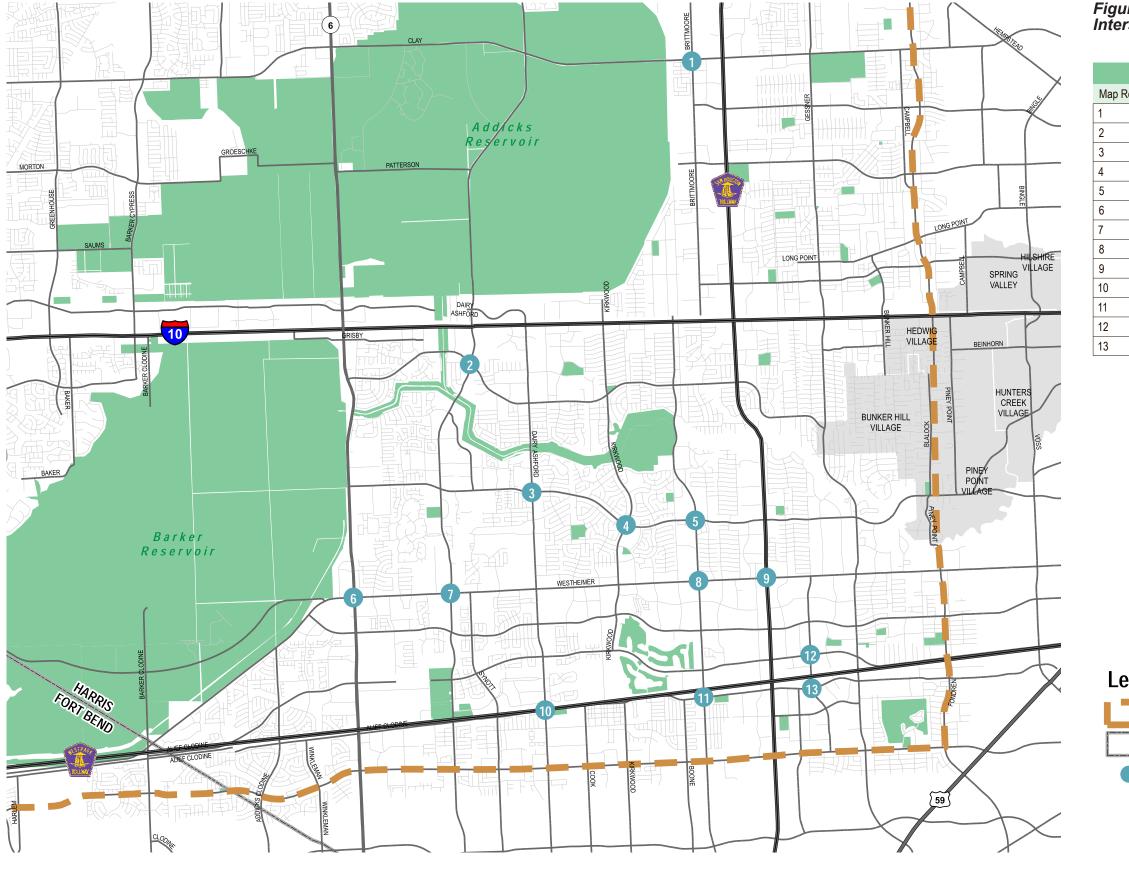


Figure 5.4 Intersection Improvements

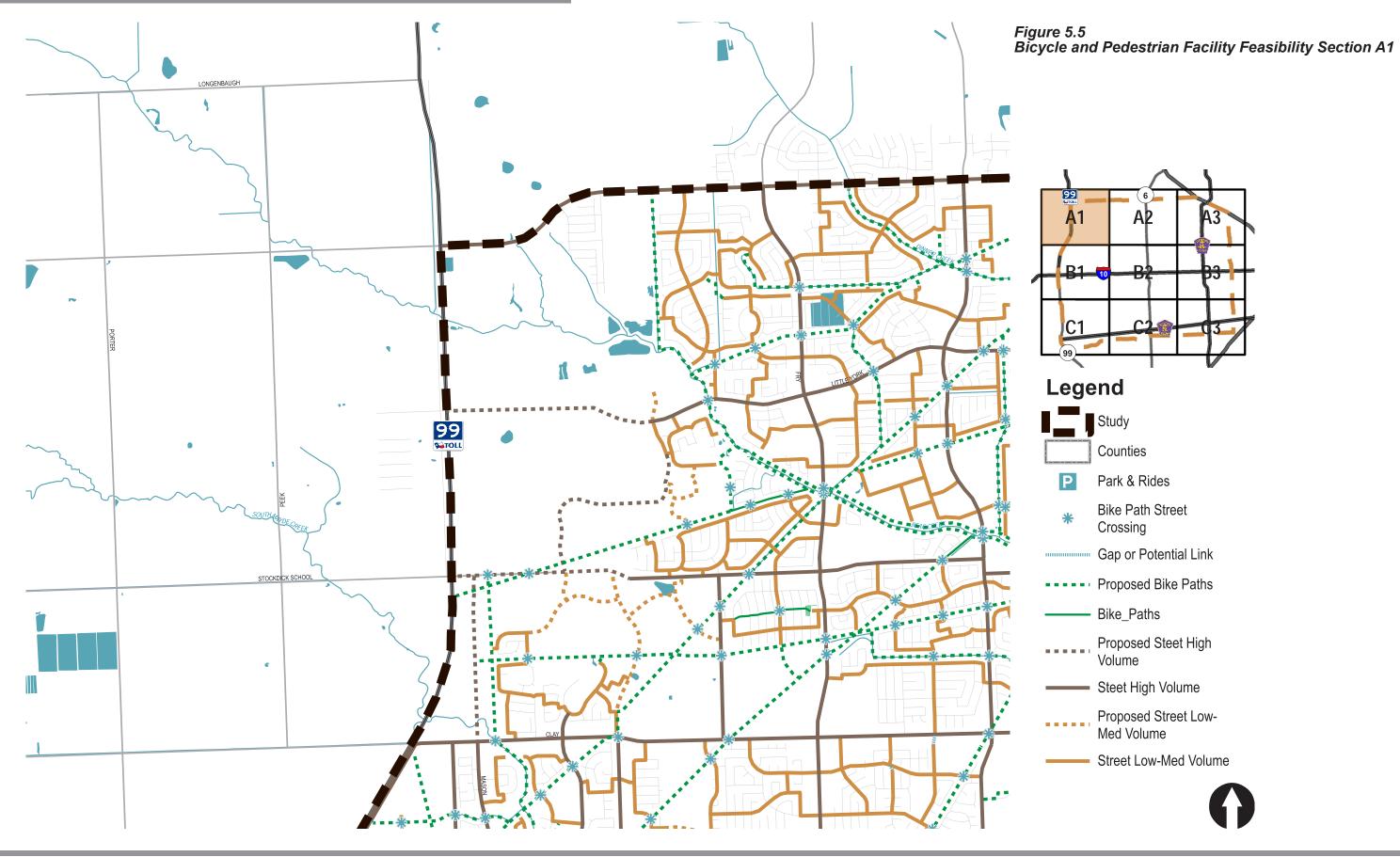
INTERSECTION	IMPROVEMENTS
Map Ref#	Location
1	Clay @ Brittmoore
2	Memorial @ Elderidge
3	Briar Forest @ Dairy Ashford
4	Briar Forest @ Kirkwood
5	Briar Forest @ Wilcrest
6	Westheimer @ SH 6
7	Westheimer @ Elderidge
8	Westheimer @ Wilcrest
9	Westheimer @ Beltway 8
10	Alief Clodine @ Diary Ashford
11	Harwin @ Wilcrest
12	Westpark @ Briarpark
13	Harwin @ Ranchester

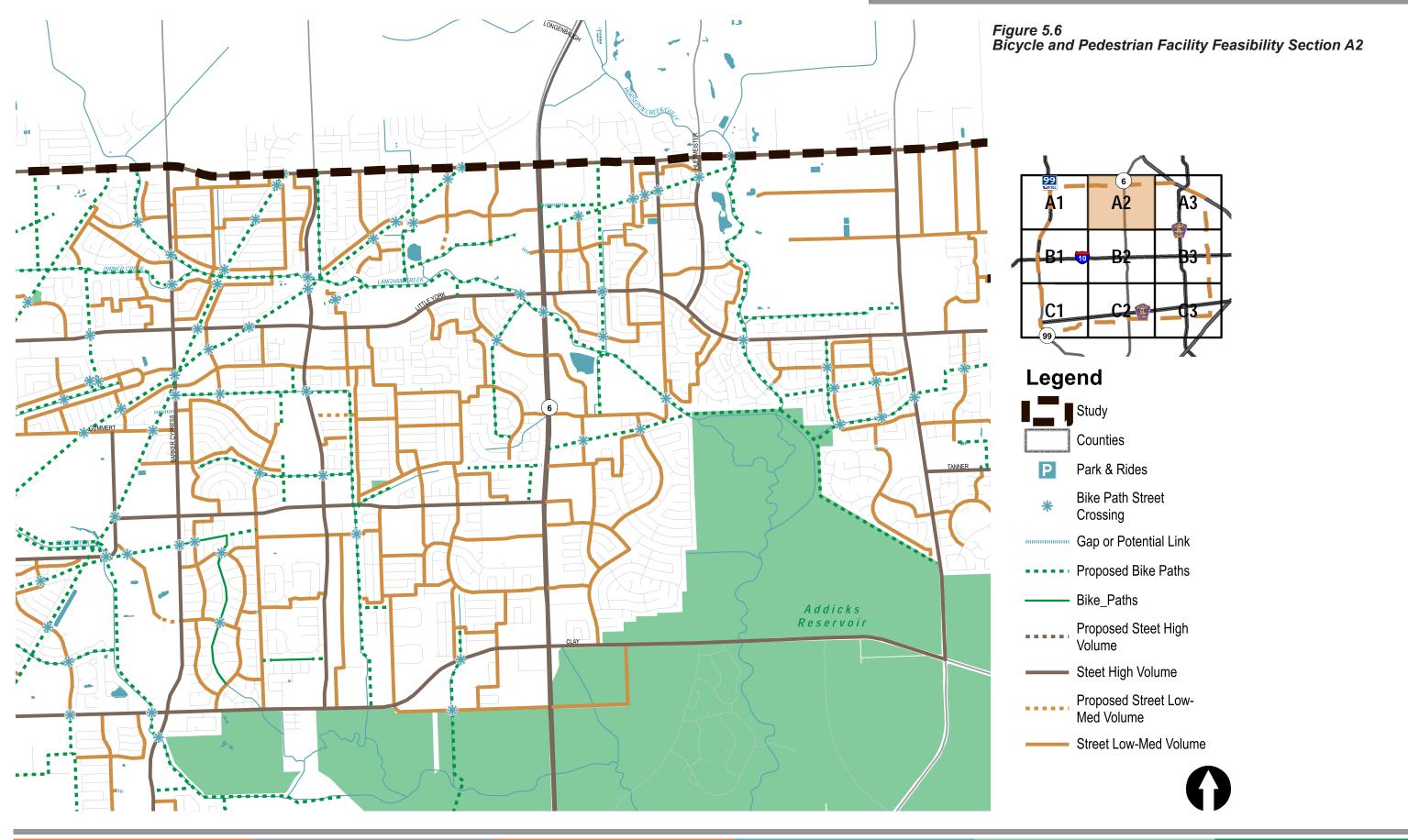




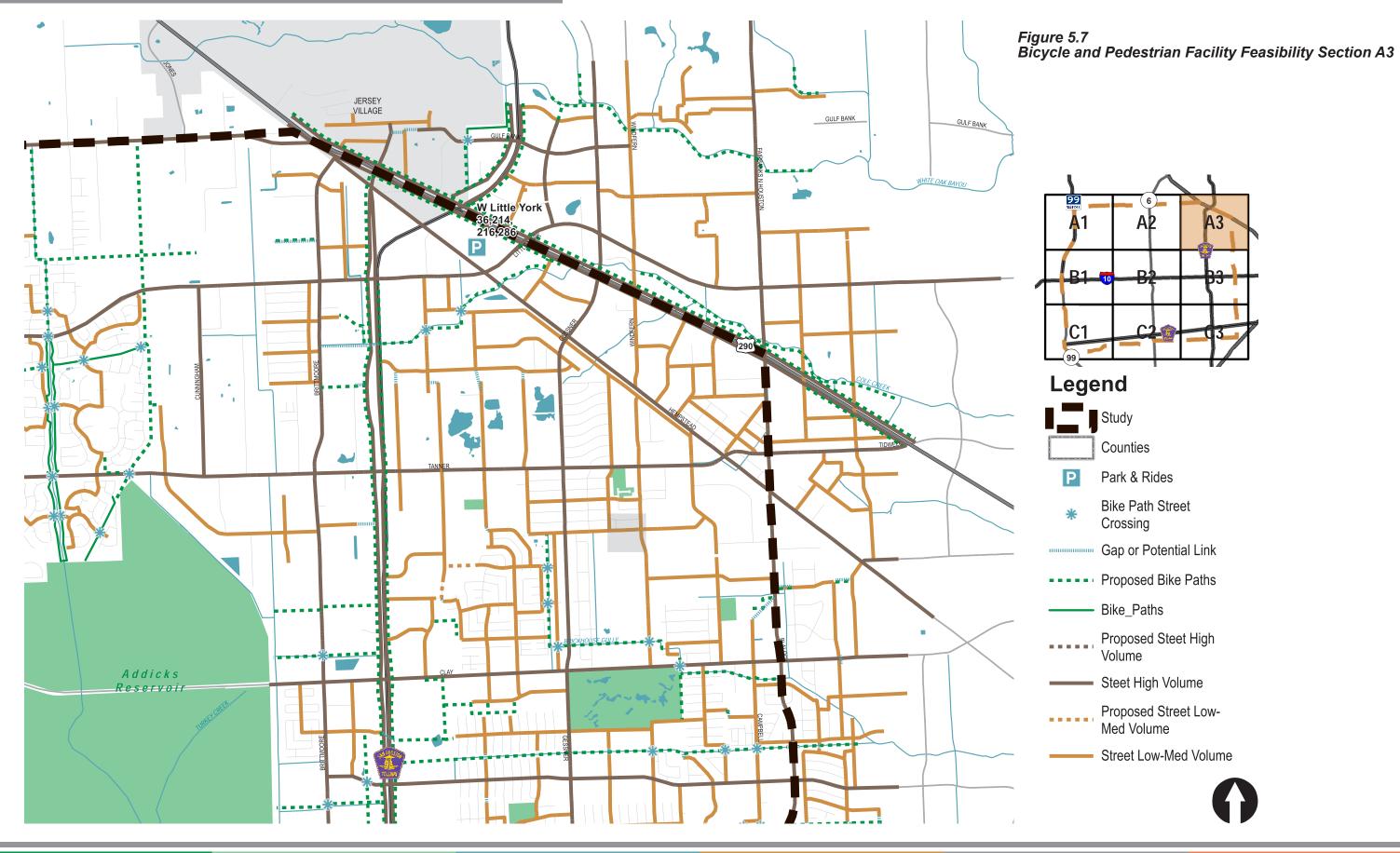


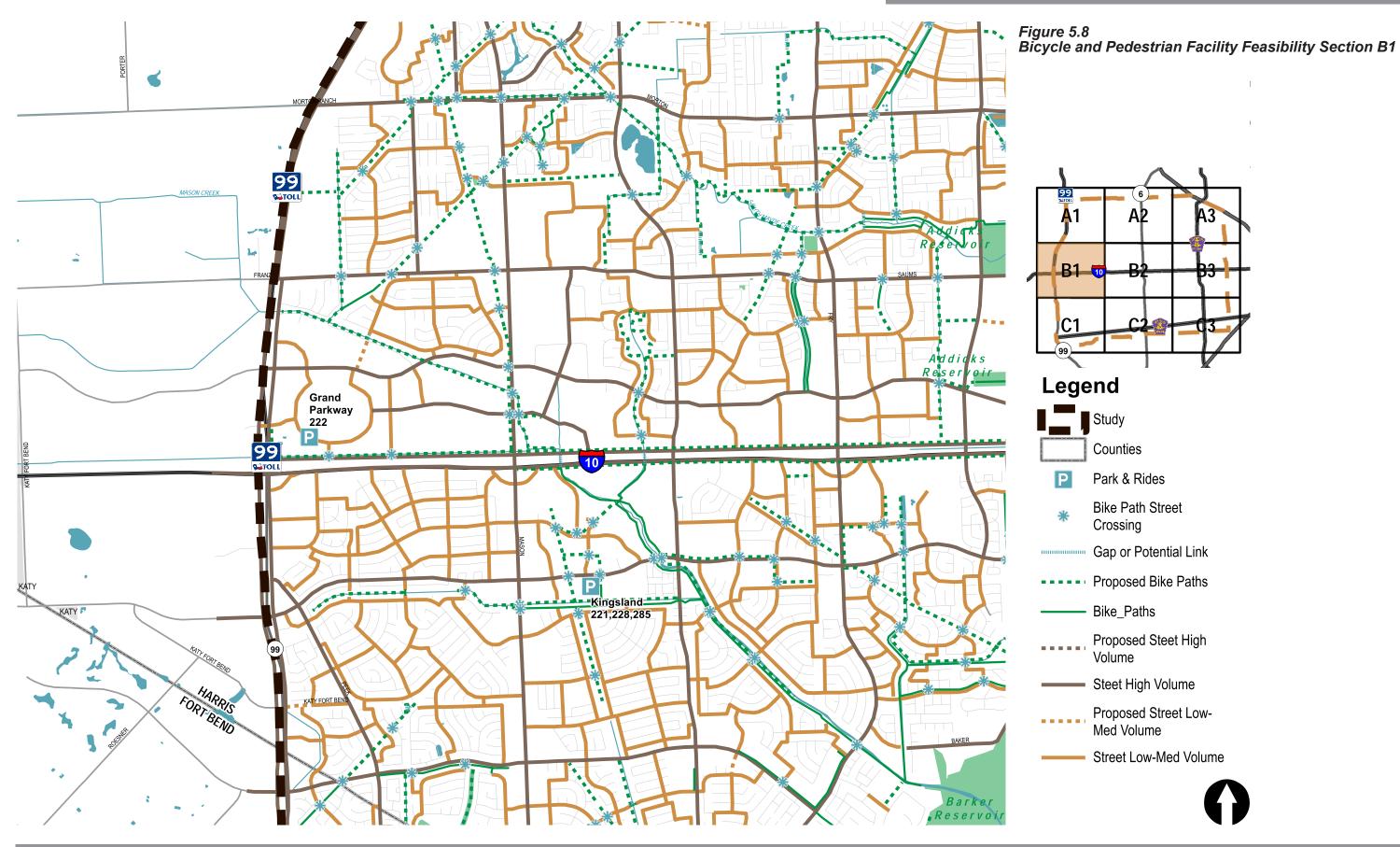




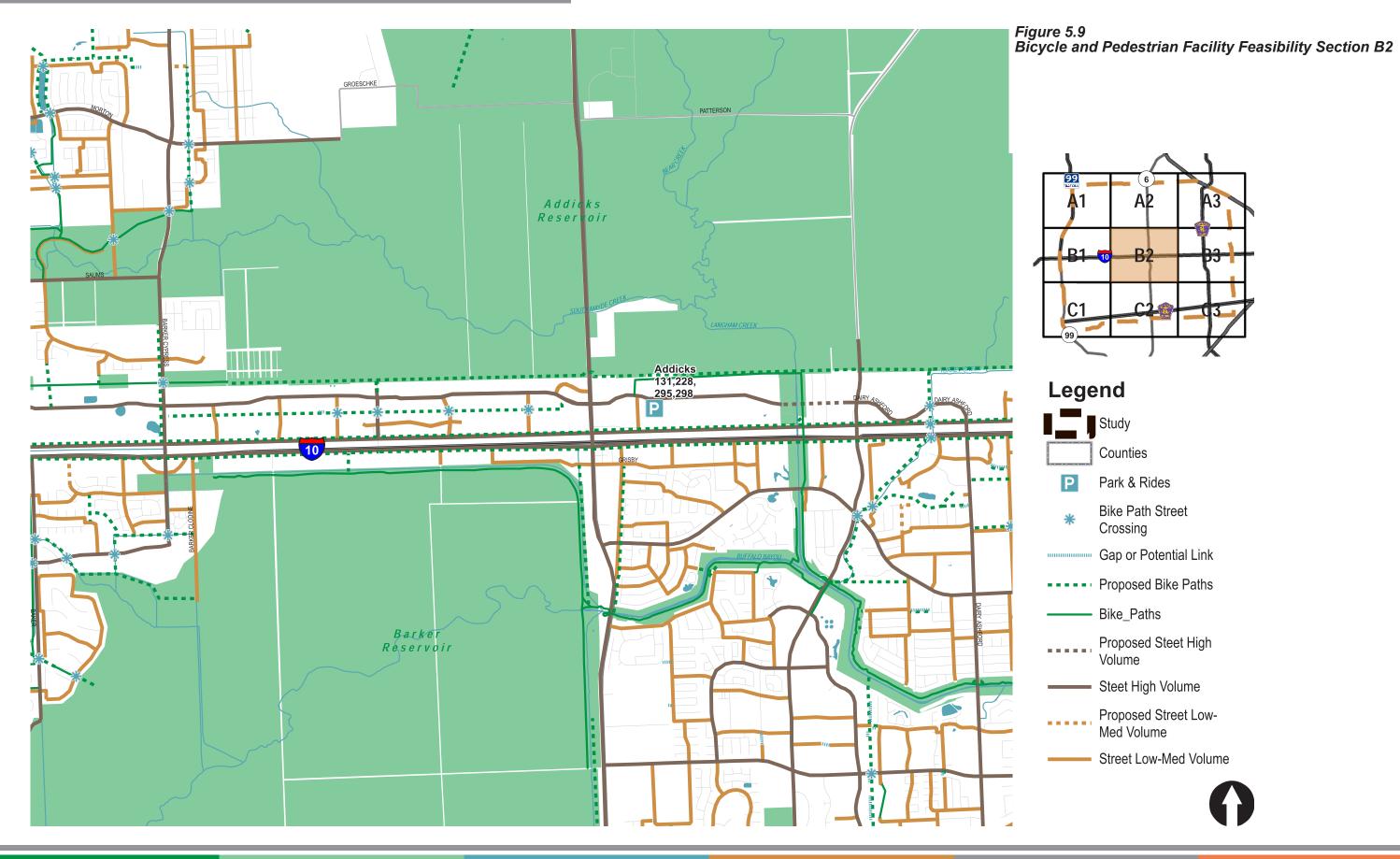


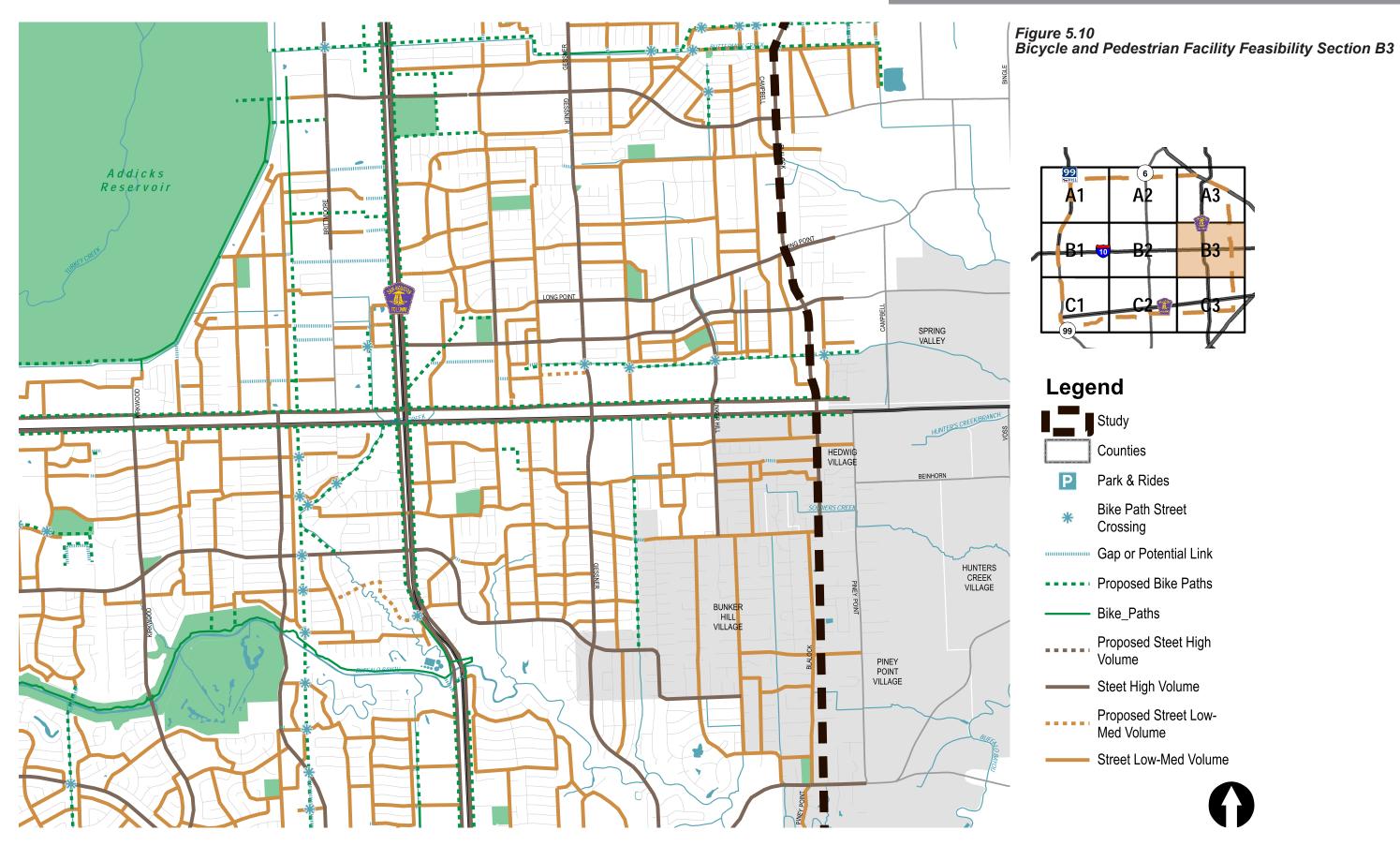




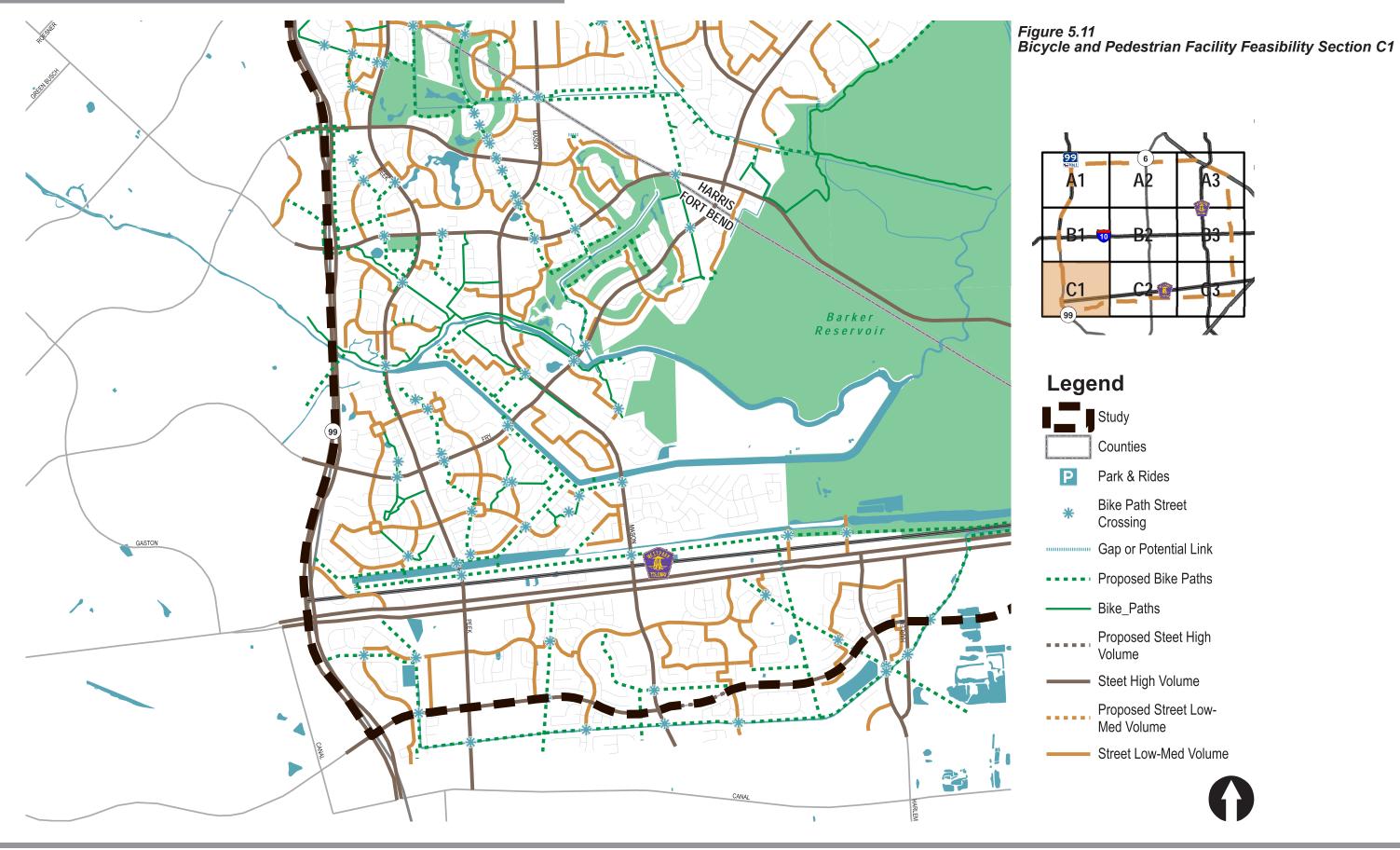


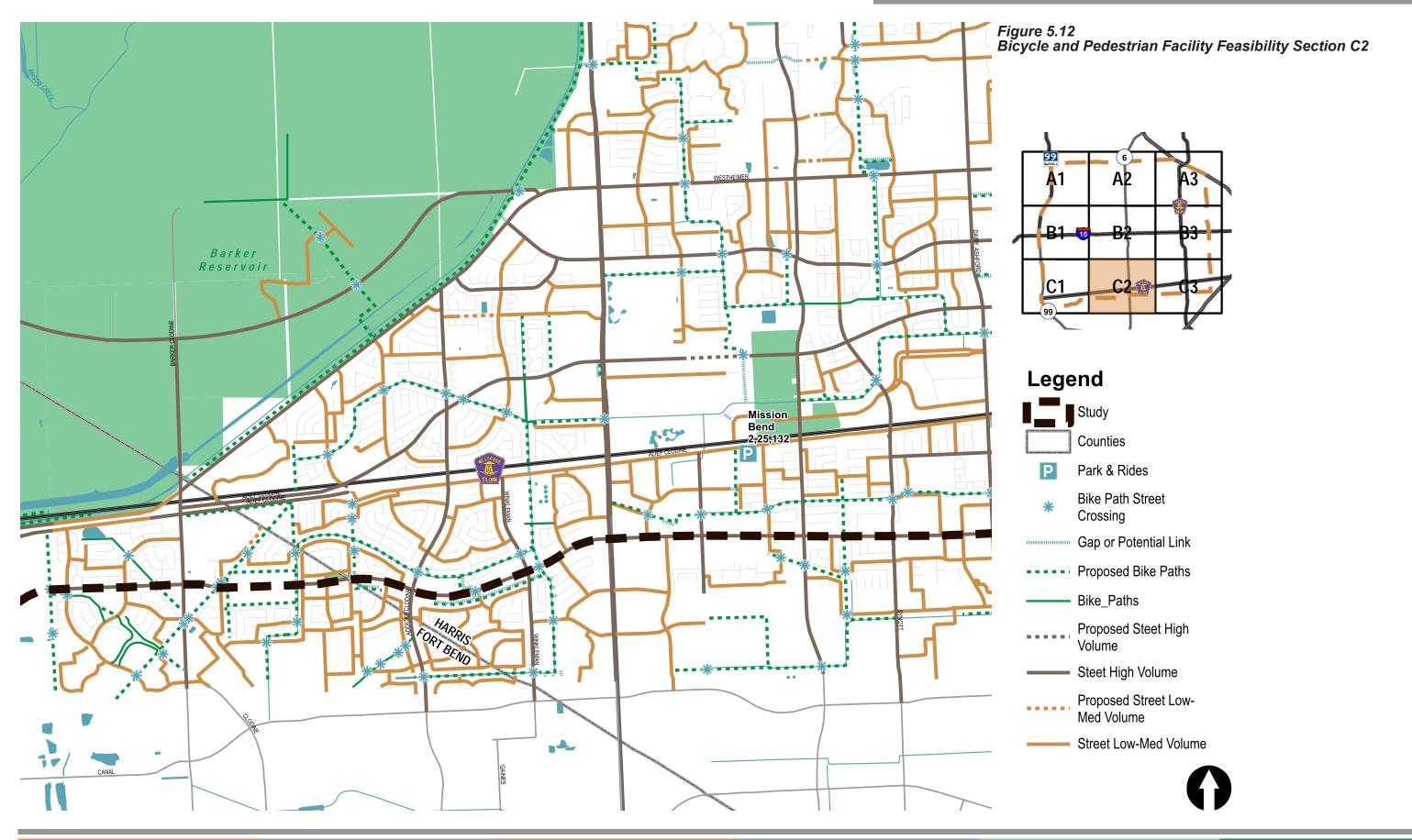




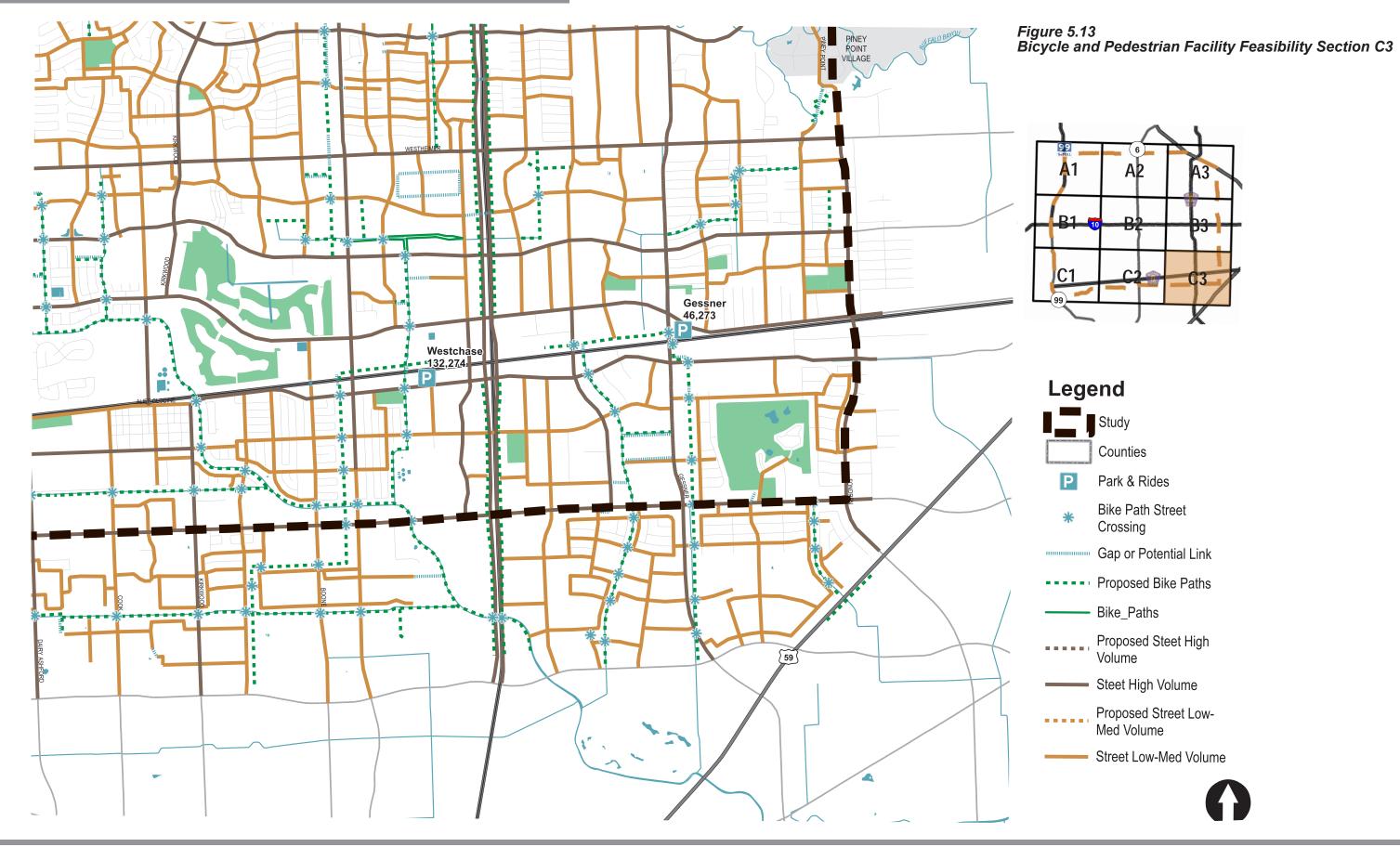












# **Transit Corridors** 99 PARK ROW Legend WESTHEIMER Study Area Counties **Transit Corridors** Local Transit Corridor Commuter Transit Corridor



## IMPROVEMENT OPPORTUNITIES

# 5.2 SERVICE OPPORTUNITIES

In order to preserve adequate mobility in the Study Area, transit and alternative mode services will play an increasing vital role. As previously mentioned, nearly 25 percent of METRO's 2013 average daily ridership is on local routes that operate in the Study Area. With the launch of METRO's new local bus network (METRO NBN) that percentage should increase substantially. The recommendations below include enhancements to METRO NBN, as well as recommendations to expand alternative modes that complement transit or serve as additional travel modes. Table 5.4 lists the transit enhancements that will help maintain and/or boost ridership under METRO NBN. Recommendations include capital projects to enhance operations, policy changes to test and meet untapped demand, and concepts for future high capacity service.

Service and facility recommendations are shown together in Figure 5.17. Individual routes are shown in greater detail in Figures 5.18 and 5.19.

Fort Bend County Transit (FBCT) is in the preliminary stages of constructing a Park & Ride facility along the Westpark Tollway. The facility is located in 19800 block of FM 1093 near Mason Road. The facility will initially provide 262 parking spaces (Figure 5.20), and is will offer direct service to Greenway Plaza and Uptown/Galleria. The facility is expected to begin operating in 2016.



### IMPROVEMENT OPPORT

FBCT should explore formal Interlocal agreements or partnerships with METRO to provide express bus service in METRO's Service Area. This includes current routes outside the Study Area. FBCT routes currently stop at METRO Park & Rides to afford passengers the opportunity to transfer to and from METRO routes. Formal Interlocal Agreements would help synchronize services to reduce transfer wait times as well as pave the way for a common fare box system.

To complement METRO NBN in the Study Area, Enhanced Transit Transfer Areas (ETTAs) are proposed primarily at locations were two high frequency routes intersect (Figure 5.19). These ETTAs would provide ease of transfer from one route to another with pedestrian intersection improvements, upgraded bus shelters, lighting, security, and dynamic information systems (Figures 5.15 and 5.16).

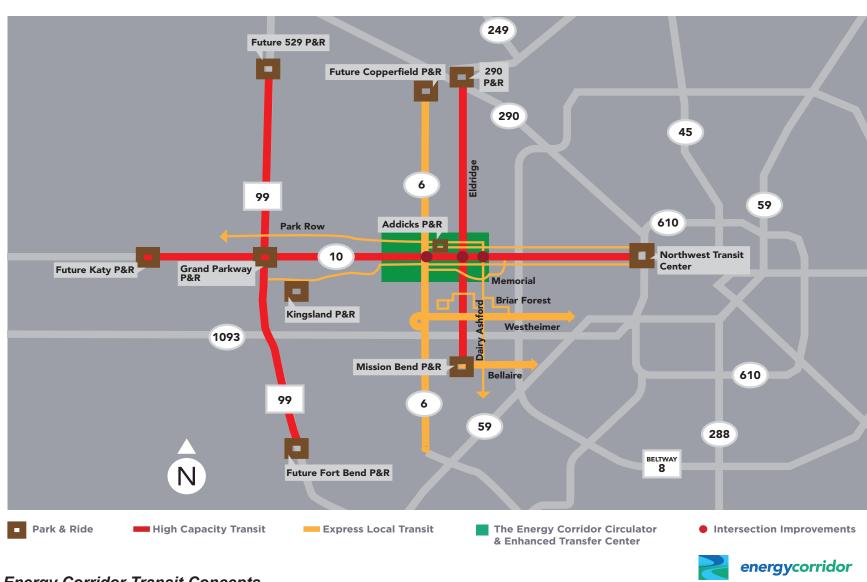
Each Funding Partner Management District should develop or refine one or more circular shuttle services within their districts. These circulars provide vital "last mile" service to and from existing or future transit facilities. Circulars should be coordinated with other services at these facilities to minimize wait times and allow seamless transfer from one mode to another. The circulars would provide a level of convenience needed to encourage daily commuters to use transit. Circulator services could be created through partnerships with METRO similar to the 75 Elderidge Crosstown route between METRO and the Energy Corridor. Such partnerships

would be beneficial to both METRO and Management Districts by lowering METRO's operating costs and allowing to management districts to avoid huge capital outlays for vehicles and drivers.

Metro National is considering expanding the operating hours of Memorial City shuttle (See Figure 2.46) as demand warrants. This service should be coordinated with METRO routes and facilities in the Memorial Mall area to provide enhance services and boost ridership on both services. Likewise, the Energy Corridor District has proposed a additional circulator service to enhance utilization of the Addicks Park & Ride/ Transit Center (Figure 5.20). Westchase Management District's Long Range Strategic Plan calls for the development of a district circulator service (See Figure 5.14) to complement both current and future transit services in the area.

Rideshare, carpool and vanpool service utilization will have to be expanded substantially to meet the unmet demand in West Houston. These services should be coupled with car sharing services, guaranteed ride home, flexible work schedules, and tele-working to give employees true options when and if they choose to commute. These services will require the participation of virtually all employers in the Study Area to truly be successful. Therefore, local jurisdictions, management districts, and other area partners will have to develop ways to incentive participation in these programs.





### **Energy Corridor Transit Concepts**









Figure 5.14 Westchase District circulator plan







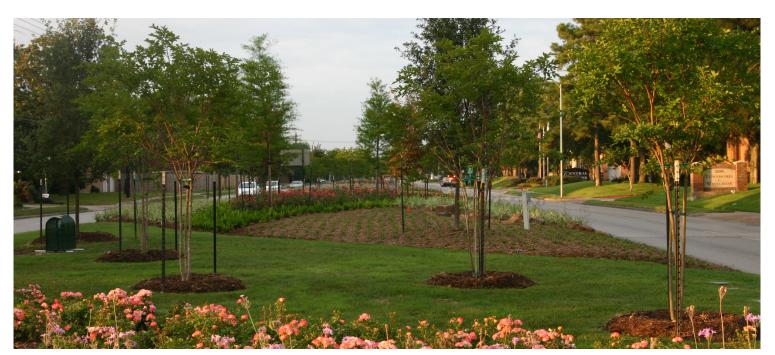






Figure 5.16
Gessner and Westheimer Proposed Improvements

			I	ABLE 5.4 - TRANSIT ENHANCEMENTS
Timeframe	Category	Туре	Description	Comments
Short	Service	Circulator Bus	Energy Corridor Circulator	Facilitates short trips within Energy Corridor. Could be its own route or more frequent turnback service of Routes 67/75/162; to be designed funded by Management District.
Short	Service	Circulator Bus	Westchase Circulator	Facilitates short trips within Westchase. To be designed and funded by Management District.
Short	Service	Express Bus	Nonstop service from Memorial City to Addicks P&R using Katy Freeway	Provides high-speed connection between Energy Corridor and Memorial City. Could be extension of Route 160.
Short	Service	Local Bus	Park Row: Addicks P&R to Fry Road	Serves apartments, offices, hospitals and HCC campus along Park Row. 60 min base headway; Could be new route or extension of Route 32 or 33
Short	Service	Local Bus	FM 1960/SH 6: Willowbrook Mall to Addicks P&R	Connects Energy Corridor to development along FM 1960/SH 6 corridor and Willowbrook Mall. 30 min base headway.
Short	Service	Signature Bus	Extension of Route 402 (Bellaire Quickline) to Mission Bend P&R	Limited stops and frequent headways; operates during weekdays only.
Short	Service	Signature Bus	Westheimer Quickline: Downtown to West Oaks Mall	Limited stops and frequent headways; operates during weekdays only.
Short	Service	Signature Bus	Gessner Quickline: West Airport to West Little York P&R	Limited stops and frequent headways; operates during weekdays only.
Short	Capital	Enhanced Transfer Point	Bellaire at Gessner	Provided at areas of frequent transfer activity; increases rider safety and comfort by providing shelters, lighting, ramps, special crosswalk treatment, landscaping, etc.
Short	Capital	Enhanced Transfer Point	Bellaire at Fondren	Provided at areas of frequent transfer activity; increases rider safety and comfort by providing shelters, lighting, ramps, special crosswalk treatment, landscaping, etc.
Short	Capital	Enhanced Transfer Point	Beechnut at Wilcrest	Provided at areas of frequent transfer activity; increases rider safety and comfort by providing shelters, lighting, ramps, special crosswalk treatment, landscaping, etc.
Short	Capital	Enhanced Transfer Point	Westheimer at Gessner	Provided at areas of frequent transfer activity; increases rider safety and comfort by providing shelters, lighting, ramps, special crosswalk treatment, landscaping, etc.
Short	Capital	Enhanced Transfer Point	Westhemier at Wilcrest	Provided at areas of frequent transfer activity; increases rider safety and comfort by providing shelters, lighting, ramps, special crosswalk treatment, landscaping, etc.
Short	Capital	Enhanced Transfer Point	Westheimer at Eldridge	Provided at areas of frequent transfer activity; increases rider safety and comfort by providing shelters, lighting, ramps, special crosswalk treatment, landscaping, etc.
Short	Capital	Park and Ride	West Bellfort P&R Expansion	Current facility is at parking capacity.
Medium	Service	Circulator Bus	Memorial City - Citycentre Circulator	Facilitates short trips within Memorial City. Operational once transit center is constructed; to be designed and funded by Management District.
Medium	Service	Express Bus	SH 6: Addicks P&R to Sugar Land Town Center	Facilitates "suburb to suburb" commute. Limited stops (West Oaks Mall, Shell Tech Ctr, Mission Bend P&R, Bissonnet, etc.); requires signal synchronization, access management enhancements, and other improvements prior to implementation; would require TxDOT and Fort Bend County participation.
Medium	Service	Express Bus	West Sam Houston Tollway Express: West Bellfort P&R to West Little York P&R	Facilitates "suburb to suburb" commute. Intermediate stops at Westchase P&R, Memorial City Transit Center, and Clay Road Transit Center.
Medium	Service	Local Bus	Extension of Route 65 (Bissonnet) from Synott to SH 6	Frequent route; coordinate with Fort Bend County (although intersection of SH 6 & Bissonnet is within COH limited purpose annexation area and therefore may be within METRO Service Area).
Medium	Service	Local Bus	Extension of Route 79 (West Little York) from Fairbanks - N Houston to SH 6	Provides local route coverage within study area. 60 min base headway; Serves West Little York P&R Routes 45 (Tidwell West) and 46 (Gessner) would be adjusted to serve West Little York Park and Ride as well.
Medium	Service	Local Bus	North Eldridge/Tanner/Brittmore: Northwest Station P&R to Clay Road Transit Center	Provides local route coverage within study area. 60 min base headway.
Medium	Service	Local Bus	West Road: Northwest Station P&R to Barker - Cypress	Provides local route coverage to area just north of study area. 60 min base headway.
Medium	Capital	Park and Ride	Possible TOD redevelopment of Addicks P&R	Pending METRO/H-GAC Station Area Planning Study.
Medium	Capital	Park and Ride	Possible TOD redevelopment of Westchase P&R	Pending METRO/H-GAC Station Area Planning Study.
Medium	Capital	Park and Ride	Possible TOD redevelopment of Kingsland P&R	Pending METRO/H-GAC Station Area Planning Study.
Medium	Capital	Transit Center	Memorial City Transit Center	Serves riders traveling to and from Memorial City; transfer point between Routes 26,46,70,160, 161, 162 and proposed Memorial City - Citycentre Circulator.
Medium	Capital	Transit Center	Clay/Sam Houston Tollway Transit Center	Transfer point between Route 23,36, 58 and proposed North Eldridge/Tanner/Brittmore route.
Long	Service	Local Bus	FM 529: Grand Parkway to West Little York P&R	Serves FM 529 corridor on northern edge of study area. 30 min base headway.
Long	Service	Express Bus	Nonstop service from Addicks P&R to Grand Parkway P&R using Katy Freeway	Provides high speed service between Grand Parkway and Energy corridor. Could be extension of Route 160.
Long	Service	Local Bus	Barker - Cypress: Cypress P&R to Kingsland P&R	Provides north-south connection through rapidly-developing portion of study area. 60 min base headway.
Long	Service	Local Bus	Extension of Route 79 (West Little York) from SH 6 to Fry Road	Coverage route. 60 min base headway.
Long	Service	Local Bus	Extension of Park Row route from Fry Road to Katy Mills Mall	Coverage route. 60 min base headway.
Long	Service	Local Bus	Fry Road - W Little York to Kingsland	Coverage route. 60 min base headway.
Long	Service	Local Bus	South Mason: Park Row to Westpark Park and Ride	Provides north-south connection through rapidly-developing portion of study area. 60 min base headway; Requires Fort Bend County participation.

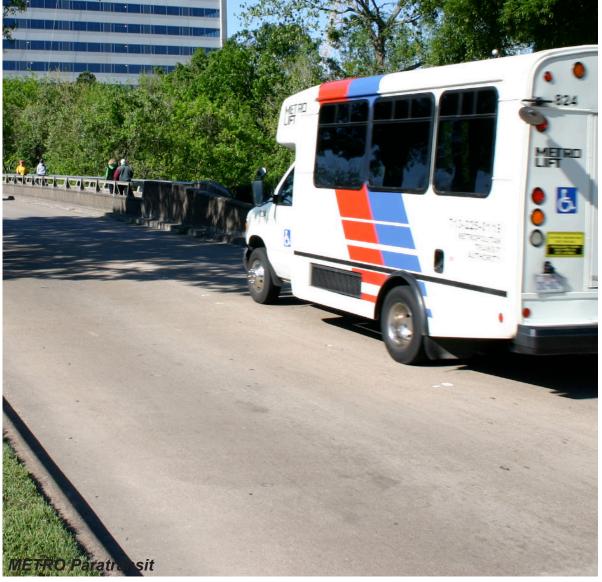


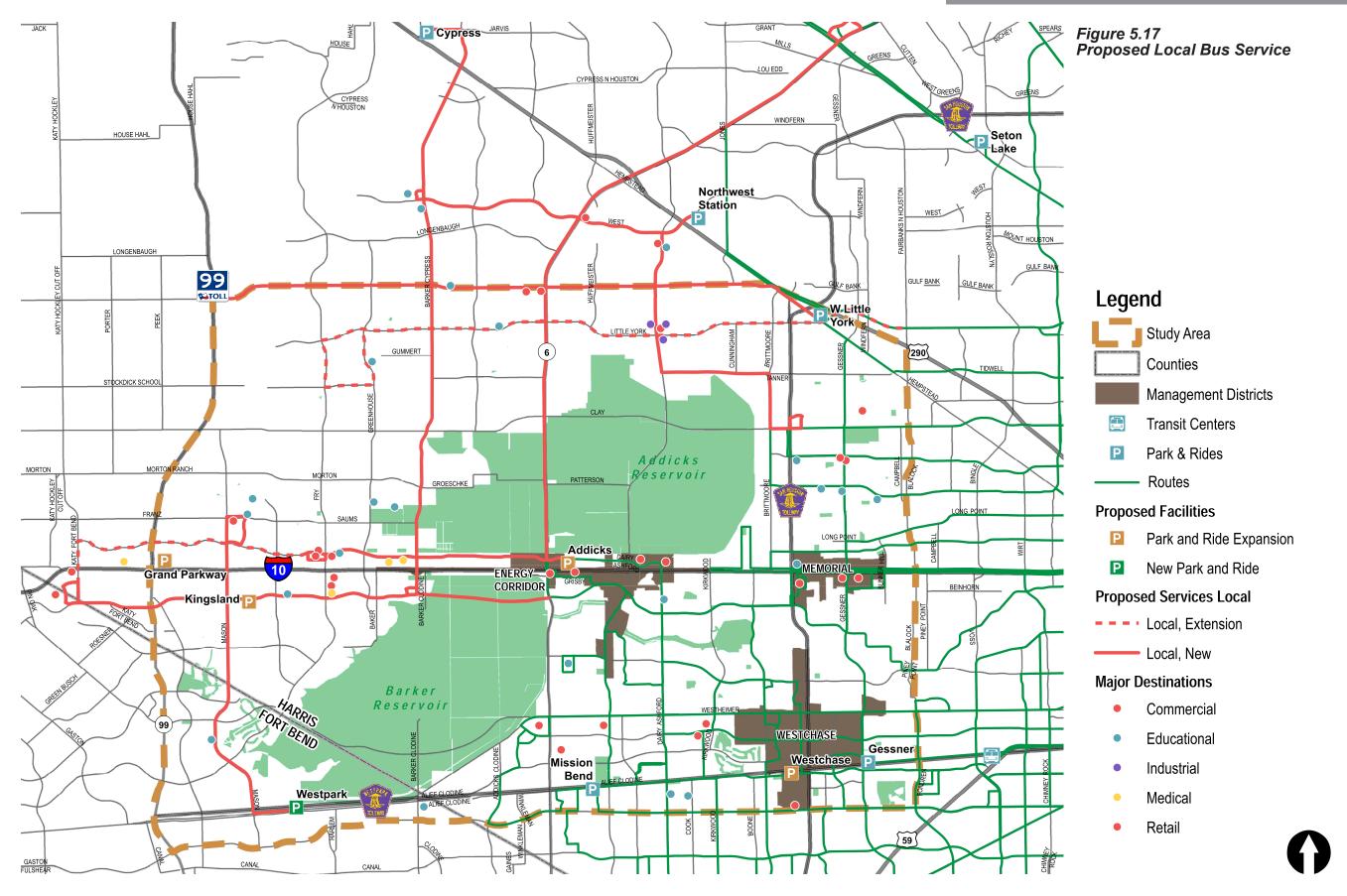
	TABLE 5.4 - TRANSIT ENHANCEMENTS (CONTINUED)								
Timeframe	Category	Туре	Description	Comments					
Long	Service	Local Bus	Memorial/Kingsland: SH 6 to Katy Mills Mall	Provides east-west connection through rapidly-developing portion of study area. 60 min base headway; Serves Kingsland P&R requires extension of Memorial Drive through Barker Reservoir.					
Long	Service	Local Bus	Clay Road - SH 6 to Grand Parkway	Coverage route. 60 min base headway.					
Long	Capital	Direct Connector	T-Ramp from Katy Managed Lanes to Memorial City TC	Allows direct access from Katy Freeway managed lanes to Memorial City Transit Center. Requires TxDOT participation.					
Long	Guideway	High Capacity	Westpark Corridor: Grand Parkway to Bellaire/Uptown TC	Could interline with University Line between Hillcroft TC and Bellaire Uptown TC depending on chosen technology; requires Fort Bend County and/or GCRD participation.					
Long	Guideway	High Capacity	US 290/Hempstead Corridor: Downtown Hempstead to Northwest Transit Center	Could extend into downtown; requires TxDOT and/or GCRD participation.					
Very Long	Guideway	High Capacity	Katy Corridor: Grand Parkway P&R to Northwest Transit Center	Would replace existing managed lanes; requires TxDOT and possibly GCRD participation.					
Very Long	Guideway	High Capacity	Gessner Corridor: West Little York P&R to West Bellfort P&R	Provides high-capacity north-south connection on eastern edge of study area.					

Projects assumed to be implemented by METRO unless otherwise noted

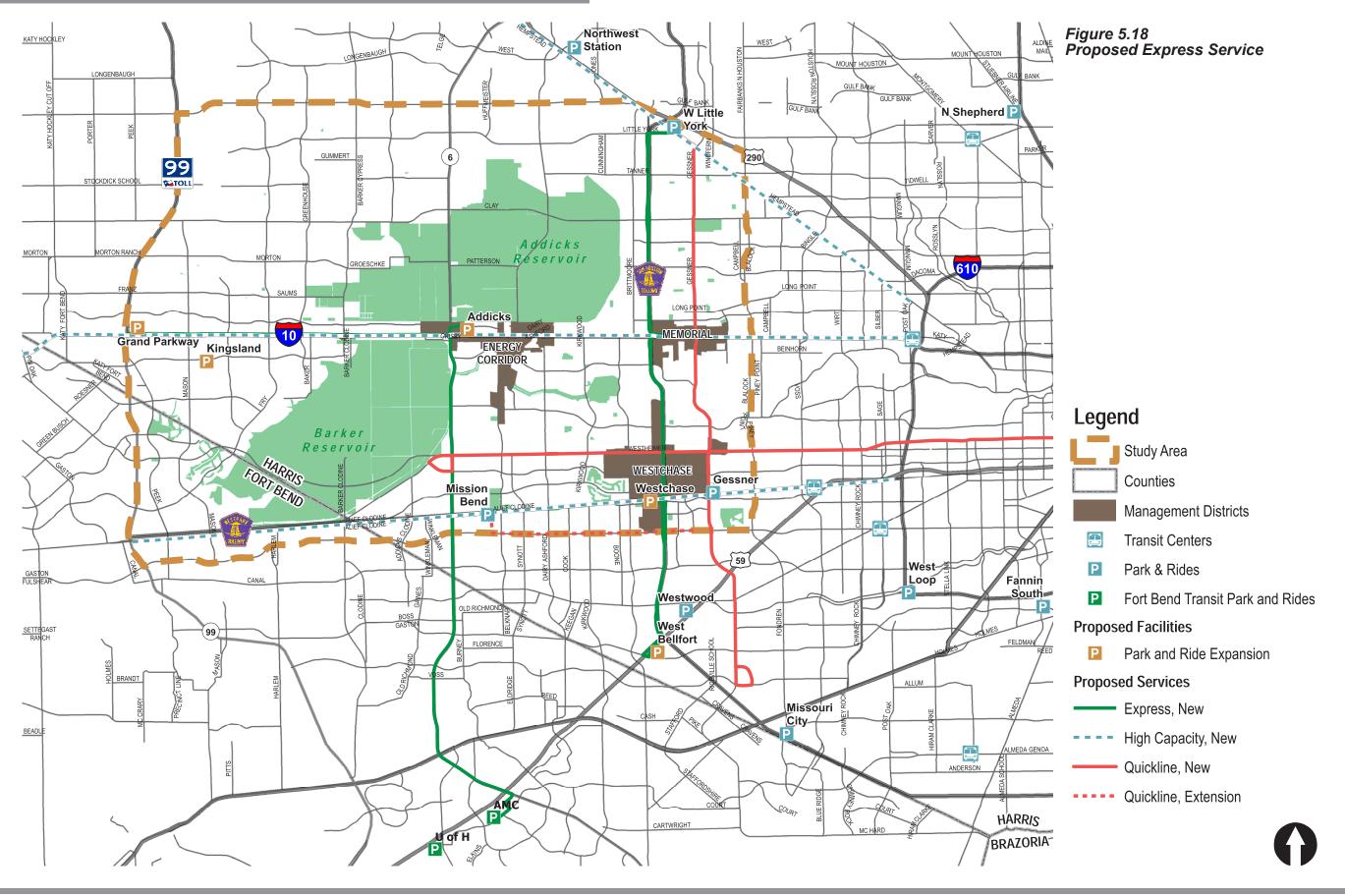
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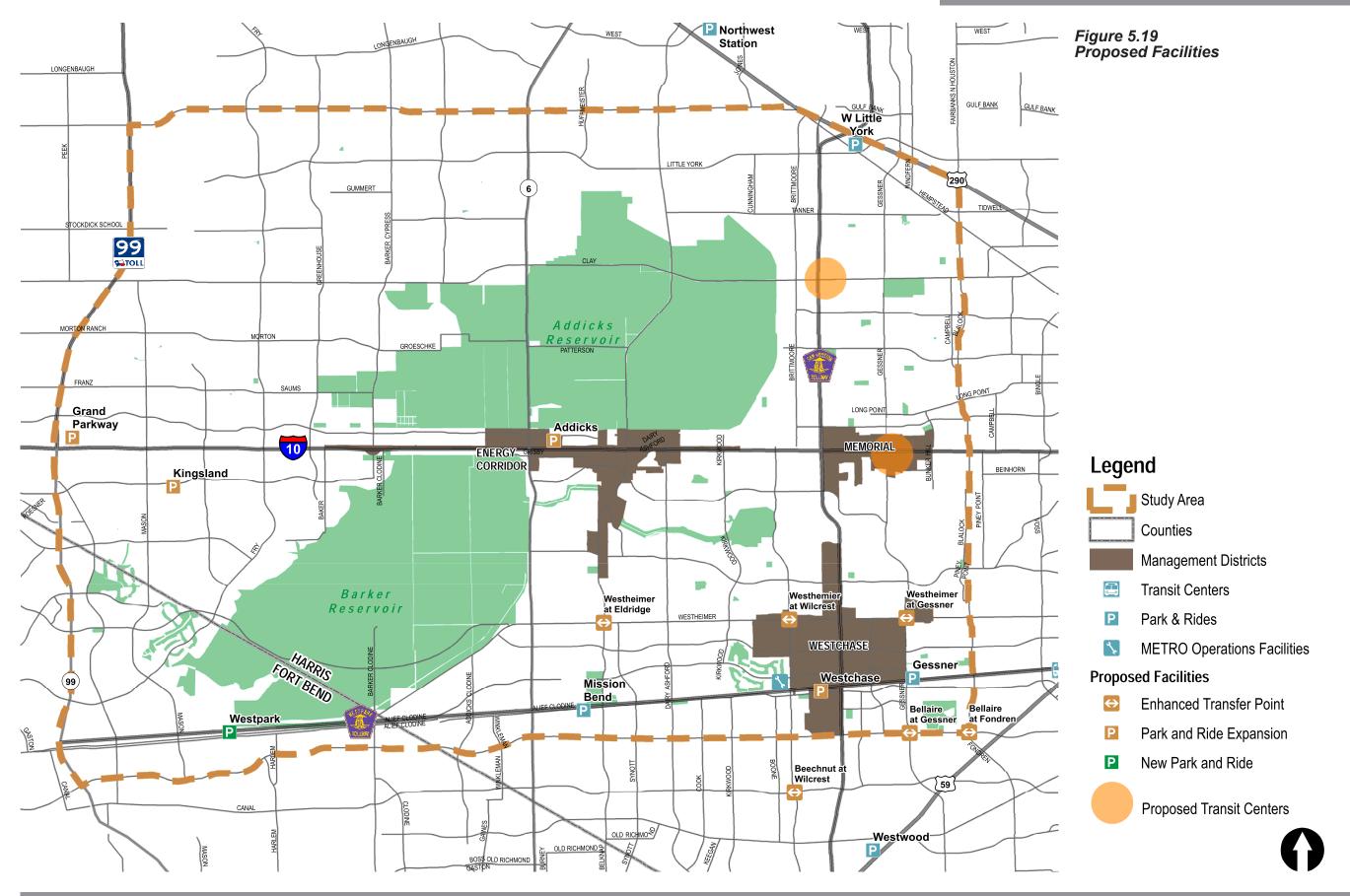














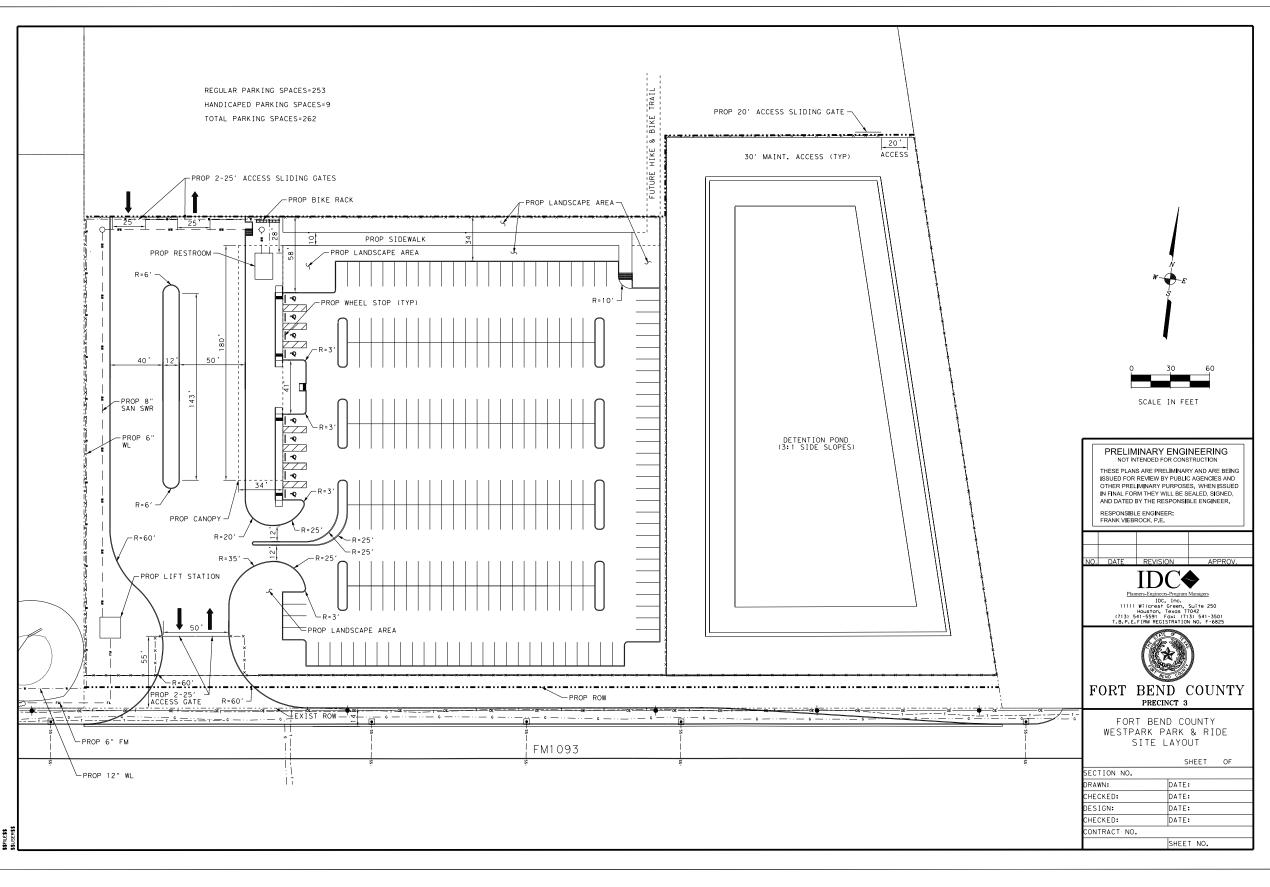


Figure 5.20
Proposed FBCT Westpark
Park & Ride, Located in the
19800 Block of the Westpark
Tollway (See Figure 5.19)

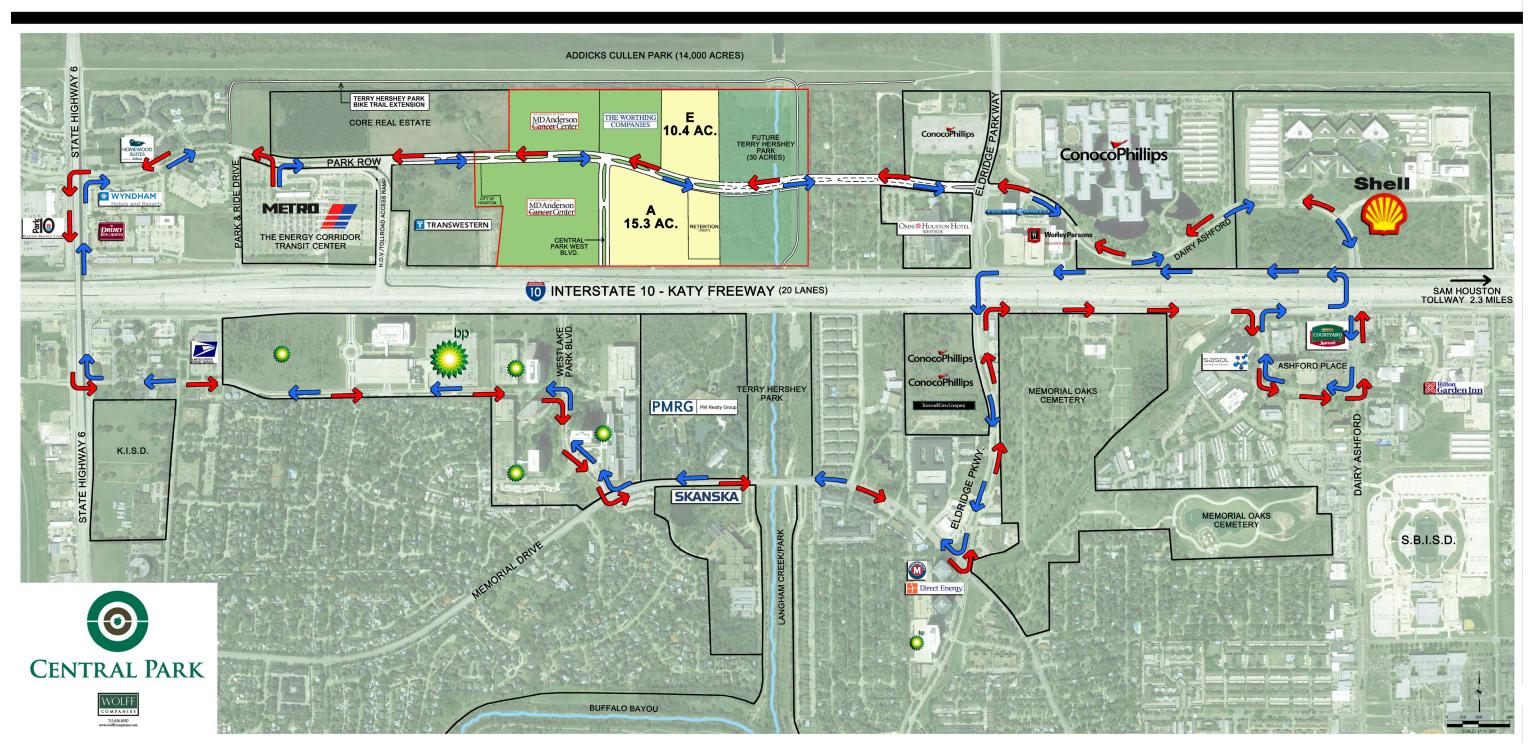
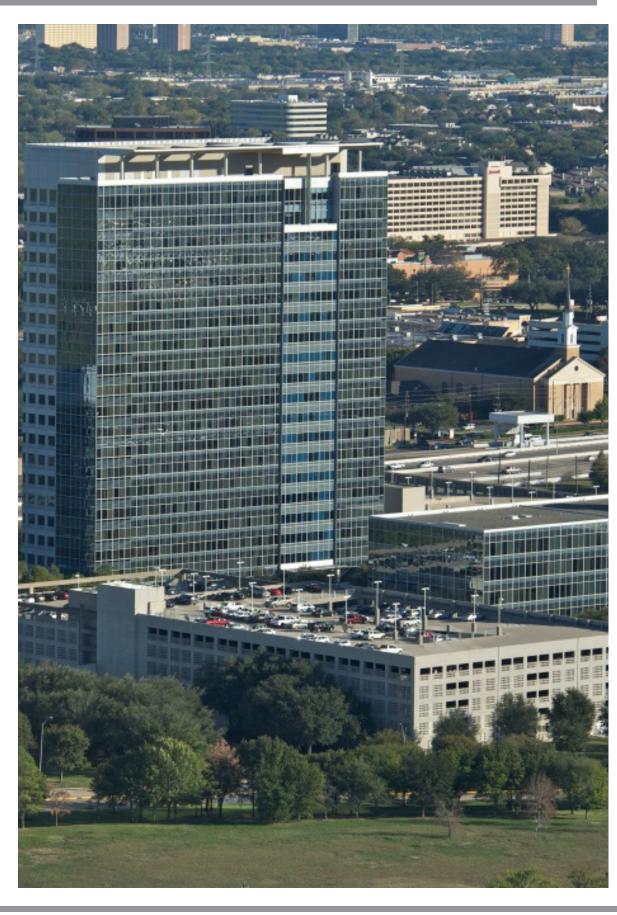


Figure 5.21 Proposed Energy Corridor Circular Service



### )VEMENT ()PP()



### 5.3 POLICIES

The policy recommendations below are intend to guide future development for transportation infrastructure and services in the West Houston Study Area. These policy recommendations are intended to remove procedural barriers to transportation and land development options that currently hinder the types of improvements and development needed to ensure mobility and preserve the quality of life that residents and commuters in West Houston expect and deserve.

Some recommendations are summaries of statements in previous sections, while others provide general guidance for future development in the Study Area and the Region. All recommendations are grouped by government entity or subject matter.

### City of Houston Major Thoroughfare and Freeway Plan

- Add all roadways shown in the MTFP Map to the MTFP Hierarchy Table (Section 5.1)
- Add the list of nominated collector streets to the MTFP (Section 5.1)
- Add needed roadway connections across Addicks and Barker Reservoirs (Section 5.1)
- Require a minimum of 120' right-of-way for 6-lane roadway configurations

### Infrastructure Design Manual

City of Houston should amend Chapter 42 of the Charter of Ordinances to allow for corridors that have high-frequency transit service (as described in METRO Reimagining) to be classified as Transit Corridor Streets; currently corridors must have fixed guideway transit to be classified as Transit Corridor Streets

- Continue emphasis on Context Sensitive Design (Section 4.4) on all current and future roadway projects
- Inclusion of safe and equitable pedestrian facilities on all roadway projects within the City of Houston where appropriate and feasible

### **County Governments**

- Consider inclusion of Bicycle and/ or Pedestrian facilities along streets with transit service, were appropriate (Section 5.1)
- · Ensure build out of the MTFP grid in unincorporated areas

### Special Districts

- Continue/improve partnerships between City, County, management districts and developers on large-scale projects with significant impact on the Study Area
- Develop or refine circulator shuttle services within the management districts (Section 5.2), including partnering with METRO and/or Fort Bend County Transit to provide services
- Provide incentives to employers to provide transit and/or alternative mode

benefits for their employees, including partnerships for use of park-and-ride facilities and expanding the use of vanpools, ridesharing, car sharing, guaranteed ride programs, flexible work schedules, and tele-working opportunities throughout the Study Area

### **Transit Providers**

- METRO should consider adding fixed route or flex zone service in the West Houston Study Area within Harris County between SH 6 and SH 99
- METRO should consider amending the guideline in Reimagining that stipulates that flex zones will not be considered in areas that previously did not have fixed route transit services
- Increase coordination between METRO and Fort Bend County transit programs to serve local and commuter transit demand in the West Houston Study Area
- METRO should assist management districts in planning for future transit connections between the Major Activity Centers within the Study Area
- METRO should build the transit centers and park-and-ride facilities identified in this study
- METRO should partner with the **Energy Corridor Management District** and private developer(s) to construct a structured parking facility at the Addicks Park and Ride lot that can accommodate future TOD
- METRO should partner with area management districts and employers



- to offer last mile service that enhances reverse-commute options
- METRO should indentify a location for a future bus barn in the Study Area to reduce "deadhead" travel times for routes in the Study Area
- Fort Bend County Transit should study current and future commuter service demand to the major activity centers in the Study Area

### **General Polices**

- Adopt concepts detailed in the Urban Houston Framework Study
- Implement recommendations from previous studies, where they are still applicable
- Adopt recommendations in the 2040 Regional Bikeway Plan, where applicable and appropriate
- Apply Access Management principles on all new and reconstruction projects where appropriate
- Develop utility and drainage corridors for pedestrian and bicycle facilities when feasible
- Implement a regional incident management program
- Increase maintenance resources, especially safety-related maintenance
- Consider mid-mile grade separations across freeways (no connection to freeway/frontage roads)
- Stagger construction along corridors to ease traffic congestion due to construction
- Expand intelligent transportation

- systems (ITS) including improved accuracy and timeliness of traveler information; add or expand ITS on high-volume arterials and toll facilities, upgrade dynamic message signs to be able to provide wider array of messages and graphics
- Synchronize and optimize signal timing where necessary, especially on corridors where traffic signals are maintained by multiple jurisdictions
- Develop improvement projects at thoroughfare intersections forecast to have the highest congestion, up to and including grade separations
- Provide separate bus lanes on those thoroughfares when and where ridership would justify Express/BRT Services

### Regional Policy

- Build out all projects currently listed in the City of Houston's MTFP and the H– GAC RTP (Section 4.2)
- Implement proposed changes from METRO Reimagining program
- Provide permanent funding for a regional incident management program
- Use best practices for bicycle and pedestrian facility connectivity and safety
- Provide permanent funding for commuter rail

### Regional Procedures

- Review and revise incident management procedures for lane closures
- When analyzing mobility effectiveness, utilize person and freight throughput rather than vehicles throughput







# IMPLEMENTATION TOOLBOX



### IMPLEMENTATION TOOLBO

### 6.1 FUNDING

As outlined in Section 2.10, there are many development tools and strategies available to local jurisdictions and special districts in West Houston to implement recommendations in this study. These items will be discussed with an emphasis on encouraging greater coordination of effort among local jurisdictions, private land developers, and other area stakeholders. In addition to the federal and state funding available through the H-GAC RTP/TIP process, local jurisdictions and stakeholders can utilize existing funding mechanisms or collaborate to create new ones were appropriate. Existing funding mechanisms include Energy Corridor Management District and Westchase Management District 380 agreements, the Memorial City Redevelopment Authority (TIRZ 17), the City of Houston's Rebuild Houston Program, funds from the collection of tolls by the Harris County and Fort Bend County Toll Road Authorities, and various TxDOT discretionary funds. In addition, Public-Private Partnerships can be created around the right opportunities to funding facilities and/or services.

Currently, two of the three Funding Partner Management Districts have 380 agreements. These agreements provide additional funding for capital improvements with the designated funding area. Both are examples of creative, collaborative funding arrangements being utilized to implement improvements in West Houston. The Energy Corridor Management District initiated a 380 agreement with the City of Houston in December 2012 to fund the construction of \$20 million in capital improvements along Park Row. These improvements include extending Park Row from the Addicks Park and Ride to its existing terminus west of Eldridge Parkway. The project includes the installation of water and sewer infrastructure as well as street lights and all applicable traffic controls. In October 2013, the Westchase Management District entered into a 380 agreement with the City of Houston to funding approximately \$573.5 Million in mobility, drainage and community improvements over 30 years. The improvements include civic buildings, parking structures, a transit center, new street construction, street modification, parks, and trails.

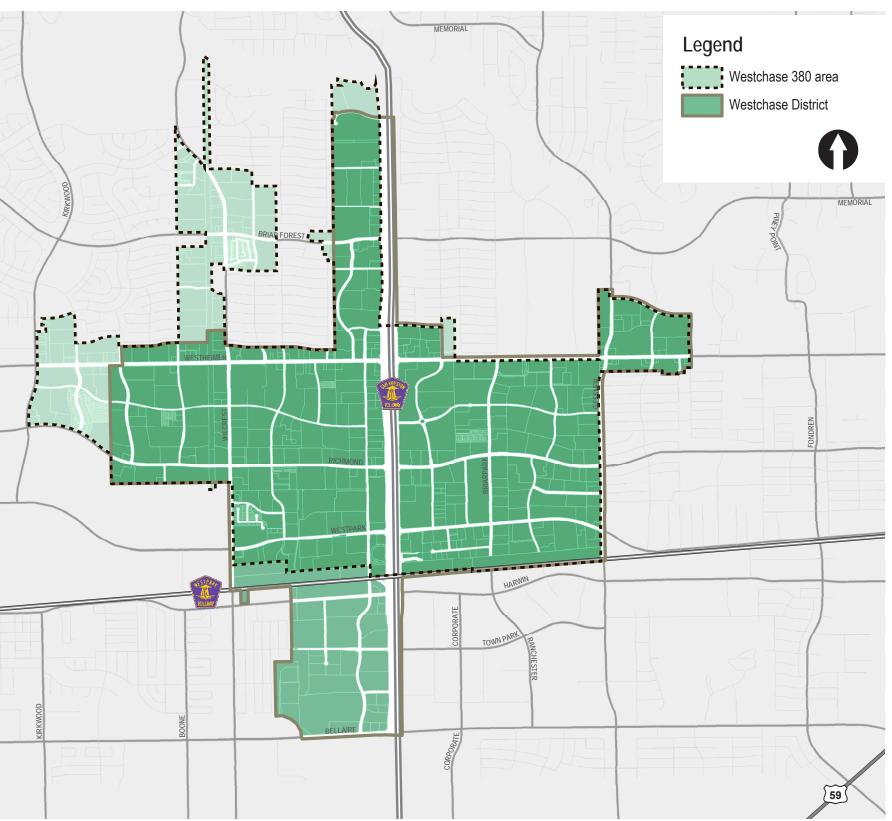


Figure 6.1 Westchase 380 Agreement Boundary

## IMPLEMENTATION TOOLBOX





Expected population growth in West
Houston will place increasing demands
upon the area's transportation infrastructure
and services. In order to meet this demand
both public and private entities in the
area will need to develop and significantly
expand alternative modes of travel and work
to increase housing density and choices
within the Study Area. Improving east—west
connectivity will be critical.

However, the reservoirs pose a challenge to this objective. The impediment caused by the reservoirs makes the expansion of alternative modes of travel, particularly high-capacity transit even more important. If high-capacity transportation is properly expanded and utilized it could negate the need to build additional roadways through the reservoirs.





# APPENDIX A PUBLIC COMMENTS



### APPENDIX A

Comments received from the public are listed below. The comments are grouped by method of receipt.

### **DIRECT EMAILS**

### Received February 10, 2015

I appreciate your taking the time to review this portion of the mobility plan. My 1st goal is for the Greater West Houston Mobility Plan to 2040 to substantially incorporate segregated or physically separated pedestrain and cycle lanes. I am starting with advocating for the 2 roads that we discussed: Addicks Satsuma and West Little York. These roads intersect at an combined elementary and middle school complex. Currently, I see two major issues that will need to be considered when updating Addicks Satsuma: 1) there is a narrow bridge that spans the bayou that is only wide enough for 2 vechicles and it sits right after a major curve in the road. This is dangerous for both automobile drivers, pedestrians, and cyclists. 2) Along major portions of Addicks Satusuma, specifically north of the bridge that spans the bayou and all the way to FM 529, there are very large ditches that are located on both sides of the road.

Thank you again for your help!! Oh, I am also curious if Harris county has received any federal funding from the Safe Routes to School (SRTS) federal program? Would you know if this funding has been incorporated into the mobility plan or any other associated projects?

### Received February 5, 2015

I was very alarmed to receive word of the proposed Highland Knolls extension. I am very concerned that efforts were not made to make sure the public, who use this well loved area and appreciate it, knew of this proposal and that efforts were not made to see that they were. Concerning that it seems those seeking for this extension were discreet about it so as not to be opposed when so many others, who knew nothing of this proposal, will be affected by it. It sees that every person in the community affected by this roadway should be informed about such a proposed plan and have rights to express their concerns and reasons for not putting it in. It is unfair to bring something like this to the public discreetly and that, during the holidays when so many other things are going on to keep a very interested and perhaps negatively impacted public and community out of the picture. I hope all involved will do things more positively and upfront for the community involved in the future! I would like to share a few things that have come to mind with this proposal.

First, I live near this area and it seems unnecessary and a waste of public money to put the proposed extension in. This area is currently well developed and traffic is not terrible. I don't believe it would help the current traffic situation on I-10 or Westheimer Parkway. All other routes this road leads to are already congested. It would really benefit no one in the end and negatively impact the communities/ neighborhoods from George Bush Park to the Grand Parkway. Would it not be better to have a nature reprieve for the public's use instead reserved and left alone? As the city grows and expands, I believe all such areas are needed, necessary and beneficial for the well being of it's people. Can we not utilize funds better, improving those highways that are already in place? Is the stream of traffic on Westheimer Parkway so bad that we need to construct another main highway just a few minutes north of Westheimer? Do we want to put more traffic through already developed quiet neighborhoods (especially the Highland Knolls road between Mason and Westgreen)? This area has been developed. I don't believe adding another road is necessary to help traffic through the area.

Second, would it not be better for traffic to instead encourage and better develop routes for other commuting options such as biking? We live in a climate that can be biked nearly all year. Except when the park is flooded from rainfall, it's a great and safer way for commute. Third, I believe it would negatively impact all in the community on the west side of the park in many ways. Businesses and those living on the west side of the park do not need the Highland Knolls extension. I fear it would allow for increased crime in an area that has a natural city barrier. The trail through George Bush Park is a step away from the city into a natural reprieve. A very nice bit of nature right in the surrounding neighborhood's and community's back yard. A road through this park would destroy much of what makes this trail so special. Thank you for taking time to address my concerns. Please put a stop to the proposed Highland Knolls extension!

First, let me say that I hope you are not serious about "stealing" a bike path from underneath the feet of the Houston-Katy cycling community (per attached). That would be a major step backwards for a city that promotes active lifestyles and is a major source of fund raising for the MS 150 ride. Are there no other options? I have one, how about encouraging drivers to venture out from behind the wheel of their vehicle and commute to work on a bike? I realize very few would even consider that as an option; the point is that the interests of those cyclists that use that trail for commuting to work or for exercise in general need to be given strong consideration before converting the trail into one for motorized vehicles. I can assure you that there is strong local cycling community that will insist its voice be heard those eager to "convert paradise to a parking lot" get started.



I recently have learned about the proposed roads through George Bush Park. https://mywesthouston.files.wordpress.com/2014/12/wh-public-meeting-4-presentation1.pdf. I do not like any of it. George Bush Park is a real gem for the Houston/Katy area. It's why we bought our current house. My family walks, rides bikes, or runs in the park every day. So many of my friends and neighbors also regularly use the path. The trees, wildlife, and serenity of the park make it my favorite place in Houston/Katy. Our house is a block away from the path. We enjoy seeing the birds in our yard that come from the park. If roads were built through George Bush Park everyone would lose all of this. Also, the construction would be incredibly noisy and the increased traffic would be a nuisance. It would make living where we are undesirable.

First, I hope all of you have been enjoying good rides lately. I still can't say I miss the cold north one little bit and I love having the option of riding almost every day. HOWEVER: It looks like our commute route and weekend getaway area may be at risk. Attached is a flier that was put up in Bush Park with information that the West Houston Mobility Plan would wipe out the Bush Park bike paths to build more roads (so people can find new places to sit in their cars waiting to get past Hwy 6). There are so many things wrong-headed with this idea that it is hard to know where to start, but since there have been meetings and the plan seems real, I would propose that we learn who else may be organized to oppose the plan and support them. Let me know if you are interested in somehow helping to oppose the plan and we'll figure out next steps.

For more information about the plan, the link is http://mywesthouston.com/meeting-materials/ and the email address for the guy that put up the signs: David\_lippeH@hotmail.com.

I live in Katy and frequently (two to three times a week) use the bike paths that start at Highland Knolls and run through George Bush Park eventually surfacing at I-10 near the Constables Station. The attached file contains a picture of a sign that has been posted along the trails. While I agree that West Houston needs more east-west routes to relieve congestion, how will the extension of Highland Knolls to connect with Briar Forest impact the bike trails? The email distribution list you see below is a group of cyclists and friends all of whom also use the trails including some who commute by bike to their jobs in the energy corridor.

...I know traffic is a big problem in Katy and I understand the need for progress related to Highland Knolls expansion. I am hoping that the walking/bike path will be rerouted/replaced in conjunction with the Highland Knolls expansion. The trails through George Bush park are one of the big attractions to people living in Katy. It helps keep home values up and attract new residents as older ones downsize. I bike 16.5 miles each way to work 2-3 times a week using these trails to go from Peek and Fry to Eldridge Parkway. I'm healthier and happier for it. And there is one less car on the roads when I'm on my bike!!

Please rebuild the main walking/biking treks through George Bush park. Please!

### Received February 4, 2015

I agree with John Ciccarelli's comments. As a folding bike owner, I know we have not tried this sub-mode much at all in Houston, but it is extremely useful for use with transit, and it makes the demand on the transit vehicle much less.

The only thing I have to add is... I know where to get a property for the Copperfield Park and Ride. It is the abandoned HEB property at the SE corner of Barker-Cypress and FM529. It has been vacant for years. It has a large parking lot. It must be going for a song by now. No one wants it. Buses could originate there, and travel down FM529 to Highway 6, or they could make a run up-and-down Barker-Cypress and E-W on Park Row to the Addicks Transit Center.

### Received January 29, 2015

Here's another public comment that I agree totally. http://www. littergetters.com/mobilityplan.htm. George Bush trail is the best 12 miles out of my 17 miles regular bike commute route. Westheimer Parkway can shorten my commute to 10 miles, but the traffic there moves at freeway speed.



### APPENDIX A

### **PUBLIC COMMENTS INBOX EMAILS**

### Received January 17, 2015

I am a resident of Parklake Village. We purchased our home in 2001 under the premise that the George Bush park would remain as a sanctuary. I strongly oppose the construction of the continuation of Highland Knolls to Highway 6. Please let me know if there will be a hearing or meeting regarding this issue.

### Received January 16, 2015

I have been working in energy corridor since 3 years now commuting from Sugar Land every day. And over 3 years, the traffic has gone from good to worse now. I see that there are some programs started by energy corridor to mitigate and reduce traffic congestions. But I see none of them helping in any way, and its making traffic every day worse. I currently have a van pool with metro, and we are finding difficulty maintaining the number of riders in the van. All because of fixed times associated with commuting with van pool. Energy corridor is like another downtown, and metro has bus services from all over the Houston to downtown. However, there is not a single express bus from anywhere in the city to energy corridor. I don't know why this option has not been thought of. I would like to know if this option was considered and if yes, why is it not implemented. I think this would greatly reduce the traffic even if there is a bus every 30 minutes or hour to begin with from various parts of the town. I reviewed the last meeting materials. And see that there is no mention or plan to provide Metro Bus services to energy corridor which is another Houston Downtown now, with many oil companies in the area. Why can't there be bus services from various park and rides to energy corridor?

### Received December 22, 2014

Please incorporate Peter Wang's comments (below) regarding the West Houston Mobility Study. What happened to the bicycle study? Peter has more knowledge of the potential for alternative modes possible in this study area than any of the consultants. Please respect his comments.

- 1. Show express bus service on SH 6 north of IH 10 to the Addicks P&R in dedicated lane or queue jumpers art intersections (not local bus service)
- 2. Refer to high speed rail on the Hempstead railroad alignment
- 3. Rather than roads why not consider elevated electric powered high capacity transit in the reservoirs

- 4. Show ped/bike sidewalks and pathways connecting to transit
- Show the level of stress diagrams referring to bicycling on existing streets
- 6. Show cycle tracks on Barker Cypress and on SH 6
- 7. Refer to H-GAC (Alliance) SH 6 Access Management study for per/bike along SH 6.

Transit - It was great to finally see a transit poster, but I noticed that the service on Highway 6 north of I-10 was tagged as "local service" not "express service". I beg to differ; I think we need express service as badly as they do south of I-10. The big problem for transit on Highway 6 is that you really need it to be in a dedicated, segregated guideway. You want the BRT or train to blow by motionless grid-locked cars at 40 - 50 MPH. Sheer envy and covetousness will get people out of their cars. If the BRT is suffering with the rest of the vehicles on grid-locked Highway 6, and going ever slower because it is big, slow, and making frequent stops, then it becomes the Transportation of Last Resort for the Poor, which is what METRO local bus service is already. Suburban neighborhoods will reject that, too. In the final report, please discuss, in general terms, the possible impacts of Houston Dallas HSR along 290. You have to realize, having an HSR station on 290 would be orders of magnitude more impactful than having a simple METRO bus stop. It would be like having an airport along 290. It would be a major socio-economic engine, a total game-changer for at least half of the sub-region. You have to make an effort to address is as best you can. even if only by borrowing materials from the Texas Central website. Streets across the Army Corp reservoir? We know the damage that runoff pollution, trash, and internal combustion fumes would cause to the natural environment? If you want traffic to go over the Reservoir, why not use electrified transit vehicles on an elevated, dedicated guideway across reservoirs to have a non polluting solution? Run the vehicles across the Reservoir to the Addicks Transit Center, for example.

Bike/Ped - There was no bike-ped map or any kind of display. This was disappointing. What happened to John Ciccarelli, Bicycle Solutions? The "Thoroughfare Changes" poster didn't show hardly any roads recommended for a shared-use path. That's inconsistent with the transit poster, because every street with transit needs to have a sidewalk, right? People walk or bike to transit, no one drives 1/4 mile or 1/2 mile, parks, and then takes transit. Why would you stop your car journey at that point? If you don't have sidewalks and paths you will have trouble initiating transit, because people will be unable or reluctant to get to it. A bike transportation plan cannot be afraid of bikes in or near the street and road. Yes, I agree, separation by more than a mere paint stripe is good. But consigning most of the effort in bike routes to bayous, gas pipeline, and electric ROWs is consigning them to being far less relevant as transportation. There are no originations, and no true destinations for bike journeys on bayous, electric, or gas pipeline ROWs. They all have to start and end with some kind of a journey on a street, even if they use the non-street as part of the journey. So please don't avoid bikes-onstreets. Those type of facilities have to be built. This is a transportation plan, not a parks and recreation plan. We have to get out of the Harris County mindset (this was actually told me by a Harris County official) that "roads are for cars, and bikes should stay off the roads." No! That's such an outdated, "last millennium" sentiment! Barker Cypress road has so many apartments and businesses on it now, it desperately needs a shared use path, and Highway 6 too, just like the Highway 6 North Access Management Study recommended. Speaking of which, I didn't see evidence in the meeting that you merged in the Highway 6 North Access Management Study recommendations for bike/ped, because there was no bike/ped display. Please address this deficiency.

### Received January 12, 2015

I submitted the below comment at www.mywesthouston.com on 01/02/2015 and have not received any kind of response: Regarding the transit recommendations map on page 29 of the Dec. 18, 2014 presentation, is there a map legend to help me better understand the transit recommendations?



#### Received January 9, 2015

I have been riding bicycles in the George Bush/Eldridge Park for almost as long as it's been open. Every other weekend I ride about an hour primarily to maintain health but also to enjoy to enjoy nature. One of the best features of this park is that there are still trails which are remote enough that there are no man made sounds, no diesel trucks, no cars honking, no sound of cars going down the road, no ambulances or police, only the quiet sound of nature and wildlife. I have heard that there are plans being considered to extend Briar Forest through the middle of the park. I strongly object to this proposal. Doing this will destroy the quiet solitude that exists there now. There are essentially NO places in Houston like the Bush/Eldridge Park. That is why there are so many people going there, they go to get away from the city, get away from the noise of the city and chill out. PLEASE do not put a road through here.

Absolutely no more construction should occur in Barker Reservoir. It is built for detention and not roadways. The region you propose to build roadway is a swamp, and floods extensively after relatively small rains. Before any serious consideration of construction, the land should be surveyed by an engineer. This study clearly had no professional engineer survey the lands. A professional engineer would realize the dangers with constructing a roadway here and not see it as a site to build any. This road not only would interfere with pedestrians on bikes and running, but also kill the large amount of wildlife inside the reservoir. There are many pigs, deer, and alligators in the reservoir and if this road was built it would be a VERY short time before someone ran into them and got injured. There are also many snakes, frogs, lizards, bunnies and other wildlife that would get run over by cars frequently. Overall any roads built inside Barker Reservoir is a terrible idea.

#### Received January 8, 2015

I speak for a large group of cyclists when I say that we do not want to have a road cut through the middle of George Bush Park. My apologies for the questions, I have not been aware of previous meetings. When will this go to a vote? What is the status?

#### Received January 5, 2015

When I read your about your "mobility plan" yesterday it started 2015 on a bad note. It was hard to pick my jaw up from the disbelief at how stupid some of your recommendations are. There is plenty wrong with this plan but I am going to focus my comments on the worst part of it allthe proposals you have for land within Barker and Addicks Reservoirs. Did anyone who designed this "mobility plan" even go out and explore the areas within Barker and Addicks Reservoirs that you plan on destroying? It appears to me from reading this plan that you never physically entered the area and just looked at satellite photos and drew a line wherever you felt like a road or trail should be. If this is the case your entire study is the equivalent of a child drawing on a napkin with a crayon and whoever put this together should be fired and ashamed to even be alive. I spend the majority of my free time within Barker Reservoir and will focus my comments on that section of your plan but everything I have to say applies to what you are proposing within Addicks Reservoir as well. I will begin by addressing the roads first and the "shared use path/trails" afterwards.

Road impact on wildlife - My primary problems with your "plan" are the proposed street extensions of Patterson, Baker, and Highland Knolls/ Briar Forest roads through Barker and Addicks Reservoirs. Barker and Addicks Reservoirs are the ONLY areas in West Houston/Katy that have been left in a somewhat undeveloped state (excluding the shooting ranges, golf course, baseball fields, etc) and they absolutely should remain undeveloped. As West Houston and Katy have grown into ridiculous sprawl these two reservoirs are the only refuge for wildlife that have been forced out of their homes for an endless procession of retail centers, subdivisions, and apartment complexes. When you look at a satellite photo of West Houston these reservoirs are the first thing you notice due to the development in every direction around them. The area of Buffalo Bayou North of Westheimer Parkway heading towards Mason Creek is perfectly described by Louis Aulbach as "the wildest, most remote and inaccessible sections of its course. Protected from development and allowed to remain in a mostly natural state, the land in the interior of Barker Reservoir is a wild an untamed place within a stone's throw of urban civilization.1"

Both Mason Creek and Buffalo Bayou are tree lined and beautiful throughout this area other than the litter that flows in constantly from residents of the very developments you are trying to appease by building these roads. Neither channel looks anything like the portions outside of the reservoir where Cinco Ranch and other developments have widened them to ridiculous proportions and removed all foliage along the banks. And you want to build a road directly through this area to destroy it! The wildlife diversity in this area of Barker Reservoir is incredible and I have spent hundreds of hours there exploring and photographing wildlife. There are already numerous species of animal that have been extirpated from the West Houston/Katy area and this loss of species will increase if you are allowed to build roads to bisect these reservoirs. For instance, the archaeological study by Joe Ben Wheat which started in 1947 within Addicks Reservoir found bone evidence from bison, badgers, and antelope. When is the last time you saw any of those in West Houston2?

These sections of Buffalo Bayou and Mason Creek overflow their banks anytime it rains more than an inch or two and the surrounding woods in any direction are left multiple feet under water for weeks at a time. Consequently the amount of reptiles and amphibians here is greater than areas outside of the reservoir. Satellite photos reveal a couple oxbow lakes and ponds but in actuality the entire area is primarily wetland. From a human standpoint these street extensions are a horrible idea as well. For cyclists, joggers, walkers, etc the trails within Barker and Addicks Reservoir are the ONLY places in West Houston/ Katy where someone can go multiple miles without having to worry about automobiles running them over or choking them with exhaust fumes. The trail that begins at the Highland Knolls and Fry Road intersection into Barker Reservoir is a haven for cyclists and you are proposing building a road there to ruin it. Whether the road is separate from the trail or you plan to build a "shared use" road the end result is the same-it will destroy this area for cyclists. Why don't you put out a map of your proposed roadway near the benches where cyclists gather near Highland Knolls and Fry Road and ask their opinion of your plans? Are you scared of the backlash? From an archaeological perspective these roads are also a horrible idea. Previous archaeological studies within Addicks and Barker Reservoir such as those by Blaine Ensor, Prewitt & Associates, or Joe Ben Wheat all found numerous historic sites.



## APPENDIX A

You are proposing building roads in areas that could contain undiscovered historic sites. Once you cover the ground with concrete for a road there is no turning back-those sites will be lost forever. The former LH7 Ranch has already been destroyed for an apartment complex adjoining Barker Reservoir and we do not need more of our past lost. How do you plan to mitigate for wildlife in this area when you build a road that bisects their home? How do you plan on keeping alligators, snakes, frogs, skinks, deer, feral hogs, and other animals from getting ran over constantly? What do you plan on doing when the first human is killed that runs into a feral hog on these roads with their vehicle? Nowhere in the Houston area have roads been built with any wildlife considerations like wildlife overpasses, underpasses, culverts, or elevated roadways and I suspect you have no intentions of doing so either. How do you plan on keeping debris, chemicals, and other pollutants from the roadway from contaminating these areas? If these horrible roads are allowed to be built I sincerely hope that whoever designs them has read the book Road Ecology by Forman et al and that wildlife mitigation is a primary concern. Putting a road through these areas will also open up access to humans who otherwise would not visit them and further stress wildlife that currently lives in relative peace with infrequent human visitation. Regardless of how you build the road there will always be a place where someone can pull over and park their car to get out and explore. People on dirtbikes and four wheelers will find a way into these areas from your new roads and be off-roading where they do not belong in no time at all. What is your plan to mitigate the flooding impact of your proposed roads in these reservoirs? You are proposing building roads through spots that are constantly flooding and concrete will only add to the problem. During the last large rainfall events in May 2014 and September 2014 are you aware that Buffalo Bayou overflowed its banks less than 3/4 mile from the Cinco Ranch Saddlebrook Crossing neighborhood and your road could be the cause of a future flooding disaster.

The proposed shared use path/trails - The Army Corp of Engineers manages these reservoirs for flood control along with "recreation and nature observation opportunities..the visitor is welcome to come and walk through the fields or along the streams and enjoy the many opportunities that mother nature has to offer.(3)" There is simply no reason to build a path or trail on every single piece of land around-it is just as bad as building a roadway. Organizations such as your own are obsessed with building hike and bike trails and so called greenways along every single bayou in existence. These areas are already open to the explorative public at all hours.

I am going to focus on the proposed trails along Buffalo Bayou and Mason Creek within Barker Reservoir but my comments apply to all the other areas within the reservoirs you want to build a trail on. You want to build a trail along Buffalo Bayou connecting the Barker Clodine trail and the Texas Western Railway trail for what reason? The primary allure of this section of Buffalo Bayou is the lack of visitors. For those such as myself that spend time there it gives a chance to explore nature for hours and escape the surrounding city. On the paved trails within the reservoirs it is rare to go even 30 seconds most days without seeing another person. You are basically wanting to build a shortcut to connect two existing recreation trails and promoting laziness by offering people an easy way out. If people want to explore this area of Buffalo Bayou there is already a game trail parallel to the water on both sides that is easily followed. If people cannot follow an obvious trail through the woods they should not be there because they are likely unaware of their surroundings and could be injured, yet these are the people you are wanting to create access for. Your proposed trail would take away both the seclusion and chances for exploration in this area.

Wildlife will be negatively affected by these trails both by loss of habitat and by being killed by pedestrians using the trails. These areas are heavily populated with snakes which inevitably are killed by many morons whenever they are encountered. Are you aware of how many ponds, creeks, and other wetlands exist in this area that branch off of Buffalo Bayou or Mason Creek? Do you intend to build bridges over all of these spots (every 100 or so feet) to keep people high and dry who use this trail?

Again this goes back to my initial question of whether you even visited these areas since these wetlands are not visible on satellite photos. If you just sat in an office and never went out there you need to get off your rear end and go for a hike to see for yourself how stupid your plans are. Are you aware that along Buffalo Bayou there are wooden nesting boxes every couple hundred feet throughout this area along the game trail? Do you know that multiple nesting boxes have become full of active bee hives that many people will not like to pass by. These trails would do nothing to increase mobility or allow more than a fraction of a percent of people to commute to work by bicycle. They are unnecessary and should not be made.

In conclusion - Have you even contacted the U.S. Army Corp of Engineers to inquire about whether it is possible to build roads and trails on their land? How exactly do you intend to seize federal land to build a road when you have no authority to do so? The overall problem spurring your study is the sprawl that is continuing unrelentingly within the West Houston and Katy area. These "master planned" communities are built with seemingly no consideration for mobility or pedestrian use. I could type a few thousand words on it but instead would just suggest you read the book Suburban Nation by Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck. Your "mobility plan" is only doing exactly what developers want by building more roads to allow them to build more useless sprawl. Transit options make sense constructing more roads does not. Unsurprisingly there is no stakeholder group listed on your website that has any concerns about wildlife. Nothing was considered for your plan except human interests and how to attract more development and growth, which will require yet more roads in a never ending cycle. The stakeholders listed such as The Energy Corridor were created to represent some of the most environmentally appalling companies on the planet that have offices in West Houston. From looking at the plans it appears that you put absolutely no thought into anything other than trying to worsen the sprawl situation. Everyone in the Houston area will be worse off if your horrible recommendations within Barker and Addicks Reservoir are turned into reality. We are all blessed to have 2 reservoirs that contain around 26,000 acres of somewhat natural areas in the West Houston area and they should remain undeveloped perpetually-no trails, no roads, no retail centers, donut shops, or whatever you come up with next to screw them up.



Just because a piece of land is undeveloped does not mean that it is useless. If you are allowed to build a road in either reservoir there is no question you will want to keep building more things alongside it and you need to be stopped before ever starting. I have also put my comment online illustrated with photographs backing up many points at www. littergetters.com/mobilityplan.htm

#### Received January 5, 2015

I strongly oppose the proposals to build new roads through George Bush Park. In my view the best way to address Houston's traffic issues is through public transport, not by building more roads and especially not through existing parks. I view this proposed intrusion into a great public space to be a significant backwards step for the quality of life for the residents of Houston.

I commute to work nearly daily, year-round, from Katy through Barker Reservoir to the Energy Corridor on Eldridge. The primary reason I choose to live where I do is to have cycling access to work where I don't have to worry about getting hit by cars while riding. Further, I love to take advantage of the fantastic green space offered by the Barker Reservoir with my family. Barker Reservoir in its current state is an amazing asset to have in West Houston. It certainly has a "Central Park" feel as Houston has exploded around it. I see countless people running, walking, fishing, cycling and more at all times of the year in Barker Reservoir - it is an oasis in the chaos of streets, traffic and urban sprawl. I recognize that the study being performed is trying to balance various modes of commuting but in respect for all the people who currently use the trail system in the park as well as the generations yet to come, I feel obligated to voice a preference to NOT construct additional roads through George Bush Park / Barker Reservoir as tempting as it may be from a traffic perspective. The park is a unique and wonderful resource and offers to be that way for decades to come. Traffic patterns and centers of industry are fickle and change frequently, often radically. Once roads, traffic lights, etc. are put into the park, they will stay there forever, regardless of how the city expands or where job centers move. Further, there is a sustained upkeep cost forever imposed on taxpayers to maintain these additional roads. I humbly plea that if any changes are made to the park / reservoir, that they instead be additional access points for cyclists, runners, etc.

Promote a healthier Houston by way of commuting via bike, rather than compound the problem by just encouraging more driving. Large employers like Conoco Phillips, BP and more reward employees by finding alternative modes of commuting - but people won't cycle to work if the roads are as hazardous as they are now in Houston. A trick to reducing car traffic is to provide alternative options and other cities around the world have already taken this on in spades.

#### Received January 1, 2015

I am a resident in Spring Branch, Council Member Pennington's area, and have added my voice along with my neighbors about our concern that TIRZ 17 will disregard our desire NOT to widen Gessner or Memorial.

#### Received May 26, 2014

I was wondering what the status of the study is. According to the presentation on the website there should have been a public meeting in March 2014 for Proposed improvements to key corridors.

#### Received January 1, 2014

Working at BP at the Westlake Campus I just don't understand every time I drive down Memorial or more commonly known as the Moonscape Drive I am amazed that this street has not been rebuilt. Providing a non-potholed and even street surface will surly improve the flow efficiency along that corridor. I'm not sure how this observation will get included for consideration but Memorial truly does need to be rebuilt between Dairy Ashford and Hwy 6.

#### Received November 27, 2013

What it shows is that even our here in the suburbs we're really in the "hot" zone for proximity to jobs; of course, we who've lived here for twenty years and have worked in the Energy Corridor and Westchase have always know that, which is why we came... but it also shows that a minimum-investment (Bus Rapid Transit) system going north from I-10 up State Highway 6 could be very useful in connecting Greater West Houston to the employment centers, and it would greatly debottleneck State Highway 6 and I-10 and other roads. Bus Rapid Transit would be a faster service more like Park & Ride buses than like slow local services.

#### Received October, 7, 2013

In my immediate area on the West side, the section of Kirkwood that lies between Westheimer and Briar Forest is in absolutely deplorable condition, and getting worse as each month goes by. Please give this your attention when deciding to allocate funds for street repairs.

#### Received October 4, 2013

It is definitely challenging for the school buses that serve Nottingham Elementary in SBISD to pick up and drop off students on a daily basis. The street and the driveway are too narrow and is a hassle for parents who pick up their kids in a car also. The whole school should be reconstructed like Wolfe Elementary in my opinion.

I would like to request more biking trails that don't cross major streets. It would be nice to have a safe trail down Westview also. It is safer to cross and can vent some bikes down it and off big roads. I would like to see the Addicks Reservoir developed with some trails inside of it if possible too. With heavy tax rate and nickel and dime of the residents along Woodway, Sage, and other nearby streets. I am told the street funding and mobility funding is directed more towards the lower tax rate areas and lower income areas since they are supposedly more exposed to the failing infrastructures......also, The residents in and around Tanglewood can afford to repair their cars, also the residents of this area don't need sidewalks – we have new expensive cars to drive instead, also we don't need any flood mitigation near this area – since we can afford the flood insurance ( much higher rates after IKE ), and the out of pocket repairs associated with water damage. ON and on and on. I think --- it would be prudent to at LEAST ... replace and install where projects were never completed – new sidewalks that are wide enough to be a two /away... along the west side of Sage Road all the way from Buffalo Bayou to San Filipe. This area has fairly heavy foot traffic --but we have to mostly walk or bike in the roadway. Then again--- the roadway is in such disrepair ---- the traffic cannot speed along at an alarming rate. I hope anyone reads this --- but I don't really expect to fall on any attentive ears.



## APPENDIX A

#### Received October 3, 2013

All bus stops should have a covered seating area...benches are nice, but not important. I understand you don't want homeless turning into a shelter, but riders should be protected from the sun. All bus stops should have a paved walkway up to the corner. Take a ride over to Kirkwood and Richmond, south east corner. People in pain come from the hospital across the street, have to walk thru grass to stand in the sun until a bus comes. That is not only cruel, it's stupid. More biking lanes so we don't all get obese! Thanks!

# COMMENT CARDS RECEIVED AT WOLFE ELEMENTARY SCHOOL PUBLIC MEETING DEC. 18, 2014

If SH 6 will not be limited access, then a "supper street" should be pursued with fewer stoplights and frontage type roads for local access. Bus service is greatly needed along SH 6 and FM 529. Stoplight timing for better traffic flow needs to be implemented on all major collectors with adjustments for traffic flow based on time of day. A complete bicycle network that forms grids without gaps is needed--nobody rides a winding trail along a bayou to get to work. Roads connecting through the reservoirs is a good idea, as long as they are above the flood elevation for 50-year storms. SH 6 needs direct connectors to/from IH 10, and the I-lane northbound SH 6 ramp over the levee needs to be widened.

Can I get a copy of the A&G booklets? A digital copy is fine. Can rail be run on the IH 10 right of way? That was discussed before the last widening of IH 10.

Study was very generic, not helpful at all; not sure how you would get funding. Need high-speed /light rail over next 25 years.

- (1) Need Hwy 6 limited access multi-lane; run it down levee or inside Barker Reservoir. This will relieve congestion at Eldridge/Kirkwood/Dairy Ashford.
- (2) Need non-stop flow lanes down Westheimer; run 2 lanes east and 2 lanes west; elevated with up/down ramps per mile; provides east/west flow plus better north/south cross flow; addresses Westheimer/Gessner; Westheimer/Wilcrest.

(3) How would rail work in IH 10 corridor? Would this relieve reverse single-occupant lanes?

Re: the project detailing that Barker-Cypress Road will be widened to Glover. It would be good to have a shoulder, a bike lane, or a sidewalk included so pedestrians/cyclists have adequate space to travel along it. Currently, they have to ride/walk in the ditch.

I'm concerned that some planned road upgrades might include removing esplanades, making it more difficult for people to turn in and out of their neighborhood and also significantly degrading the aesthetics of a neighborhood. I'm particularly concerned about Wilcrest Dr, but I believe this is probably an issue for other roads. This falls under the study goal of "preserve neighborhoods."

## COMMENT CARDS RECEIVED AT HCC NORTHWEST PUBLIC MEETING - JULY 22, 2014

Please help reduce traffic. Please think outside of the box, perhaps 2 levels of roads, rail system/remove HOV lanes. Perhaps this system could travel on IH 10 to Sealy or beyond. I was here since 1981 and saw rail lines over IH 10 and Westpark. Dallas has built out rail lines more than Houston has.

When IH 10 was enlarged, we were told it was designed so a train/rail could be built down the center. Now is the time to do that! You can do away with the tollway and build rail.

Sidewalks are in very bad condition. If you are disabled, you cannot use them. If you are mobile, it still presents big problems. People won't walk if we don't fix this issue.

#### **MYWESTHOUSTON.COM WEBSITE**

#### Received February 6, 2015

Can someone ever give me an answer as to why no express metro bus services from various parts of the town going to energy corridor like downtown? Energy corridor has almost same number of people working as in downtown, yet no public transportation thought of. I am just frustrated with the energy corridor management for blocking it or not planning on it.

#### Received February 3, 2015

Building a road through this area is a waste of money. It will not solve anything. Be more creative.

Received February 2, 2015 I am against

#### Received January 21, 2015

I live near Highland Knolls and I am concerned regarding the proposed extension of the road through George Bush Park. Any extension would damage the value of all the part space currently at the intersection of Highland Knolls and Fry Roads. The resulting major thoroughfare would cause great harm to the community, in my opinion. In addition, Highland Knolls west of Westgreen is a residential street. Currently, street parking is allowed for these residents. This is already a major issue for traffic going west. It effectively reduces the road to one lane both ways between Westgreen and Mason. The associated traffic increase that would come from an extension would surely make this an even greater issue for residents and drivers.

#### Received January 17, 2015

Amazing that one of the Project Goals is to "Protect environmentally sensitive areas & green spaces" and the plan is to build roads through exactly those areas and spaces. There is nowhere for the vast wildlife that exists within the park/reservoir to go once it starts getting developed. Building more roads to feed bigger, already jammed roads is not sustainable at all. Alternative transport methods need to be incorporated. They are planning to remove the only safe cycling routes from Katy into the Energy Corridor – totally against what their own stated aims are. This whole plan has been somewhat under-the-radar – nobody holds a public meeting the week before Christmas if they genuinely want to engage the public.

#### Received January 9, 2015

As a regular user of this trail system, I oppose the road expansion for vehicle traffic. However, I favor the widening and maintenance of a trail system that is heavily used by us the tax payers of this state. Texas is not a bicycle friendly state and it is both the motorist's and bicyclist's fault because we don't share the road properly. This area needs to be protected, not developed for our enjoyment and generations to come.



#### Received January 6, 2015

I couldn't even figure out what that Kingsland to Memorial road illustrated on the map was supposed to be. They colored it black instead of blue (proposed new road) making it look like whoever drew the map thinks the road already exists. Same thing with Barker Clodine through the reservoir which has been closed to automobile traffic for as long as I can remember it is black on the map as if currently in use. Couldn't agree more though the reservoirs should be off limits to any development. Steve Radack and Harris County have already tried turning them into neighborhood parks and taking away from the original purposes of holding water. Further confusion has been caused by calling huge sections of the reservoirs things like George Bush PARK or Bear Creek PARK when they were not created to be parks.

We all live, work and commute throughout West Houston and I know that I speak for the vast majority when I say that a cutting a road through the park will be a tragic move. It will remove the tranquility and appeal of the area for runners, walkers and cyclists. At a time when most metropolitan areas are providing "greener" options it is outrageous that there is even a proposal to add concrete and motorized traffic through the middle of this area.

#### Received January 5, 2015

We just moved to the area 1 1/2 years and bought our house strictly for the location so my husband could commute to work on his bike. Our whole family uses this trail virtually every day summer and winter. I have seen no notices of this plan posted anywhere (other than one a concerned citizen posted just recently). Had we known, we would have attended meetings. It's disappointing at best that 1) this plan to destroy such a widely used recreational trail has even been proposed and 2) that it was done without notice and input of those who currently benefit from this area. In such a huge city which very little "nature" particularly in Katy, one would think that this little piece could remain to serve the well-being of this community.

#### Received January 4, 2015

Please do not build road where existing path enters George bush park. This is utilized by so many runners and bikers. That would be a major blow to those of us trying to stay fit!

#### Received January 2, 2015

I urge the public who enjoys using Addicks or Barker Reservoir for recreation to read these plans especially concerning the proposed road construction in both reservoirs. I've put my comment online that was submitted 1/2/15 for anyone to see at http://www.littergetters.com/mobilityplan.htm.

#### Received December 29, 2015

Please understand that none of these plans can succeed in an area that floods after every heavy rain. First you must 1) Abolish the grandfathering clause that allows developers to channel their floodwaters into surrounding neighborhoods (ie., CityCentre, Memorial City, Town & Country). 2) Reserve the Barker/Addicks dams for DETENTION. Do not extend roads through the dam for the convenience of residents who live west. Do not continue the practice of building community centers, sports facilities, zoos and pioneer villages inside the dam walls. Having leased the dam floor for his recreational facilities, now CC #3 Radack does not want his facilities messed up by flood waters. 3) Build detention for the Long Point Slough and the Clodine Ditch. 5) Build detention at the headwaters of White Oak bayou. 6) Have TX Dot come back to I10 and Beltway 8 and build detention that was on their original plans and omitted in the construction phase. 7) Buffalo Bayou in its natural riparian state is one of the most appealing attractions of this city and it must be cherished and preserved. I totally agree with Engineer Richard L. Long when he came to the West Houston SN meeting and proposed detention at the headwaters of White Oak bayou. Detaining the storm water before it can enter the bayou and cause flooding makes a lot more sense than cutting all the trees and channelizing the bayou with concrete after it floods. Fix the flooding please, first. then people will come to live and work in West Houston. Finally, you need an architectural committee. That 6 story apartment building and parking garage at the corner of Dairy Ashford and Memorial Drive is hideous. It is totally repulsive. It is going to sell a lot of houses, but not in Memorial. It's going to sell houses in Katy and the Woodlands.

#### Received December 14, 2014

We need a rapid train. One can keep building roads and get clogged roads. From Katy to downtown, From Katy to energy corridor, Katy to the Galleria from Katy to Memorial City. They should have park and ride lots for the trains as one needs a car to get to the starting point. A train from downtown to serve the Allen Parkway offices and the greenway plaza offices would help further.

#### Received December 12, 2014

I am objecting to extending Memorial through Barker dam to Kingsland. No further development can be tolerated within the walls of Barker/ Addicks. The primary purpose of the dams is for DETENTION. Harris County has erected permanent structures with the dams: a zoo and pioneer village, community center, shooting range, sports fields, etc. CC Steve Radack does not want his recreational facilities messed up with muddy flood waters. The dams can only hold 2-3 feet of water before the gates are open. The permanent facilities are nice for the people who live upstream of the dams, but devastating for the people who live downstream. Our yards and common areas are serving as detention. I have been to many of the meetings lately and listened to lots of jokes but nothing of substance. The best the bureaucrats can offer is to buy flood insurance. Developers envision the dams as raw land waiting to be developed. They are now drawing maps with road crisscrossing the dams with a vision of future gas stations, chain stores and strip centers. Please restore the dams to their original purpose: detention.



## APPENDIX A

## COMMENTS FROM CROWDMAP: HTTPS://WESTHOUSTON.CROWDMAP.COM

Feb. 3, 2014

Issue: Clay Road to north end of Wycliffe Dr Shared Use Path

Mode: Bicycle, Pedestrian, ADA

Location: Clay Road and Addicks Dam

Adding a concrete shared use path would improve the north south hike

and bike access to and from the Energy Corridor.

Issue: Piping Rock & Barker Oaks Stop Signs Mode: Automobile, Bicycle, Pedestrian, ADA

Location: Piping Rock Lane & Barker Oaks Drive

Place four way stop signs at this intersection to allow bike/ped traffic to safely cross Barker Oaks when travelling between Terry Hershey and Bishop Fiorenza/Eldridge Detention Basin and other points of interest.

Issue: Pedestrian signals at Westheimer & Briargreen

Mode: Bicycle, Pedestrian

Location: Westheimer & Briargreen

This will be a key crossing of Westheimer for pedestrians and cyclists moving between Terry Hershey to the north and Bishop Fiorenza/ Eldridge Detention Basin to the south. No pedestrian signals currently exist, but installing them should be a priority.

Jan. 31, 2014

Issue: Pedestrian Signal at Westheimer & Briargreen

Mode: Bicycle, Pedestrian

Location: Westheimer & Briargreen

Adding this pedestrian signal would make for safe passage of pedestrian and cyclists between Terry Hershey trail and Archbishop Fiorenza Park,

Mission Bend Greenbelt and other points south and north.

Issue: Grand Parkway Park & Ride facility needed

Mode: Transit

Location: SH 99 and I-10

Please consider acceleration of the permanent park and ride facility at 99 and I-10. The existing parking is not even large enough to fill the

buses that serve this park and ride.

Jan. 27, 2014

Issue: Southeast access point to George Bush park [ Edit ]

Mode: Bicycle

Location: 2270 Barker Oaks Drive, Houston, TX 77077, USA

There are multiple convenient access points to George Bush park almost everywhere around it, except for the very long southeastern stretch of its border. Hikers and bikers from Westheimer@SH-6 area have to drive north or west to gain access to this wonderful park and its trails. It would extremely convenient to have another access to the park (well, at least to the trail on the dam and the one along the ditch) around where West Oaks Village shopping center is. City of Houston already appears to have some property in that area on 2270 Barker Oaks Dr. There used to be some water facility, but now that property is empty (although, it is still fenced). It would be great to have a trail next to it for hikers and bikers to get to the dam and the trail next to the ditch. That trail is the only major south-north off-the-road thoroughfare in the area. It grants safe access to miles of trails and other amenities in the study area. Such an access point also would make commute in north-south direction by bike a lot safer and more desirable (SH-6 is just too dangerous for that at the moment).

Jan. 23, 2014

Issue: Terry Hershey East/Memorial Corridor Shared Use Path

Mode: Bicycle, Pedestrian

Location: Memorial Drive, BW 8 to Blalock

This project should be included in the plan as it would build a key portion of trail connection from the east end of Terry Hershey park to downtown Houston. It would be a series of 8-10' wide sidewalks along Memorial

Drive.

Issue: Cinco Buffalo Bayou Trail

Mode: Bicycle

Location: Buffalo Bayou from 99 to Fry Road

The plan should include a shared use path along Buffalo Bayou in the high density residential area of Cinco Ranch. An adequate pathway with major road underpasses would be heavily used for commuting and recreation.

Issue: Briar Forest to West Oaks Mall Shared Use Path

Mode: Bicycle, Pedestrian

Location: Briar Forest to West Oaks Mall (Westheimer & Westheimer

Pkwy)

This pathway should be included in the plan as it is a key link between Terry Hershey and the Brays Bayou park & trail complex around Bishop Fiorenza and McClendon Parks.

Issue: Buffalo Bayou West Shared Use Path

Mode: Bicycle Location: Cinco George Bush Park South

Extending the trail along Buffalo Bayou from east of Fry Road, easterly across Long Point Slough, past the cricket field in George Bush Park to Westheimer Parkway & South Barker Cypress should be included in the

plan. Please email me for details on the alignment.



Jan. 21, 2014

Issue: Sidewalk on Piping Rock Ln, between SH 6 and Briarview Dr

Mode: Pedestrian

Location: Piping Rock Ln, from SH 6 to Briarview Dr

A pedestrian crossing was added to the intersection of SH6 and Piping Rock Ln not so long ago. This a fantastic feature which allows residents, who live east of SH6, to walk over to the shopping plaza on the west side. However, there is no sidewalk between SH6 and Briarview Dr along Piping Rock Ln. So, the residents are forced to walk on the road. A sidewalk along that stretch of Piping Rock Ln would be great for pedestrian safety and convenience.

Jan. 6, 2014

Issue: Grand Parkway Park & Ride facility needed

Mode: Transit

Location: SH 99 and I-10

Please consider acceleration of the permanent park and ride facility at 99 and I-10. The existing parking is not even large enough to fill the buses that serve this park and ride.

Issue: Continuous Frontage Roads for Westpark Tollway

Mode: Automobile, Bicycle, Pedestrian

Location: Westpark Tollway east of Hwy 6

Develop continuous frontage roads for both directions on Westpark

Tollway to provide free capacity.

Dec. 7, 2013

Issue: Traffic Light at Highland Knolls & Fry

Mode: Automobile, Bicycle

Location: Highland Knolls at Fry, Katy, TX 77450

Eastbound traffic on Highland Knolls seem to assume they have protected left turn to Fry Northbound. The lights actually turn green for both Eastbound and Westbound traffic from the bike trail, implying the left turn traffic to yield to thru traffic. Safety issue occurs since the left-turning traffic do not see the need to yield. Please either put the sign "Left Turn Yield" or add protected left turn green light.

Nov. 17, 2013

Issue: Addicks-Tanner Connection Trail

Mode: Bicycle, Pedestrian

Location: Tanner Road at North Addicks Dam

I represent a group promoting a 1000 ft bike/hike trail connection from the north end of Addicks Dam to Tanner Road. We have consulted 3 area HOAs, 4 area MUD, Harris County Precinct 4, Corps of Engineers and CFISD; all are supportive. This could be built by Harris County. I wish to put this project on the map (along with 2 related sidewalk trails; separately) so that planners are aware of the activity.

Issue: Tanner Road Sidewalk Trail

Mode: Bicycle, Pedestrian

Location: Tanner Road from Eldridge to Addicks Dam

I represent a group promoting better bicycle and pedestrian access along Tanner Road from North Eldridge Parkway to a proposed connection to North Addicks Dam and Cullen Park. We have consulted 3 area HOAs, 4 area MUD, Harris County Precinct 4, Corps of Engineers and CFISD; all are supportive. I wish to put this project on the map (along with the related Addicks-Tanner Connection Trail and the Eldridge Sidewalk Trails) so that planners are aware of the activity. We are currently researching funding sources for this project.

Issue: North Eldridge Sidewalk Trail

Mode: Bicycle, Pedestrian

Location: North Eldridge Parkway at Tanner Road

I represent a group promoting better bicycle and pedestrian access along North Eldridge Parkway south and north from the Tanner Road intersection, along with improvements along Tanner. We have consulted 3 area HOAs, 4 area MUD, Harris County Precinct 4, Corps of Engineers and CFISD; all are supportive. I wish to put this project on the map (along with the related Addicks-Tanner Connection Trail and the Tanner Sidewalk Trails) so that planners are aware of the activity. We are currently researching funding sources for this project.

Oct. 24, 2013

Issue: Overlay Quality of Briar Forest

Mode: Automobile, Bicycle

Location: Briar Forest

Briar Forest asphalt overlay quality is horrible (between Dairy Ashford & Beltway 8). A lot of uneven surface, cracks, low spots where water stands, and overlay not covering the entire lane (uneven bike lanes).

Issue: SH6 Pedestrian Signal Request

Mode: Pedestrian

Location: SH6 between Richmond & Briar Forest

SH6 needs pedestrian signals at the following intersections.

1. Briar Forest (Barker Dam trail entrance)

2. Parkhollow Dr. (West Oaks Mall entrance)

3. Richmond Ave

Follow-on Comment

Gregg Nady (Jan 23, 2014)

A pedestrian signal at Westheimer & Briargreen would help the connection between Terry Hershey and Brays Bayou.

Oct. 23. 2013

Issue: Westheimer intersections with Dairy Ashford and SH 6

Mode: Automobile

Westheimer at SH 6, and Westheimer at Dairy Ashford

The afternoon rush hour commute along Westheimer at the intersections of both Dairy Ashford and State Highway 6 includes lengthy waits attempting to get through the intersections. Can the traffic signal timing be improved, and is an overpass planned for the SH 6 intersection?



## APPENDIX A

Oct. 22, 2013

Issue: Richmond Avenue

Mode: Automobile

Location: Richmond Avenue

The condition of Richmond Ave from Hwy 6 to the 610 Loop (and probably beyond) is horrible. The roadway is very uneven and, in some places, dangerous. There are a few spots of congestion, but it isn't really too bad in the morning. However, at Eldridge, there seems to be much more traffic on Richmond than Eldridge, yet the traffic on Eldridge has a much longer green light to the point that there is no traffic going through the intersection. In the morning rush, it would probably be beneficial to have a longer light for eastbound Richmond traffic and a shorter one for Eldridge traffic.

Issue: Driving through George Bush Park

Mode: Automobile

Location: Barker Cypress & FM 1093

Heading south on Barker Cypress (at FM 1093) and heading east on Westheimer Parkway (at FM 1093) it takes a long time to get out of the park during rush hour in the morning. On Barker Cypress, it often backs up more than half way to Westheimer Parkway through the park before 7:00 am. If there was more than one lane heading out of the park, then I think traffic times will be greatly reduced.

Oct. 06, 2013

Issue: Katy Freeway - Kirkwood/Wilcrest

Mode: Automobile

Location: 11400 Block of Katy Freeway - between Wilcrest and Kirkwood

Southside of Freeway

Each morning, I attempt to go from neighborhood on the north side of Katy Freeway to Loop 610 and I-10. This requires that I use Kirkwood intersection to go east of Katy Freeway. Because of the dual right turn lanes on the south side of Katy freeway, the u-turn is extremely congested and very dangerous to use. There is literally no break in the traffic and many of the cars in the u-turn actually want to cross 3 lanes of traffic into the parking lot. I use the lights to make the u-turn. Once I'm east bound on the access road, it's backed up with the traffic exiting Katy freeway and the heavy back up at the Wilcrest light on the south side of the freeway. This will be made worse with the additional apartment housing soon to be available on the south side of Katy Freeway at Wilcrest and the upcoming townhomes on Brittmore. What can be done to ease the traffic flow?



## APPENDIX A





# APPENDIX B SURVEY RESULTS

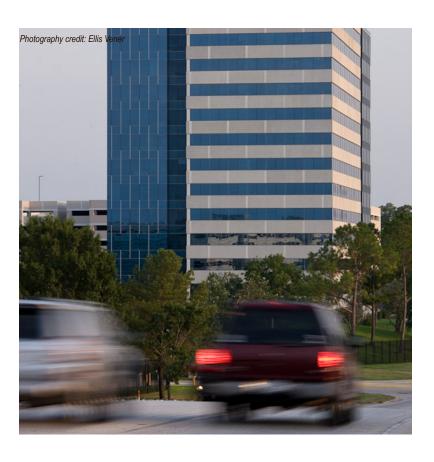


## SURVEY RESULTS

A survey was conducted at the second public meeting. Participants were asked the following questions regarding mobility opportunities and challenges in the Study Area.

#### **PUBLIC MEETING SURVEY QUESTIONS**

1. DO YOU LIVE AND/OR WORK IN THE STUDY AREA? (MULTIPLE CHOICE	ICE)
Response	Percent
I live in the study area	22.22%
I work in the study area	29.63%
I live and work in the study area	25.93%
I don't live or work in the study area, but I am interested in what is happening here	22.22%
2. WHAT IS THE BIGGEST MOBILITY CHALLENGE IN THE STUDY AREA?	? (MULTIPLE CHOICE)
Response	Percent
Traffic congestion	59.26%
Safety	3.7%
Lack of alternatives to automobile	37.04%
Other	0%
Totals	100%
3. PLEASE SELECT THE MOST IMPORTANT OPTION FOR THE STUDY A	AREA: (MULTIPLE CHOICE)
Response	Percent
Added capacity	17.86%
Efficiency/safety enhancements	21.43%
Demand management	32.14%
All are equally important	28.57%
Other	0%
No changes needed	0%
Totals	100%
4. HOW OFTEN DO YOU USE TRANSIT? (MULTIPLE CHOICE)	
Responses	Percent
Every day	7.14%
Once a week	7.14%
Once a month	10.71%
Once a year	32.14%
Never	42.86%
Totals	100%
5. WHAT KEEPS YOU FROM USING TRANSIT MORE FREQUENTLY? (MU	ULTIPLE CHOICE - MULTIPLE RESPONSE)
Responses	Percent
My destination(s) are inaccessible by transit	28.26%
Takes too long	32.61%
No transit options near my home	23.91%
Lack of safety on transit	2.17%
Other	10.87%
Nothing, I use transit frequently	2.17%
Totals	100%











## APPENDIX B



6. PREFERRED TRANSIT SERVICE (MULTIPLE CHOICE - MULTIPLE F	
Responses	Percent
Long-haul, park and ride service	27.45%
Local service that's accessible by walking	29.41%
Express bus	29.41%
Demand-response/paratransit	7.84%
I don't prefer transit	5.88%
Totals	100%
7. HOW OFTEN DO YOU RIDE YOUR BIKE? (MULTIPLE CHOICE)	
Responses	Percent
Daily	14.81%
Once a week	14.81%
Once a month	11.11%
Once a year	11.11%
Never, I don't ride a bike	48.15%
Totals	100%
9. WHY DON'T YOU RIDE YOUR BIKE MORE OFTEN? (MULTIPLE CH	
Responses	Percent
Weather – it's too hot, cold, rainy, etc.	19.15%
Lack of bike paths where I want to go	19.15%
Destination(s) are too far away	19.15%
I don't feel comfortable riding on the street with traffic	19.15%
Other	4.26%
None, I feel comfortable riding my bike	19.15%
Totals	100%
10. WHAT ARE YOUR PREFERRED BICYCLE FACILITIES? (MULTIPLE	CHOICE)
Responses	Percent
On-street bicycle facilities	3.85%
Off-street bicycle facilities	19.23%
I prefer a mix of both	46.15%
None of the above, I don't ride a bicycle	30.77%
Totals	100%
11. HOW OFTEN DO YOU WALK TO A DESTINATION? (MULTIPLE CHO	
Responses	Percent
 Daily	23.08%
Once a week	30.77%
Once a month	23.08%
Once a year	7.69%
Never, I don't walk to any destinations	15.38%
Totals	100%

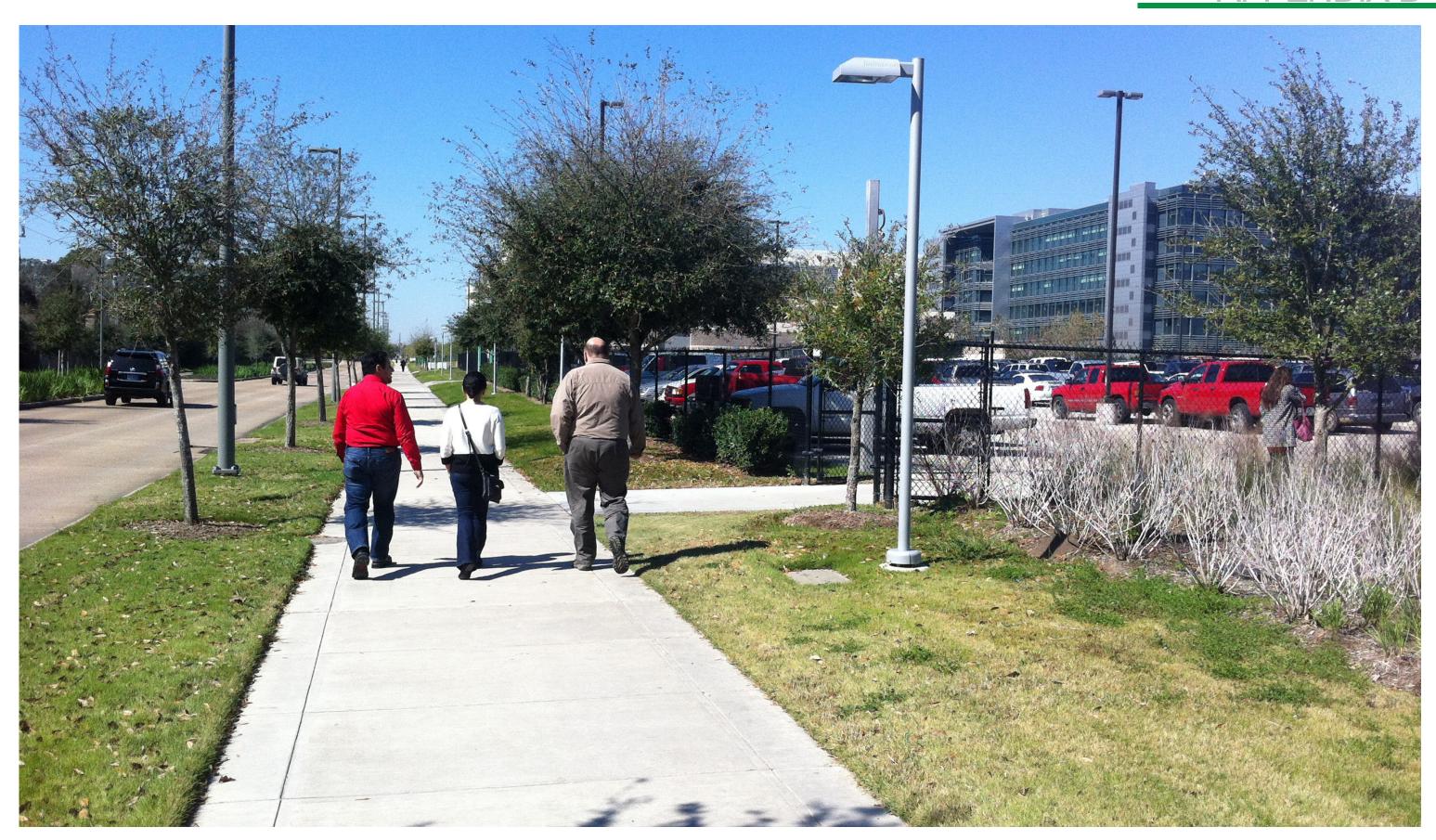


## APPENDIX B



12. WHY DO YOU WALK TO DESTINATIONS? (MULTIPLE CHOICE - M	III TIPI E RESPONSE)
Responses	Percent Percent
Recreation	28.57%
Exercise	32.65%
Commute to work	6.12%
Errands – shopping, dining, etc.	26.53%
Other	2.04%
None, I don't walk to destinations	4.08%
Totals	100%
13. WHY DON'T YOU WALK TO A DESTINATION? (MULTIPLE CHOICE	- MULTIPLE RESPONSE)
Responses	Percent
Weather – it's too hot, cold, rainy, etc.	18%
Lack of sidewalks where I want to go	16%
Destination(s) are too far away	32%
Lack of comfort walking on the street next to traffic	22%
Other	6%
None, I feel comfortable walking	6%
Totals	100%
14. WHAT IS THE MOST IMPORTANT TRANSPORTATION MODE IN TH	E STUDY AREA? (MULTIPLE CHOICE)
Responses	Percent
Vehicles	30.77%
Transit	11.54%
Bicycling	0%
Walking	0%
There should be a good mix/variety	57.69%
Other	0%
Totals	100%

## APPENDIX E







# APPENDIX C METRO PREVIOUS LOCAL SERVICE

ROUTES IN SERVICE UNTIL AUGUST 16TH, 2015



### 2 Bellaire

Service Metrics	Typical Headway (Minutes)	Span
Midday	15	
AM Peak	6	4.20 1.21
PM Peak	8	4:32am-1:31am
Evening	30	
Saturday	15	4:44am-1:43am
Sunday	22	4:14am-1:45am

- Headways in the non-peak direction are 15 minutes.
- Westchase and Mission Bend branches split frequency evenly except during weekday peak periods when Westchase has half hourly service and all other trips go to Mission Bend.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	7,354
Boardings per Revenue Mile	2.9
Boardings per Revenue Hour	32.4
Average Fare	\$0.66
Operating Ratio (Fare Revenue/Operating Cost)	18.8%
Average Subsidy per Boarding	\$3.75

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	27.8
Sunday Boardings per Revenue Hour	30.5

Performance Metrics	Value
Average Speed (Weekday)	11.1 mph
On - Time Performance	79%

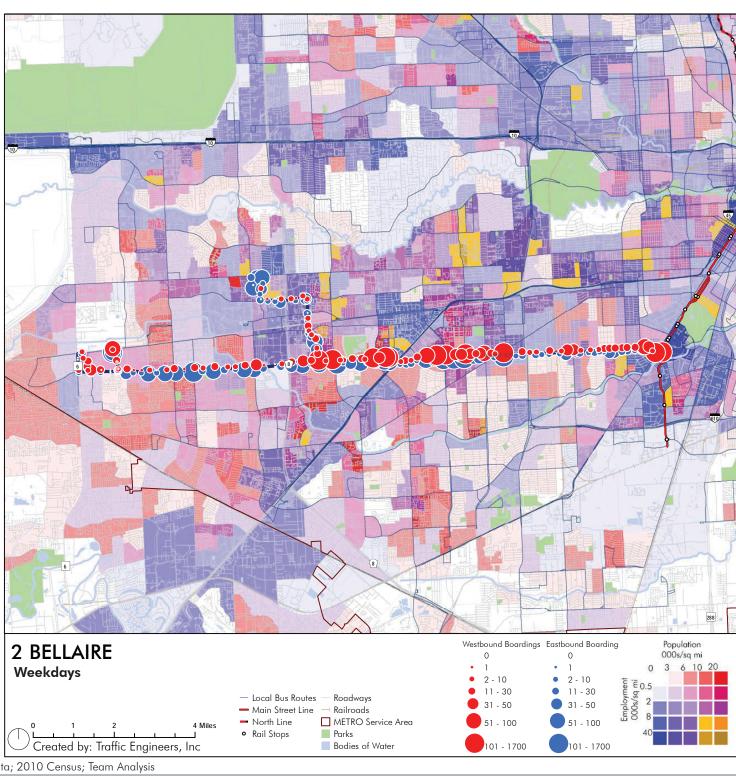
#### **Route Strengths:**

- Connects to the Texas Medical Center and Red Line at TMC TC.
- Straightforward route along namesake street.
- Operates in a straight line through diverse areas of high density and activity.

#### **Route Challenges:**

- Service pattern on Mission Bend branch can be confusing.<sup>1</sup>
- Headways on Mission Bend branch are irregular in the peak direction due to uneven split with Westchase branch.
- Crosses one railroad crossing with two tracks at grade.

## Transit System Reimagining Going Places



### 4 Beechnut

Service Metrics	Typical Headway (Minutes)	Span
Midday	20	
AM Peak	10	4.20 1.20
PM Peak	10	4:30am-1:20am
Evening	30	
Saturday	25	5:03am-1:43am
Sunday	30	5:03am-2:09am

- Outbound morning headway is 15 minutes.
- Inbound afternoon headway is 20 minutes.
- Inbound headways are inconsistent throughout the day.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	4,469
Boardings per Revenue Mile	2.1
Boardings per Revenue Hour	29.1
Average Fare	\$0.61
Operating Ratio (Fare Revenue/Operating Cost)	15.2%
Average Subsidy per Boarding	\$4.34

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	29.8
Sunday Boardings per Revenue Hour	24.0

Performance Metrics	Value
Average Speed (Weekday)	13.7 mph
On - Time Performance	75%

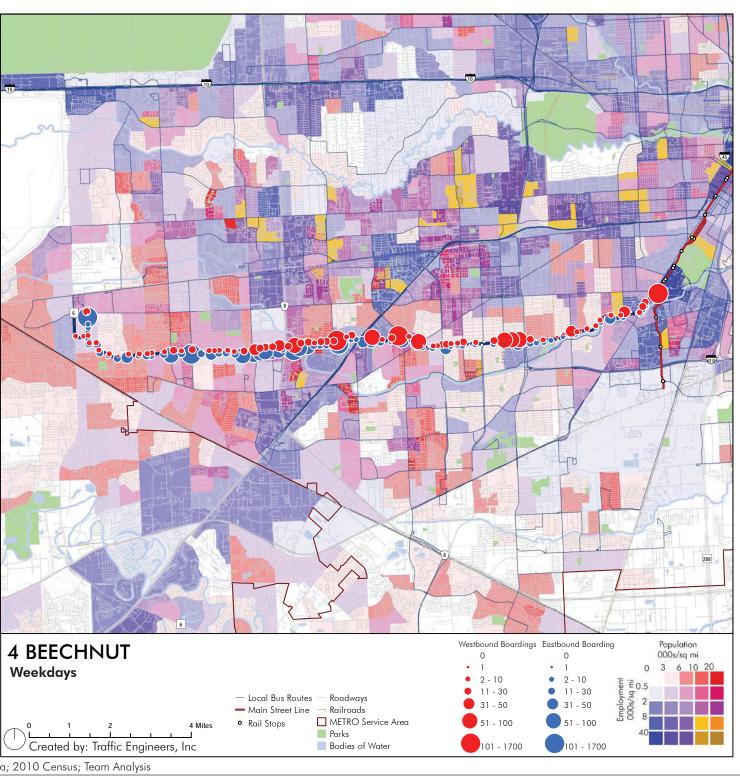
#### **Route Strengths:**

- Connects to the Texas Medical Center and Red Line at TMC TC.
- Straightforward route on namesake street.
- Operates in a straight line through diverse areas of high density and activity.

#### **Route Challenges:**

• Crosses two railroad tracks at one grade crossing.

## Transit System Reimagining METRO Going Places





### 9 Gulfton Limited

Service Metrics	Typical Headway (Minutes)	Span
Midday	40	
AM Peak	25	5.01 0.10
PM Peak	25	5:21am - 9:18pm
Evening	35	
Saturday	30	5:39am - 7:21pm
Sunday	-	-

- Hooked to 9 North Main.
- Shorter span and days of service than 9 North Main (no Sunday service).

Productivity Metrics (Weekday)	Value
Average Daily Ridership	1,402
Boardings per Revenue Mile	1.6
Boardings per Revenue Hour	20.7
Average Fare	\$0.70
Operating Ratio (Fare Revenue/Operating Cost)	11.9%
Average Subsidy per Boarding	\$6.65

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	7.8
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	12.7 mph
On - Time Performance	69%

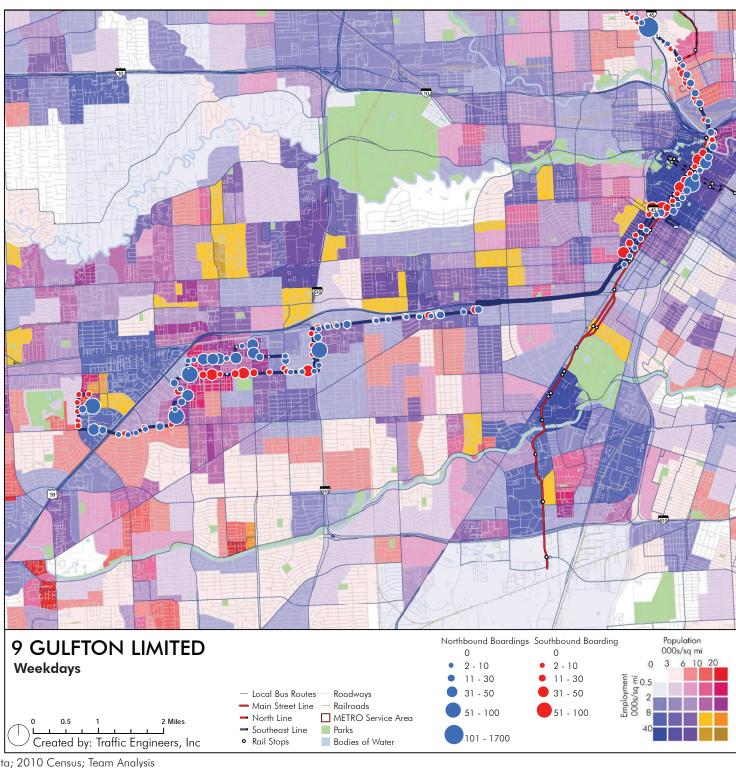
#### **Route Strengths:**

- Serves Downtown.
- Nonstop segment along Southwest Freeway.

#### **Route Challenges:**

- Name describes neighborhood served; operation along Gulfton Street is primarily
- Large one-way loop in Gulfton neighborhood; duplicates other routes.
- Numerous turns at west end.





### **19 Wilcrest Crosstown**

Service Metrics	Typical Headway (Minutes)	Span
Midday	45	4:40am - 8:03pm
AM Peak	20	
PM Peak	20	
Evening	-	
Saturday	45	5:44am - 8:38pm
Sunday	-	-

Productivity Metrics (Weekday)	Value
Average Daily Ridership	1,126
Boardings per Revenue Mile	1.6
Boardings per Revenue Hour	21.4
Average Fare	\$0.62
Operating Ratio (Fare Revenue/Operating Cost)	10.8%
Average Subsidy per Boarding	\$6.65

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	18.0
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	13.4 mph
On - Time Performance	66%

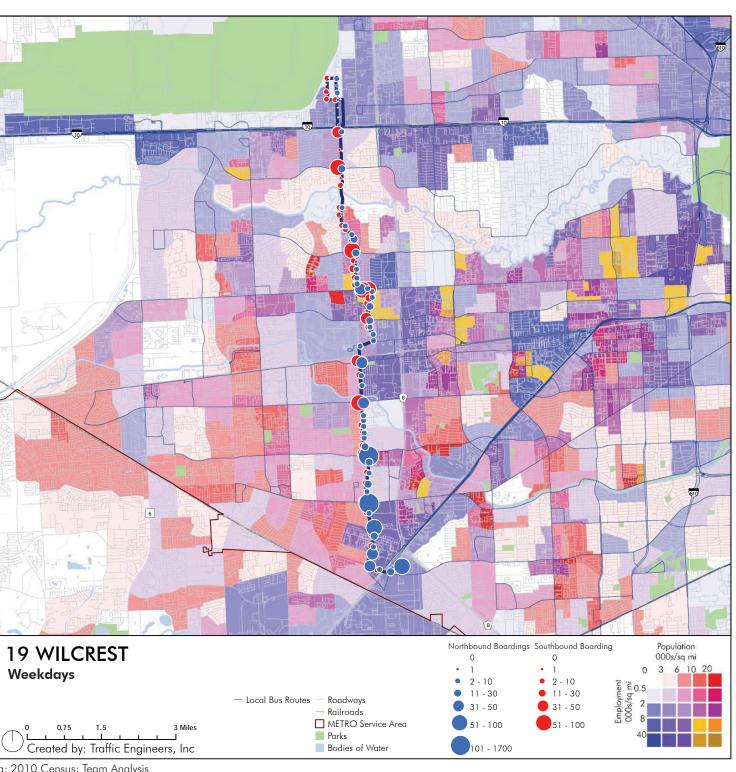
#### **Route Strengths:**

• Straightforward route primarily on namesake street.

#### **Route Challenges:**

• One-way figure eight at north end of route.8

## Transit System Reimagining Going Places





## **20 Long Point Limited**

Service Metrics	Typical Headway (Minutes)	Span
Midday	30	4:47am-12:06am
AM Peak	15	
PM Peak	15	
Evening	60	
Saturday	25	5:42am - 11:43pm
Sunday	30	5:44am - 11:47pm

Hooked to 20 Canal.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	2,391
Boardings per Revenue Mile	1.6
Boardings per Revenue Hour	25.6
Average Fare	\$0.65
Operating Ratio (Fare Revenue/Operating Cost)	13.1%
Average Subsidy per Boarding	\$5.65

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	23.3
Sunday Boardings per Revenue Hour	22.5

Performance Metrics	Value
Average Speed (Weekday)	16.3 mph
On - Time Performance	69%

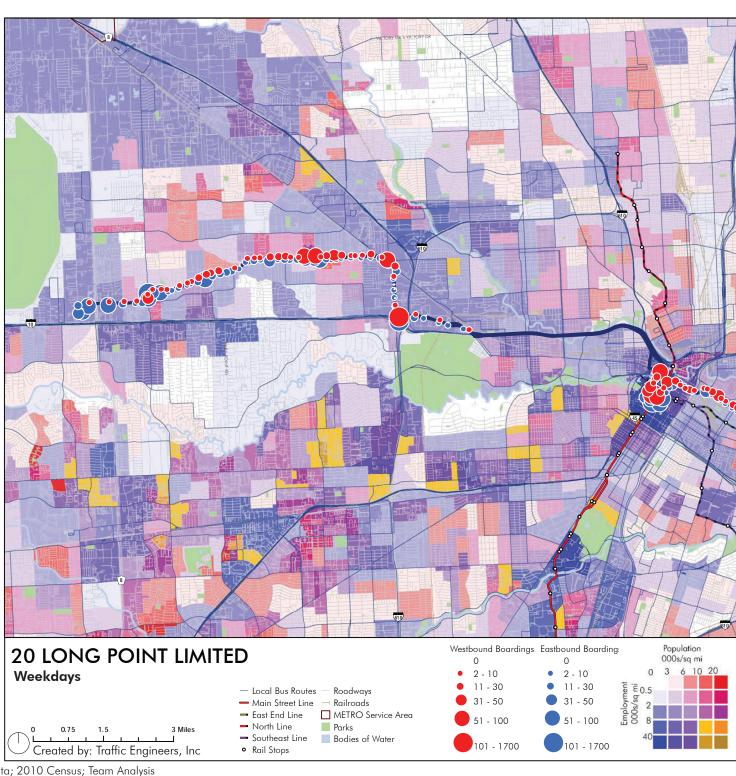
#### **Route Strengths:**

- Serves Downtown.
- Nonstop segment along Katy Freeway.
- Serves entire length of namesake street.

#### **Route Challenges:**

- Crosses two railroad crossings at grade; crossings on Canal end impact reliability as well.
- Redundant local service between NWTC and Downtown: 36, 85, 131.
- Could provide frequent service between Northwest Mall and Downtown in conjunction with the 85 Antoine but schedules are not synchronized.

Transit System Reimagining METRO



### 25 Richmond

Service Metrics	Typical Headway (Minutes)	Span
Midday	15	
AM Peak	8	3:51am - 12:49am
PM Peak	10	
Evening	30	
Saturday	20	4:57am - 1:42am
Sunday	32	5:16am - 1:42am

- Outbound AM Peak headways are 12 minutes.
- Sharpstown and Mission Bend branches split frequency evenly.
- No service to Mission Bend branch Saturday nights or Sundays.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	5,360
Boardings per Revenue Mile	2.4
Boardings per Revenue Hour	27.5
Average Fare	\$0.63
Operating Ratio (Fare Revenue/Operating Cost)	14.8%
Average Subsidy per Boarding	\$4.79

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	26.4
Sunday Boardings per Revenue Hour	22.7

Performance Metrics	Value
Average Speed (Weekday)	11.3 mph
On - Time Performance	74%

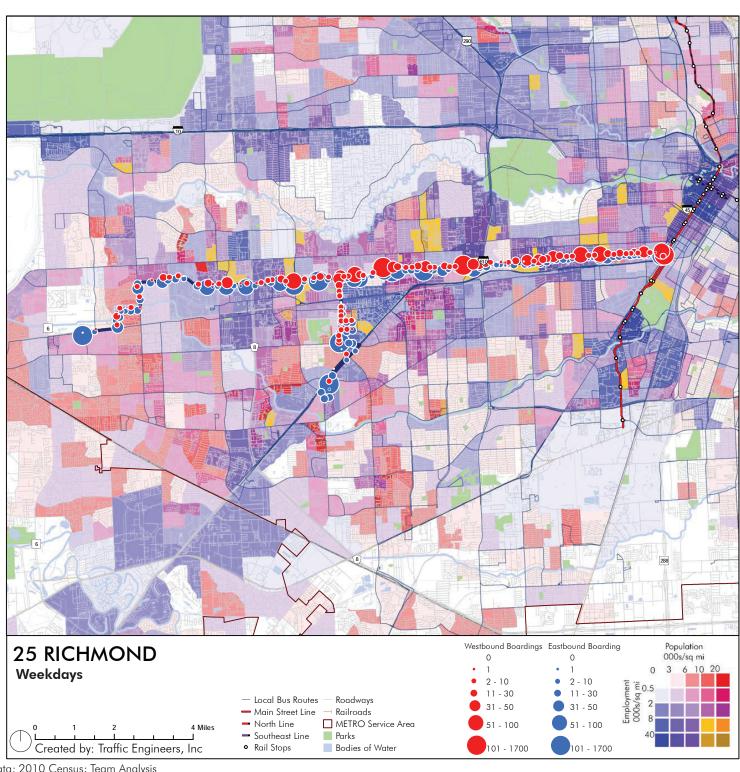
#### **Route Strengths:**

- Serves Greenway Plaza and Uptown.
- Connects to Red Line at Wheeler Station.
- Straightforward route along namesake street.
- Operates in a straight line through diverse areas of high density and activity.

#### **Route Challenges:**

- Crosses one railroad crossing with two tracks at grade.
- One-way loop and numerous turns on Sharpstown Branch.

## Transit System Reimagining METRO





## 36 Kempwood

Service Metrics	Typical Headway (Minutes)	Span
Midday	60	
AM Peak	15	5.00
PM Peak	15	5:00am - 9:48pm
Evening	60	
Saturday	60	6:46am - 10:47pm
Sunday	-	-

- Hooked to 36 Lawndale.
- Shorter weekday span and frequency and different days of service than 36 Lawndale (no Sunday service).

Productivity Metrics (Weekday)	Value
Average Daily Ridership	1,563
Boardings per Revenue Mile	1.6
Boardings per Revenue Hour	21.6
Average Fare	\$0.70
Operating Ratio (Fare Revenue/Operating Cost)	11.9%
Average Subsidy per Boarding	\$6.70

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	17.9
Sunday Boardings per Revenue Hour	14.8

Performance Metrics	Value
Average Speed (Weekday)	13.9 mph
On - Time Performance	68%

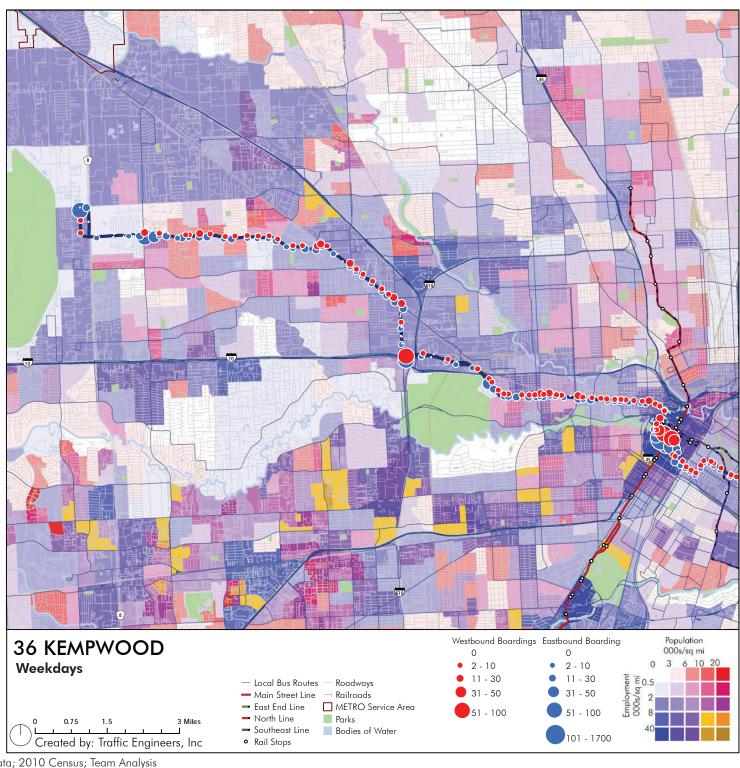
#### **Route Strengths:**

- Serves Downtown.
- Serves length of namesake street.

#### **Route Challenges:**

- Better-known Washington Avenue is not reflected in name.
- Crosses two railroad crossings at grade.
- Confusing service pattern on Washington Avenue. 85 Antoine takes over evenings and late nights but schedules are not coordinated during overlap time.
- Redundant service between NWTC and Downtown: 20, 85, 131.

Transit System Reimagining METRO



### **46 Gessner Crosstown**

Service Metrics	Typical Headway (Minutes)	Span
Midday	30	
AM Peak	12	5.00
PM Peak	12	5:00am - 11:04am
Evening	30	
Saturday	30	5:10am - 10:30pm
Sunday	45	5:45am - 8:04pm

- Slightly lower frequency southbound in the morning and northbound in the afternoon.
- Deviates to serve Gessner P&R during peak hours.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	4,983
Boardings per Revenue Mile	3.2
Boardings per Revenue Hour	39.2
Average Fare	\$0.67
Operating Ratio (Fare Revenue/Operating Cost)	21.3%
Average Subsidy per Boarding	\$3.30

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	42.8
Sunday Boardings per Revenue Hour	45.5

Performance Metrics	Value
Average Speed (Weekday)	12.1 mph
On - Time Performance	69%

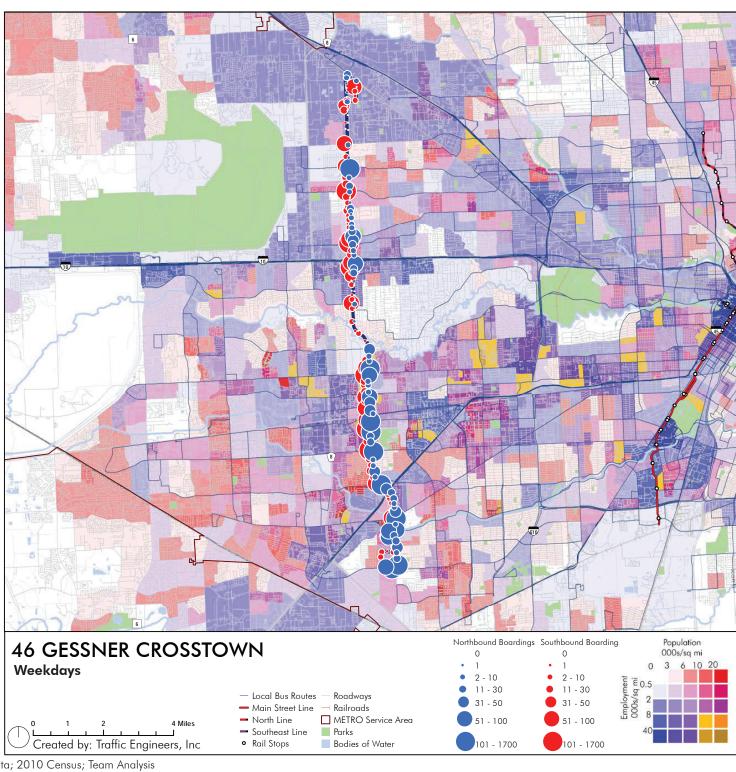
#### **Route Strengths:**

- Serves Memorial City.
- Straightforward route along namesake street.
- Operates in a straight line through diverse areas of high density and activity.

#### **Route Challenges:**

- Traffic congestion in vicinity of Katy Freeway heavily affects on-time performance.
- Span provided may not be adequate: high ridership on first and final trips most days.

# Transit System Reimagining Going Places





## **53 Briar Forest Limited**

Service Metrics	Typical Headway (Minutes)	Span
Midday	24	
AM Peak	12	4.00 11.40
PM Peak	12	4:00am - 11:49pm
Evening	60	
Saturday	40	5:19am - 9:49pm
Sunday	40	5:12am - 8:50pm

• Headway in nonpeak direction is 24 minutes.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	3,802
Boardings per Revenue Mile	1.7
Boardings per Revenue Hour	21.3
Average Fare	\$0.70
Operating Ratio (Fare Revenue/Operating Cost)	11.8%
Average Subsidy per Boarding	\$6.87

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	20.8
Sunday Boardings per Revenue Hour	16.0

Performance Metrics	Value
Average Speed (Weekday)	12.7 mph
On - Time Performance	68%

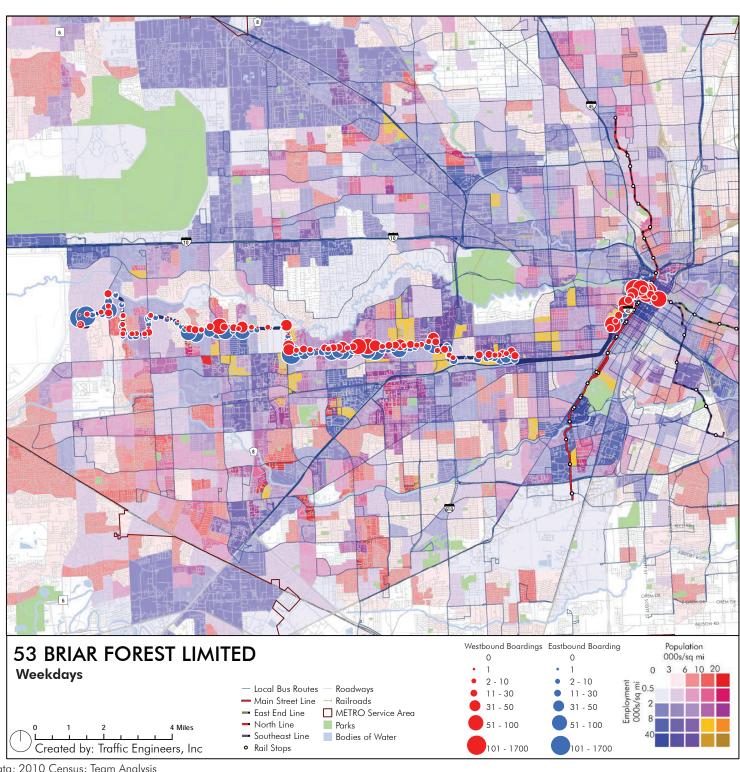
#### **Route Strengths:**

- Serves Downtown, Uptown, and Greenway Plaza.
- Nonstop segment along Southwest freeway.

- Route Challenges:Duplicates other routes for majority of route.
- One-way segments.
- Crosses two railroad tracks at one grade crossing.

# Transit System Reimagining Going Places





## **58 Hammerly**

Service Metrics	Typical Headway (Minutes)	Span
Midday	40	
AM Peak	20	5:30am - 9:19pm
PM Peak	20	
Evening	-	
Saturday	35	5:45am - 9:39pm
Sunday	-	-

Productivity Metrics (Weekday)	Value
Average Daily Ridership	818
Boardings per Revenue Mile	1.1
Boardings per Revenue Hour	13.4
Average Fare	\$0.75
Operating Ratio (Fare Revenue/Operating Cost)	8.2%
Average Subsidy per Boarding	\$10.81

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	6.9
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	12.7 mph
On - Time Performance	70%

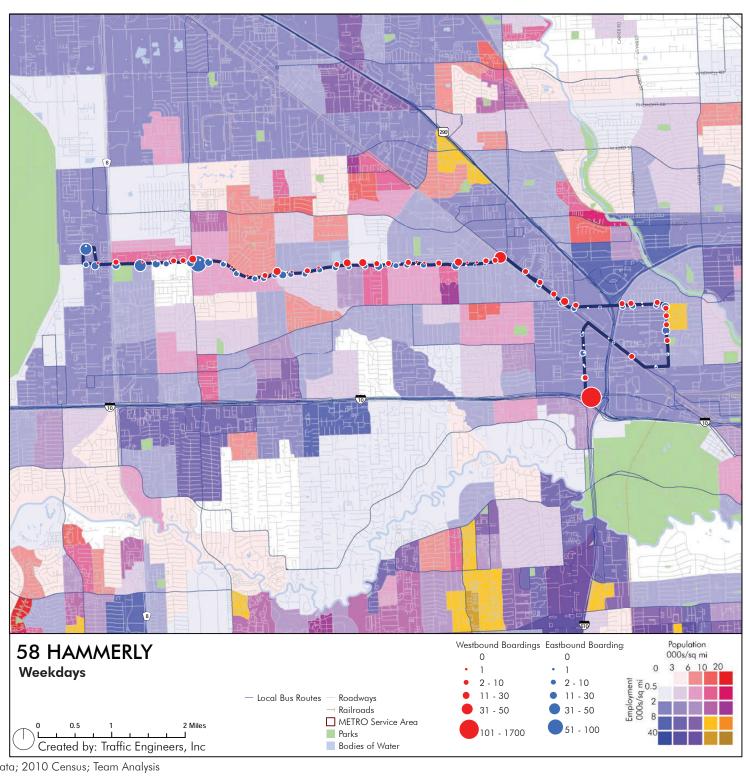
#### **Route Strengths:**

• Serves entire length of namesake street.

#### **Route Challenges:**

- Circuitous routing.<sup>24</sup>
- Crosses five railroad grade crossings.

# Transit System Reimagining Going Places





## **67 Dairy Ashford Crosstown**

Service Metrics	Typical Headway (Minutes)	Span
Midday	40	
AM Peak	40	5:09am - 8:15pm
PM Peak	40	
Evening	-	
Saturday	-	-
Sunday	-	-

Productivity Metrics (Weekday)	Value
Average Daily Ridership	758
Boardings per Revenue Mile	2.1
Boardings per Revenue Hour	23.7
Average Fare	\$0.71
Operating Ratio (Fare Revenue/Operating Cost)	12.4%
Average Subsidy per Boarding	\$6.84

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	11.1 mph
On - Time Performance	82%

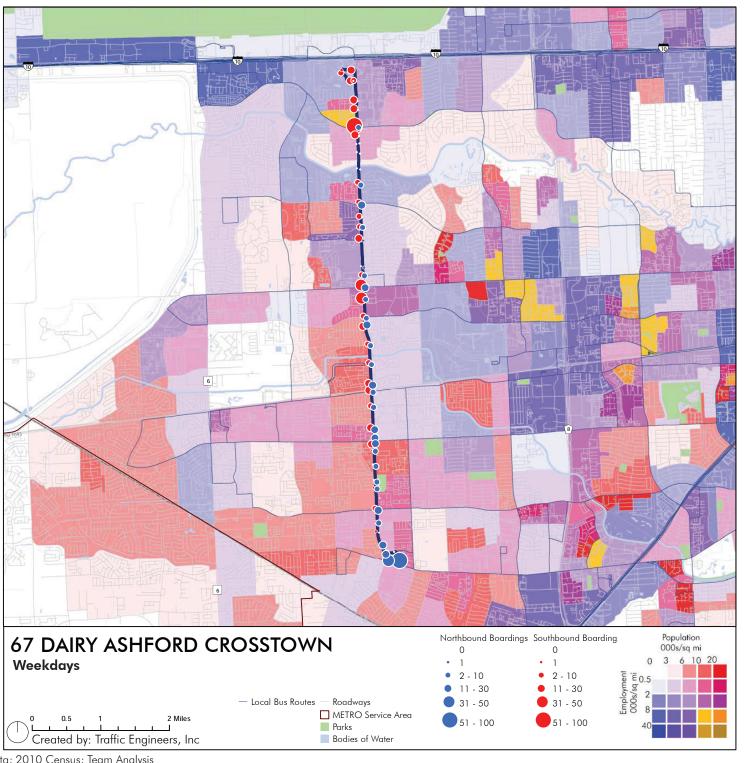
#### **Route Strengths:**

• Straightforward route on namesake street.

#### **Route Challenges:**

## Transit System Reimagining METRO





## **70 Memorial**

Service Metrics	Typical Headway (Minutes)	Span
Midday	35	
AM Peak	25	5:50am - 7:28pm
PM Peak	35	
Evening	-	
Saturday	-	-
Sunday	-	-

Productivity Metrics (Weekday)	Value
Average Daily Ridership	429
Boardings per Revenue Mile	0.6
Boardings per Revenue Hour	10.9
Average Fare	\$0.63
Operating Ratio (Fare Revenue/Operating Cost)	6.1%
Average Subsidy per Boarding	\$11.84

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	17.7
On - Time Performance	67%

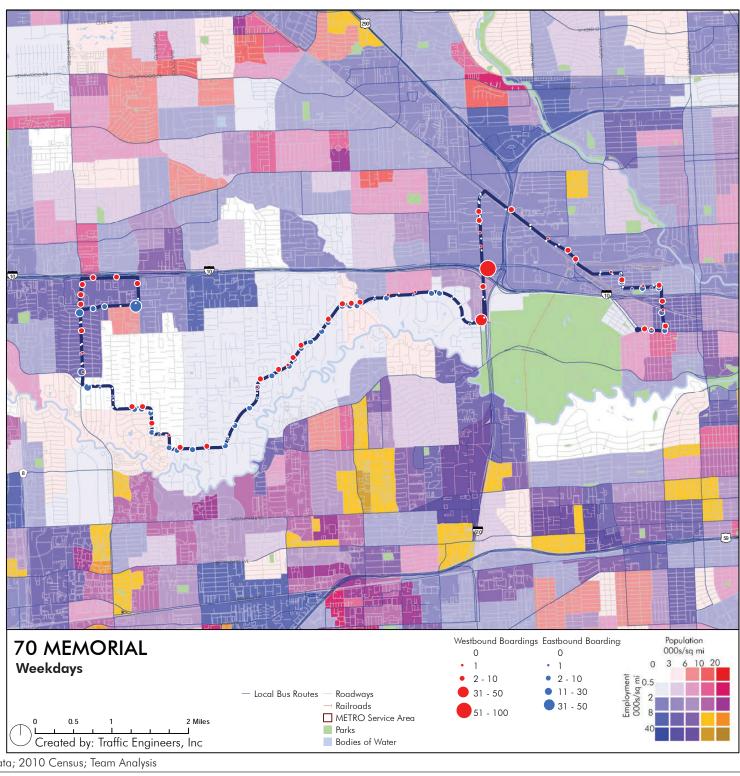
#### **Route Strengths:**

Serves Memorial City.

#### **Route Challenges:**

- Crosses numerous railroad tracks at grade (route to be realigned in June, 2013).
- Operates through areas of relatively low density.

# Transit System Reimagining Going Places





## **72 Westview Circulator**

Service Metrics	Typical Headway (Minutes)	Span
Midday	25	5:30am - 8:12pm
AM Peak	25	
PM Peak	25	
Evening	-	
Saturday	40	5:16am - 10:02pm
Sunday	40	5:16am - 7:53pm

Productivity Metrics (Weekday)	Value
Average Daily Ridership	806
Boardings per Revenue Mile	1.3
Boardings per Revenue Hour	18.8
Average Fare	\$0.70
Operating Ratio (Fare Revenue/Operating Cost)	12.9%
Average Subsidy per Boarding	\$5.90

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	15.0
Sunday Boardings per Revenue Hour	14.0

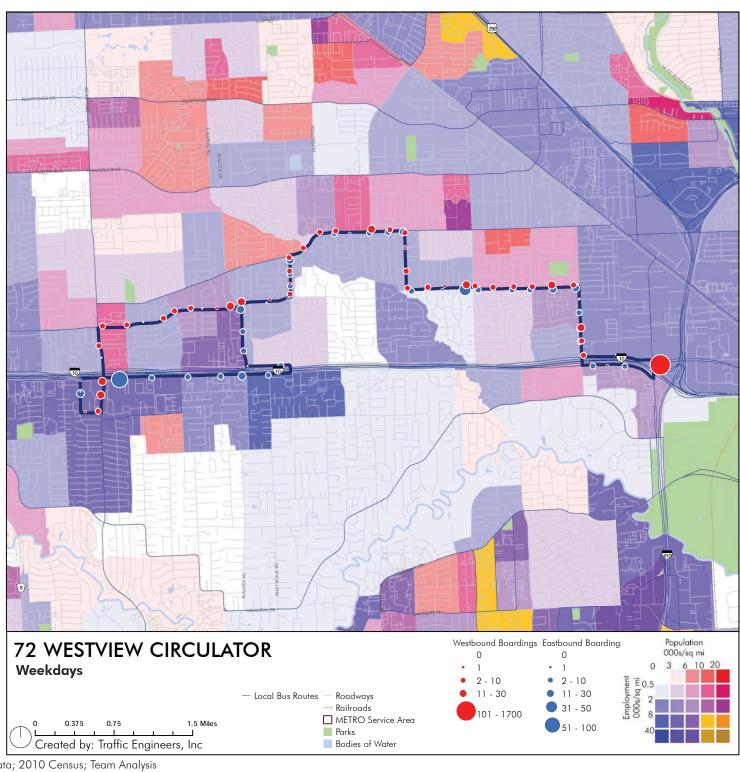
Performance Metrics	Value
Average Speed (Weekday)	14.3 mph
On - Time Performance	81%

#### **Route Strengths:**

Serves Memorial City.

- Route Challenges:
  Large one-way figure eight on the west end.
  Unfaithful to namesake street.<sup>28</sup>

## Transit System Reimagining Going Places



## **75 Eldridge Crosstown**

Service Metrics	Typical Headway (Minutes)	Span
Midday	30	
AM Peak	20	6:00am - 7:52pm
PM Peak	20	
Evening	-	
Saturday	-	-
Sunday	-	-

Productivity Metrics (Weekday)	Value
Average Daily Ridership	381
Boardings per Revenue Mile	0.7
Boardings per Revenue Hour	9.5
Average Fare	\$0.73
Operating Ratio (Fare Revenue/Operating Cost)	5.0%
Average Subsidy per Boarding	\$18.35

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	13.3 mph
On - Time Performance	81%

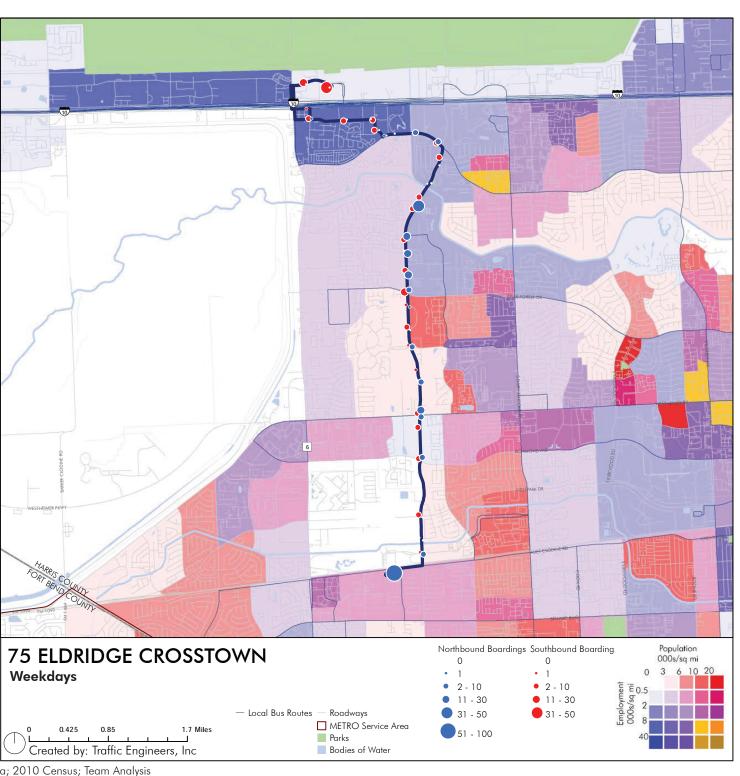
#### **Route Strengths:**

- Serves the Energy Corridor.
- Straightforward route on namesake street.

#### **Route Challenges:**

Passes through areas of low density and activity.<sup>29</sup>







## 81 Westheimer-Sharpstown

Service Metrics	Typical Headway (Minutes)	Span
Midday	20	
AM Peak	12	3:49am - 2:07am
PM Peak	14	
Evening	30	
Saturday	24	3:49am - 1:11am
Sunday	24	4:18am - 1:33am

- Headways in nonpeak direction are 20-24 minutes.
- Synchronized with 82 Westheimer West Oaks to provide twice the frequency between Hillcroft and Downtown.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	4,946
Boardings per Revenue Mile	2.9
Boardings per Revenue Hour	28.3
Average Fare	\$0.62
Operating Ratio (Fare Revenue/Operating Cost)	12.7%
Average Subsidy per Boarding	\$5.86

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	26.9
Sunday Boardings per Revenue Hour	25.0

Performance Metrics	Value
Average Speed (Weekday)	9.9 mph
On - Time Performance	69%

#### **Route Strengths:**

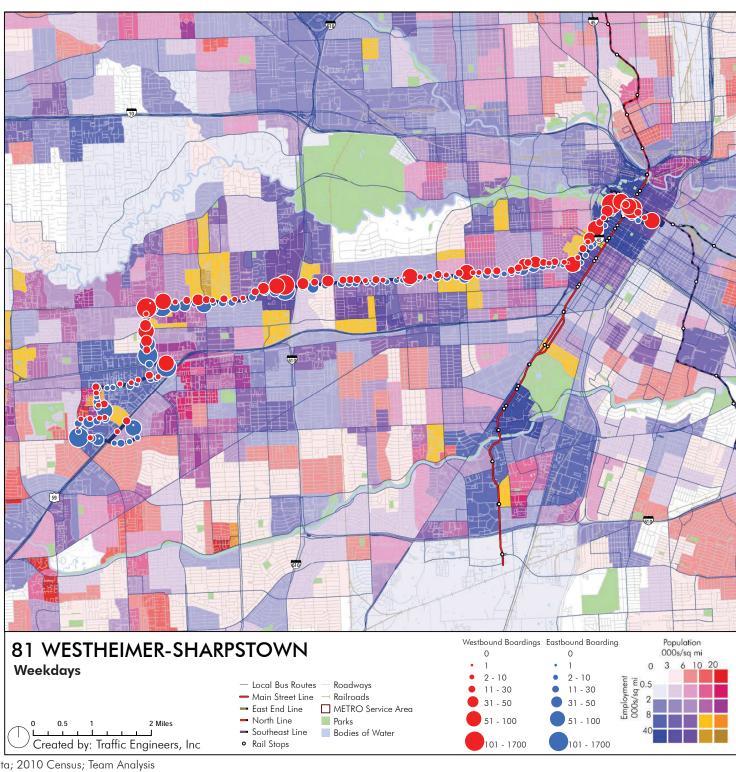
- Serves Downtown and Uptown.
- Schedule synchronized with 82 Westheimer-West Oaks to provide high frequency on common segment.

#### **Route Challenges:**

- Common schedule for Westheimer services is not available.
- Partially duplicates 53 Briar Forest without schedule synchronization.
- Crosses two railroad tracks at grade.
- Connecting to METRORail requires riding all the way into Downtown.
- Redundant service in Sharpstown area.
- Reliability impacted by Galleria-area traffic.

**Sources:** Summary of Schedules and published bus schedules; 2012 Route Ranking Model; 2013 Ridecheck Data; 2010 Census; Team Analysis

## Transit System Reimagining Going Places





### **82 Westheimer-West Oaks**

Service Metrics	Typical Headway (Minutes)	Span
Midday	20	4:31am - 1:47am
AM Peak	10	
PM Peak	14	
Evening	30	
Saturday	24	4:25am - 1:38am
Sunday	24	4:30am - 1:03am

- Headways in nonpeak direction are 20-24 minutes.
- Synchronized with 81 Westheimer Sharpstown to provide twice the frequency between Hillcroft and Downtown.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	6,523
Boardings per Revenue Mile	3.2
Boardings per Revenue Hour	34.4
Average Fare	\$0.71
Operating Ratio (Fare Revenue/Operating Cost)	21.6%
Average Subsidy per Boarding	\$3.49

Productivi	ty Metrics (Weekend)	Value
Saturday I	Boardings per Revenue Hour	38.4
Sunday Bo	oardings per Revenue Hour	34.4

Performance Metrics	Value
Average Speed (Weekday)	10.7 mph
On - Time Performance	66%

#### **Route Strengths:**

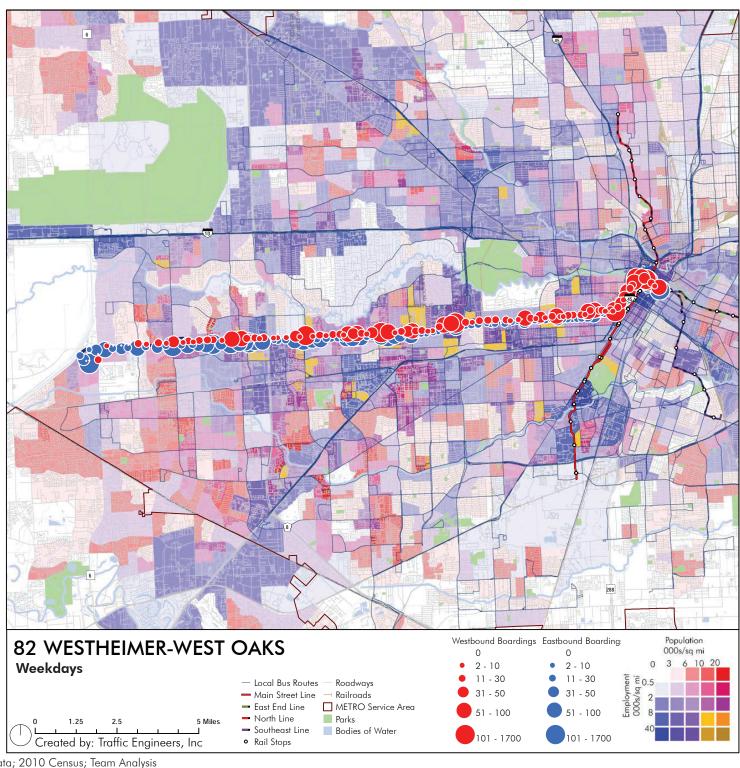
- Serves Downtown and Uptown.
- Straightforward route on namesake street.
- Schedule synchronized with 82 Westheimer-West Oaks to provide high frequency on common segment.
- Operates in a straight line through diverse areas of high density and activity.

#### **Route Challenges:**

- Common schedule for Westheimer services is not available.
- Partially duplicates 53 Briar Forest without schedule synchronization.
- Crosses two railroad tracks at grade.
- Connecting to METRORail requires riding all the way into Downtown.
- Reliability impacted by Galleria-area traffic.

Sources: Summary of Schedules and published bus schedules; 2012 Route Ranking Model; 2013 Ridecheck Data; 2010 Census; Team Analysis

## Transit System Reimagining METRO Going Places





## **131 Memorial Limited**

Service Metrics	Typical Headway (Minutes)	Span
Midday	45	4:48am - 10:45pm
AM Peak	15	
PM Peak	15	
Evening	55	
Saturday	42	6:02am - 9:25pm
Sunday	-	-

- Frequency is lower in nonpeak direction
- Some peak trips bypass NW TC and Memorial City via Katy Freeway and West Belt.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	1,694
Boardings per Revenue Mile	1.0
Boardings per Revenue Hour	18.4
Average Fare	\$0.65
Operating Ratio (Fare Revenue/Operating Cost)	8.6%
Average Subsidy per Boarding	\$8.89

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	15.3
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	18.9 mph
On - Time Performance	71%

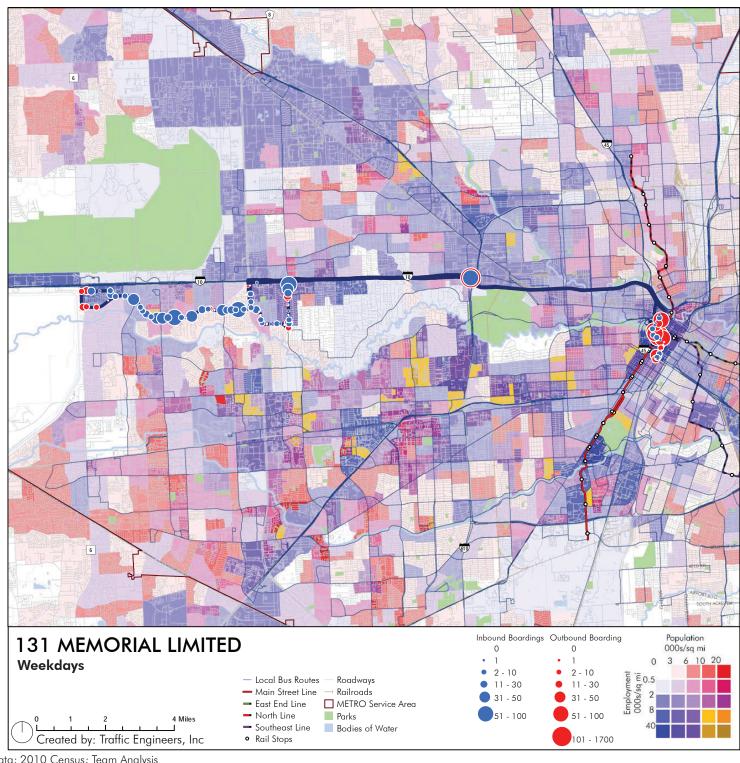
#### **Route Strengths:**

- Serves Downtown and the Energy Corridor.
- Nonstop segment along Katy Freeway managed lanes and I-10 west HOV.

#### **Route Challenges:**

- Passes through areas of relatively low density and activity.
- Redundant service between NWTC and Downtown: 20, 36, 85.

## Transit System Reimagining METRO





### **132 Harwin Limited**

Service Metrics	Typical Headway (Minutes)	Span
Midday	45	4:55am - 10:07pm
AM Peak	8	
PM Peak	8	
Evening	25	
Saturday	40	5:40am - 7:10pm
Sunday	-	-

- Handful of weekday trips and no weekend trips serve Cook Road branch and Westpark deviation.
- Some peak direction trips operate between Wheeler Station and Downtown.<sup>38</sup>

Productivity Metrics (Weekday)	Value
Average Daily Ridership	2,251
Boardings per Revenue Mile	1.3
Boardings per Revenue Hour	21.4
Average Fare	\$0.62
Operating Ratio (Fare Revenue/Operating Cost)	9.4%
Average Subsidy per Boarding	\$7.93

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	15.8
Sunday Boardings per Revenue Hour	-

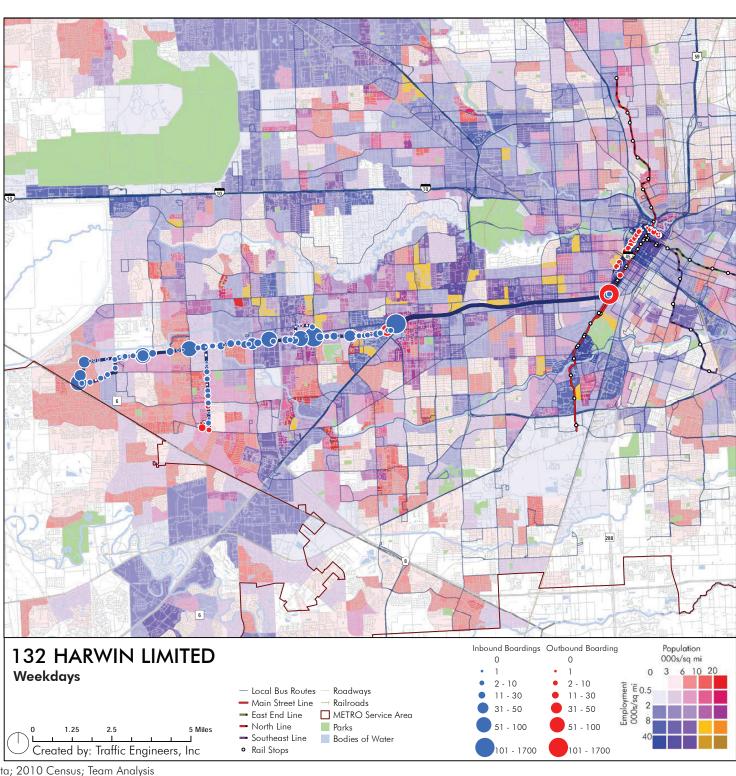
Performance Metrics	Value
Average Speed (Weekday)	16.6 mph
On - Time Performance	74%

#### **Route Strengths:**

- Straightforward route on namesake street.
- Nonstop segment on Southwest Freeway; uses HOV lane in peak direction.

#### **Route Challenges:**







### **214 Northwest Station**

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	5	4:55am - 9:21am
PM Peak	5	2:55pm - 7:29pm
Evening	-	
Saturday	-	-
Sunday	-	-

- Does not serve Northwest TC in nonpeak direction.
- Midday and evening service provided by 219 Northwest Station/West Little York-Pinemont.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	2,334
Boardings per Revenue Mile	1.1
Boardings per Revenue Hour	32.3
Average Fare	\$3.25
Operating Ratio (Fare Revenue/Operating Cost)	53.1%
Average Subsidy per Boarding	\$6.80

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	30.0 mph
On - Time Performance	84%

#### **Route Strengths:**

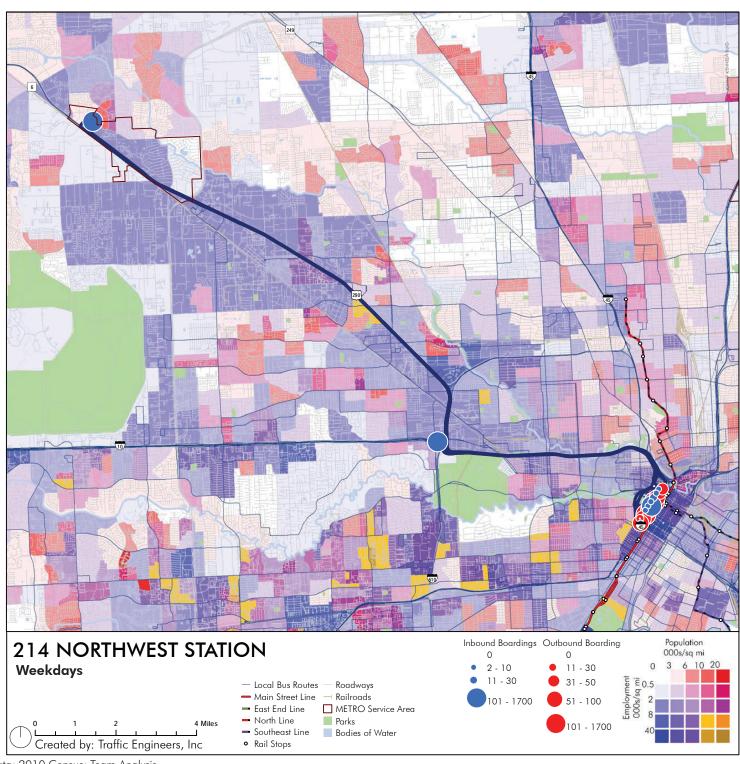
- Serves Downtown.
- Uses Northwest Freeway HOT lane in peak direction.

#### **Route Challenges:**

- Route name is confusing: Northwest Station/Northwest TC.
- No local bus connections at Park & Ride. 40

# Transit System Reimagining Going Places





### **216 West Little York-Pinemont**

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	15	5:20am - 9:24am 3:10pm - 7:15pm
PM Peak	15	
Evening	-	
Saturday	-	-
Sunday	-	-

- Does not serve Northwest TC in nonpeak direction.
- Midday and evening service provided by 219 Northwest Station/West Little York-Pinemont.
- Some PM peak trips also serve Northwest Station P&R.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	687
Boardings per Revenue Mile	0.9
Boardings per Revenue Hour	21.7
Average Fare	\$2.59
Operating Ratio (Fare Revenue/Operating Cost)	30.7%
Average Subsidy per Boarding	\$11.31

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	25.5 mph
On - Time Performance	84%

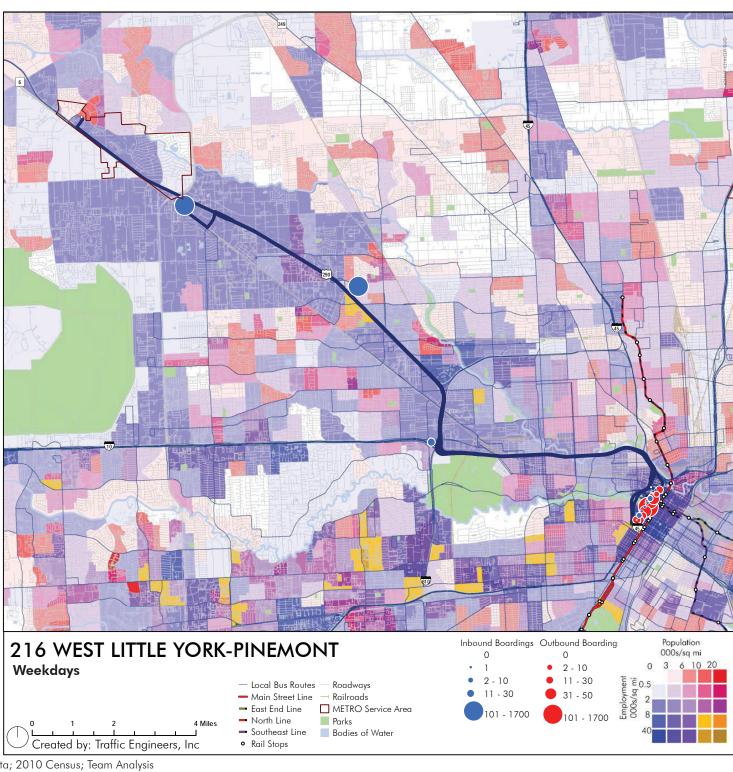
#### **Route Strengths:**

- Serves Downtown.
- Uses Northwest Freeway HOT lane in peak direction.

#### **Route Challenges:**

• TxDOT eliminating direct connector between Pinemont Park & Ride and HOT lane in January, 2014.

### Transit System Reimagining Going Places





### 217 Cypress

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	6	5:00am - 8:58am
PM Peak	5	3:05pm - 7:55pm
Evening	-	
Saturday	-	-
Sunday	-	-

• Does not serve Northwest TC in nonpeak direction.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	1,502
Boardings per Revenue Mile	0.9
Boardings per Revenue Hour	29.9
Average Fare	\$3.88
Operating Ratio (Fare Revenue/Operating Cost)	49.1%
Average Subsidy per Boarding	\$9.07

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	32.9 mph
On - Time Performance	83%

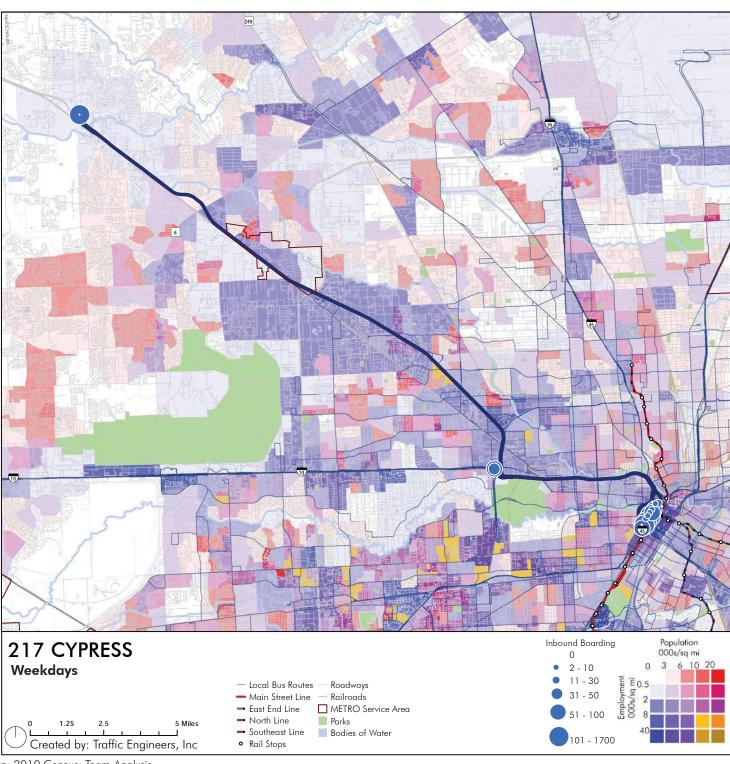
#### **Route Strengths:**

- Serves Downtown.
- Uses Northwest Freeway HOT lane in peak direction.

#### **Route Challenges:**

- No midday or evening service.
- No local bus connections at Park & Ride.
- Distance from Downtown restricts number of recycled buses/return trips.

### Transit System Reimagining METRO



### **219 NW Station/WLY/Pinemont**

Service Metrics	Typical Headway (Minutes)	Span
Midday	60	
AM Peak	-	8:00am - 3:47pm
PM Peak	-	7:05pm - 10:32pm
Evening	60	
Saturday	-	-
Sunday	-	-

• Peak service provided by 214 Northwest Station and 216 West Little York-Pinemont.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	257
Boardings per Revenue Mile	0.5
Boardings per Revenue Hour	29.9
Average Fare	\$2.35
Operating Ratio (Fare Revenue/Operating Cost)	31.4%
Average Subsidy per Boarding	\$5.43

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	23.4 mph
On - Time Performance	not available

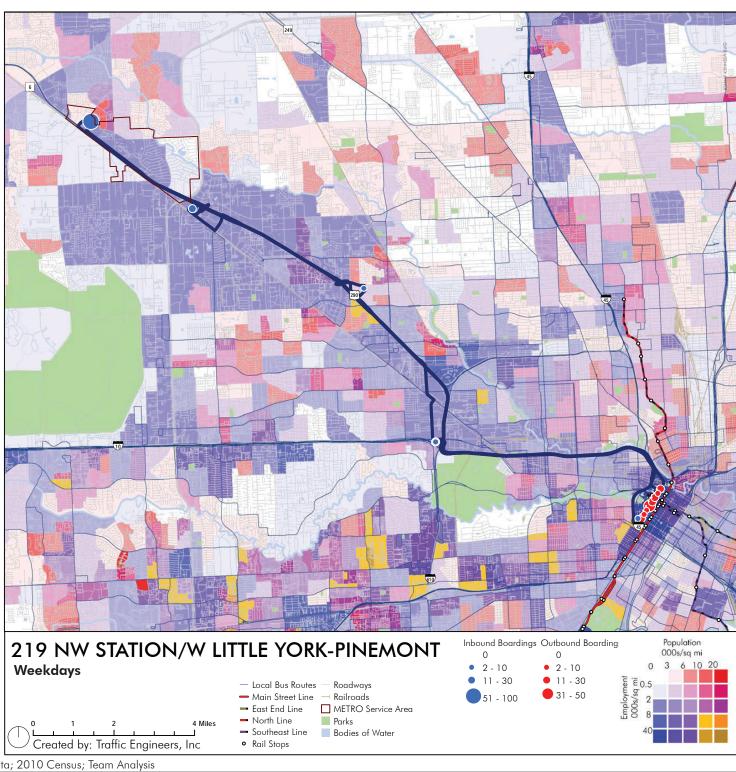
#### **Route Strengths:**

- Serves Downtown.
- Some trips use Northwest Freeway HOT lane.

#### **Route Challenges:**

- No local bus connections at Park & Rides.
- Significant seating capacity available on most trips.







### **221 Kingsland**

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	4	4:30am - 9:25am 3:04pm - 7:22pm
PM Peak	5	
Evening	-	
Saturday	-	-
Sunday	-	-

- Some early morning trips also serve Addicks P&R.
- Midday and evening service provided by 229 Kingsland/Addicks.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	2,307
Boardings per Revenue Mile	0.9
Boardings per Revenue Hour	30.4
Average Fare	\$4.44
Operating Ratio (Fare Revenue/Operating Cost)	54.8%
Average Subsidy per Boarding	\$9.69

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	31.2 mph
On - Time Performance	80%

#### **Route Strengths:**

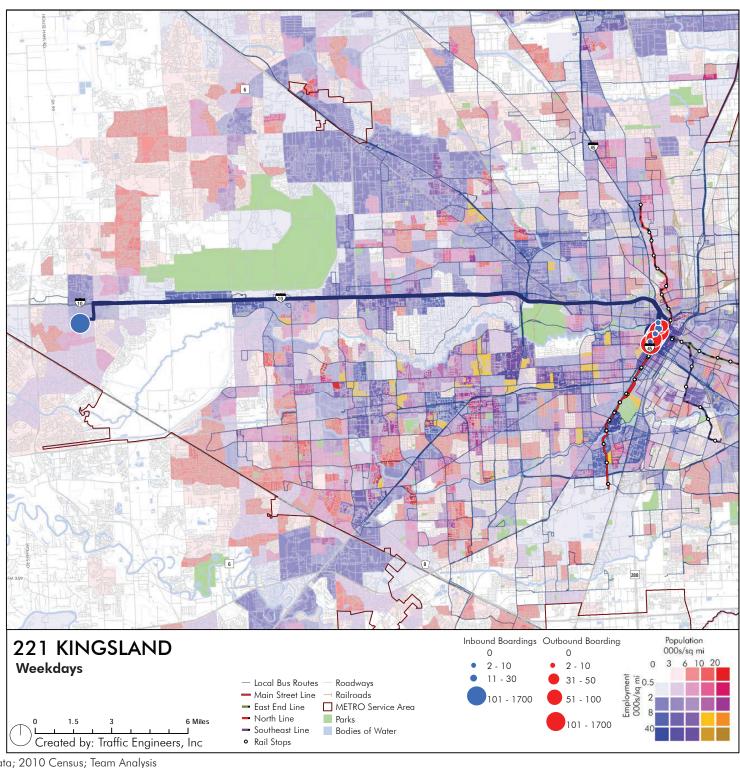
- Serves Downtown.
- Utilizes Katy Freeway managed lanes.

#### **Route Challenges:**

- No local bus connection at Park & Ride.
- Parking lot is capacity constrained.

### Transit System Reimagining METRO





### **222 Grand Parkway**

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	10	5:30am - 9:02am 3:30pm - 7:15pm
PM Peak	10	
Evening	-	
Saturday	-	-
Sunday	-	-

Productivity Metrics (Weekday)	Value
Average Daily Ridership	713
Boardings per Revenue Mile	0.8
Boardings per Revenue Hour	23.3
Average Fare	\$4.15
Operating Ratio (Fare Revenue/Operating Cost)	45.0%
Average Subsidy per Boarding	\$11.13

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	31.4 mph
On - Time Performance	88%

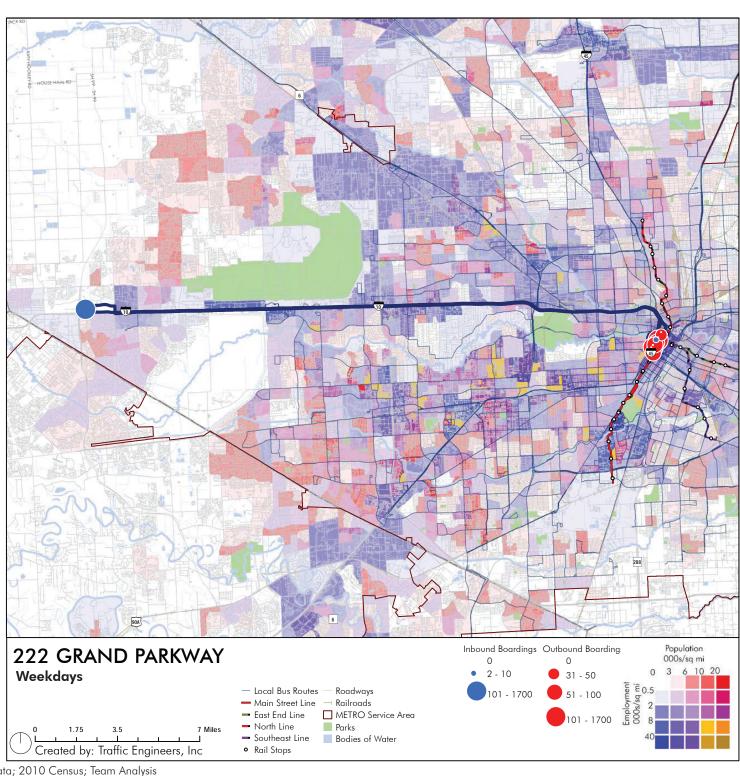
#### **Route Strengths:**

- Serves Downtown.
- Utilizes Katy Freeway managed lanes.

#### **Route Challenges:**

- No midday or evening service.
- No local bus connections at Park & Ride.
- Leased spaces in parking lot; cpacity constrained.

### Transit System Reimagining Going Places





### 228 Addicks

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	6	4:30am - 9:21am
PM Peak	4	3:05pm - 7:07pm
Evening	-	
Saturday	-	-
Sunday	-	-

- A handful of trips serve Northwest TC and Houston Center.
- Midday and evening service provided by 229 Kingsland/Addicks.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	1,960
Boardings per Revenue Mile	1.1
Boardings per Revenue Hour	30.2
Average Fare	\$3.36
Operating Ratio (Fare Revenue/Operating Cost)	44.2%
Average Subsidy per Boarding	\$9.71

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	28.9 mph
On - Time Performance	84%

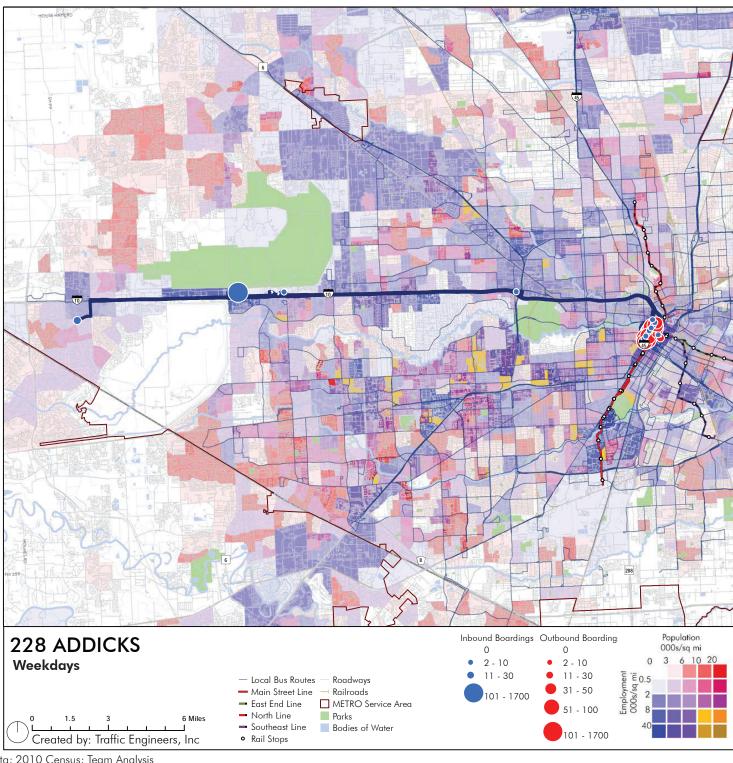
#### **Route Strengths:**

- Serves Downtown.
- Utilizes Katy Freeway managed lanes.
- Local bus connection at Park & Ride.

#### **Route Challenges:**

• Limited access to lot via Park Row.

### Transit System Reimagining METRO



### **229 Kingsland/Addicks**

Service Metrics	Typical Headway (Minutes)	Span
Midday	45	
AM Peak	-	9:00am - 4:00pm 6:50pm - 10:28pm
PM Peak	-	
Evening	60	
Saturday	-	-
Sunday	-	-

• Peak service provided by 221 Kingsland and 228 Addicks.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	468
Boardings per Revenue Mile	0.7
Boardings per Revenue Hour	17.7
Average Fare	\$2.87
Operating Ratio (Fare Revenue/Operating Cost)	47.7%
Average Subsidy per Boarding	\$3.40

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	24.3 mph
On - Time Performance	not available

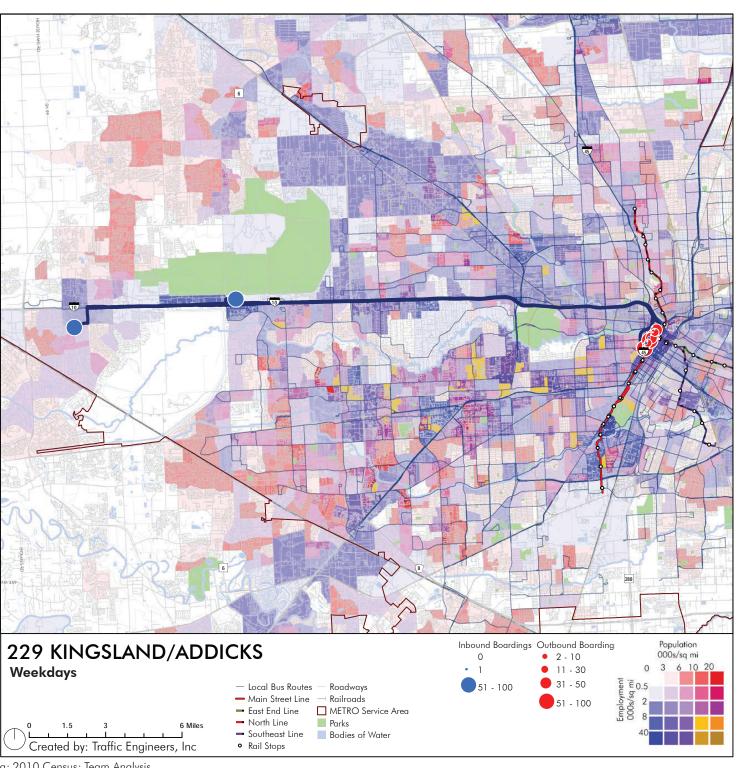
#### **Route Strengths:**

- Serves Downtown.
- Utilizes Katy Freeway managed lanes.
- Local bus connection at Addicks.

#### **Route Challenges:**

• Significant seating capacity available on most trips.







### 274 Westchase/Gessner

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	15	5:48am - 9:07am
PM Peak	15	3:30pm - 7:52pm
Evening	-	
Saturday	-	-
Sunday	-	-

- Trips in the nonpeak direction do not serve Gessner P&R.
- Westchase P&R served in the midday and evening by local routes.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	431
Boardings per Revenue Mile	0.9
Boardings per Revenue Hour	16.9
Average Fare	\$2.74
Operating Ratio (Fare Revenue/Operating Cost)	29.9%
Average Subsidy per Boarding	\$13.77

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	18.4 mph
On - Time Performance	86%

#### **Route Strengths:**

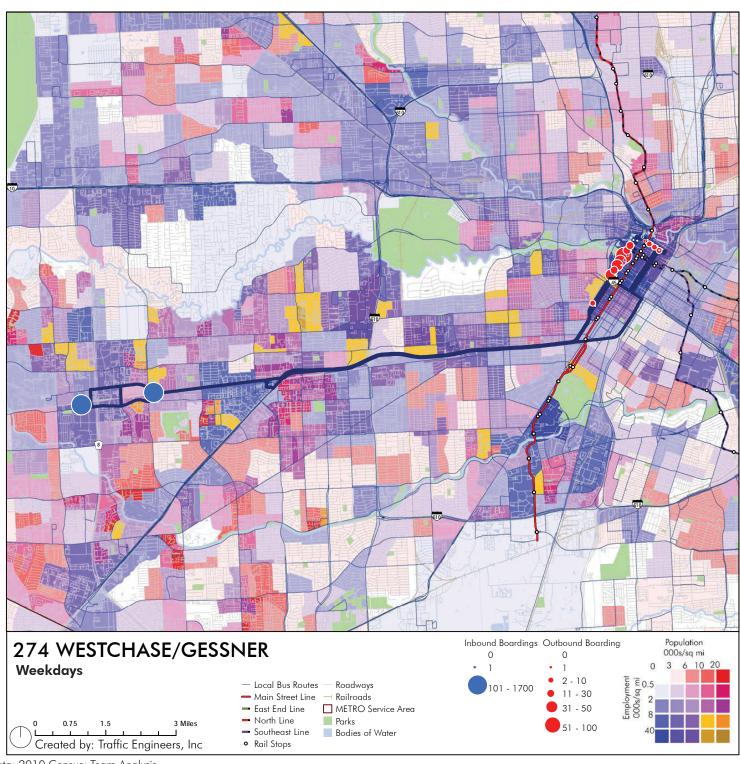
- Serves Downtown.
- Utilizes Southwest Freeway HOV lane in the peak direction.
- Local bus connections at Park & Rides.

#### **Route Challenges:**

• No midday or evening service, though the Westchase lot is served by the 132 Harwin Limited.

### Transit System Reimagining Going Places





### 285 Kingsland/Uptown

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	20	5:45am - 9:08am 3:40pm - 7:14pm
PM Peak	20	
Evening	-	
Saturday	-	-
Sunday	-	-

New route in 2012.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	not available
Boardings per Revenue Mile	not available
Boardings per Revenue Hour	not available
Average Fare	not available
Operating Ratio (Fare Revenue/Operating Cost)	not available
Average Subsidy per Boarding	not available

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	29.1 mph
On - Time Performance	94%

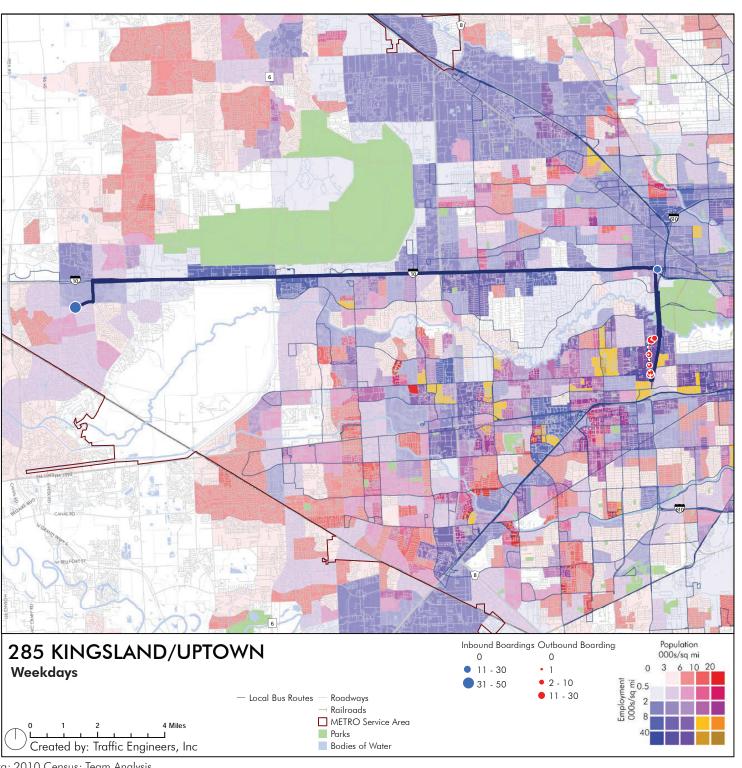
#### **Route Strengths:**

- Serves Uptown.
- Provides connection to other Katy and Northwest corridor services at NWTC.

#### **Route Challenges:**

- No midday or evening service.
- Significant seating capacity available. 42

### Transit System Reimagining METRO





### 298 Kingsland/Addicks/TMC

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	8	5:06am - 9:05am 3:00pm - 8:00pm
PM Peak	8	
Evening	-	
Saturday	-	-
Sunday	-	-

• Does not serve Northwest TC in the nonpeak direction.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	1,117
Boardings per Revenue Mile	0.9
Boardings per Revenue Hour	21.5
Average Fare	\$3.60
Operating Ratio (Fare Revenue/Operating Cost)	36.0%
Average Subsidy per Boarding	\$13.12

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	24.0
On - Time Performance	not available

#### **Route Strengths:**

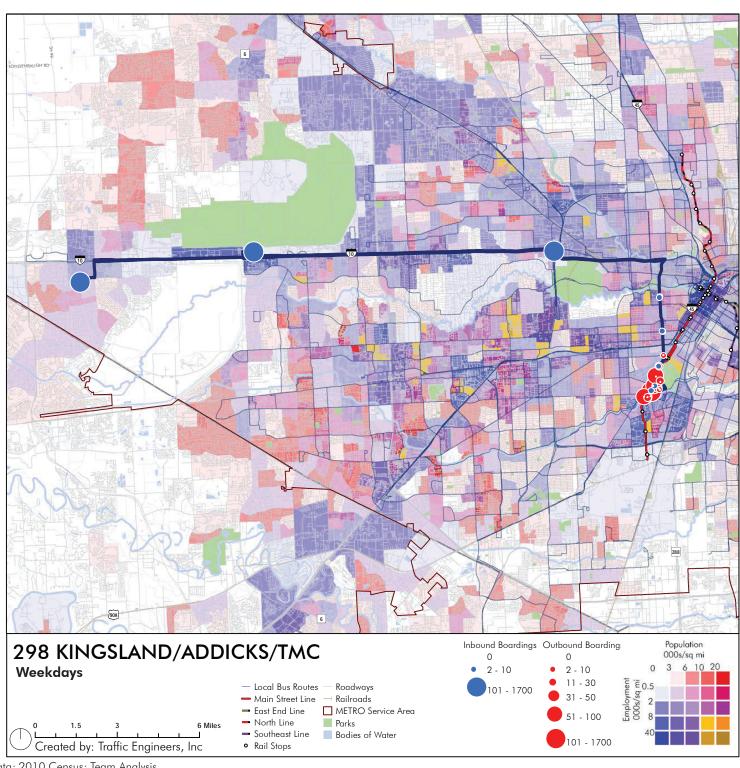
- Serves the Texas Medical Center.
- Utilizes the Katy Freeway managed lanes.
- Provides connection to other Katy and Northwest corridor services at NWTC.

#### **Route Challenges:**

• No midday or evening service.

### Transit System Reimagining METRO





### **402 Quickline Bellaire**

Service Metrics	Typical Headway (Minutes)	Span
Midday	-	
AM Peak	15	6:00am - 9:31am 3:00pm - 6:31pm
PM Peak	15	
Evening	-	
Saturday	-	-
Sunday	-	-

• Local service provided by 2 Bellaire.

Productivity Metrics (Weekday)	Value
Average Daily Ridership	719
Boardings per Revenue Mile	1.5
Boardings per Revenue Hour	20.4
Average Fare	\$0.49
Operating Ratio (Fare Revenue/Operating Cost)	6.3%
Average Subsidy per Boarding	\$9.69

Productivity Metrics (Weekend)	Value
Saturday Boardings per Revenue Hour	-
Sunday Boardings per Revenue Hour	-

Performance Metrics	Value
Average Speed (Weekday)	13.3 mph
On - Time Performance	75%

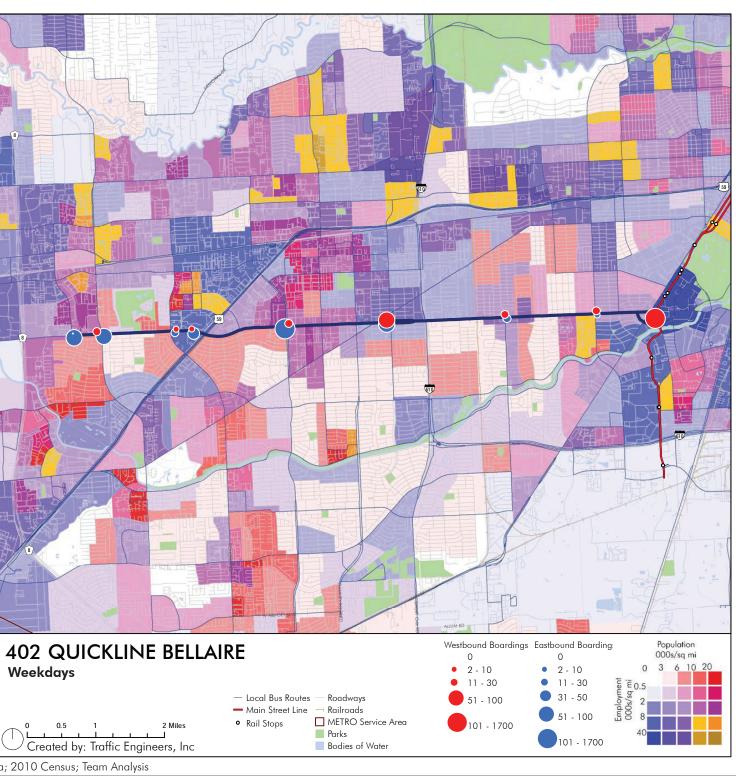
#### **Route Strengths:**

- Serves the Texas Medical Center and connects to the Red Line at TMC TC.
- Limited stop service.<sup>45</sup>
- Upgraded vehicles and stations.

#### **Route Challenges:**

- No midday, evening, or weekend service.
- Real-time arrival displays are unreliable.









# APPENDIX D METRO NEW BUS NETWORK ROUTES

PROPOSED ROUTES AS OF OCTOBER 2014
ROUTES AND ROUTE NUMBERS CURRENTLY IN USE MAY DIFFER



### 2 Bellaire

#### **Frequent Network**

#### **Mission Bend P&R to TMC TC:**

Peak Headway	Base Headway	Span
10	15	20
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

TMC

#### **Rail Line Connections:**

• TMC Transit Center Station (Red)

#### **Frequent Network Connections:**

• 4 Beechnut, 27 Shepherd, 33 Post Oak, 46 Gessner, 56 Airline/Montrose, 63 Fondren, 65 Bissonnet

#### **Transit Center and Park & Ride Connections:**

Mission Bend P&R, Bellaire TC, TMC TC

#### **Eastbound Route:**

- Mission Bend P&R, R Metro, L Bellaire, Bellaire TC, S Holcombe, R Fannin, R TMC TC **Westbound Route:**
- TMC TC, R Pressler, L Holcombe, S Bellaire, Bellaire TC, R Metro, L Mission Bend P&R **Proposed Equipment:**
- 60' transit bus as fleet allows or 40' transit bus

### 2 Bellaire Base Headway Half Mile Access Red Line Transit Center **1**0, 12, or 15 minutes ● Park & Ride Green Line = 30 minutes • Quickline Stop Purple Line = 60 minutes 4 Miles Peak Only Rail Station --- Railroads

Transit System Reimagining Going Places

Base headway includes weekday middays and weekends. Evening headway is 20 minutes. Span is consistent seven days a week.

### 4 Beechnut

#### **Frequent Network**

#### **Mission Bend P&R to Eastwood TC:**

Peak Headway	Base Headway	Span
10	15	20
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

TMC

#### **Rail Line Connections:**

• TMC Transit Center Station (Red)

#### **Frequent Network Connections:**

• 2 Bellaire, 25 Richmond, 27 Shepherd, 40 Heights/Telephone/41 Kirby Polk, 46 Gessner, 50 Broadway, 54 Scott, 56 Airline/Montrose, 63 Fondren, 65 Bissonnet, 80 MLK/Lockwood

#### **Transit Center and Park & Ride Connections:**

Mission Bend P&R, TMC TC

#### **Eastbound Route:**

 Mission Bend P&R, L Metro, L Alief Clodine, L Sugarland Howell, R Bellaire, L Pavilion, L Pavilion Point, R Sugarland Howell, L Beechnut, S N Braeswood, L S Main, R Pressler, L TMC TC, L Pressler, L Bertner, R Moursund, L S MacGregor, L Ardmore, L N Macgregor, R Ennis, R Cleburne, L Scott, R Holman, L Cullen, R Elgin, R Eastwood TC

#### **Westbound Route:**

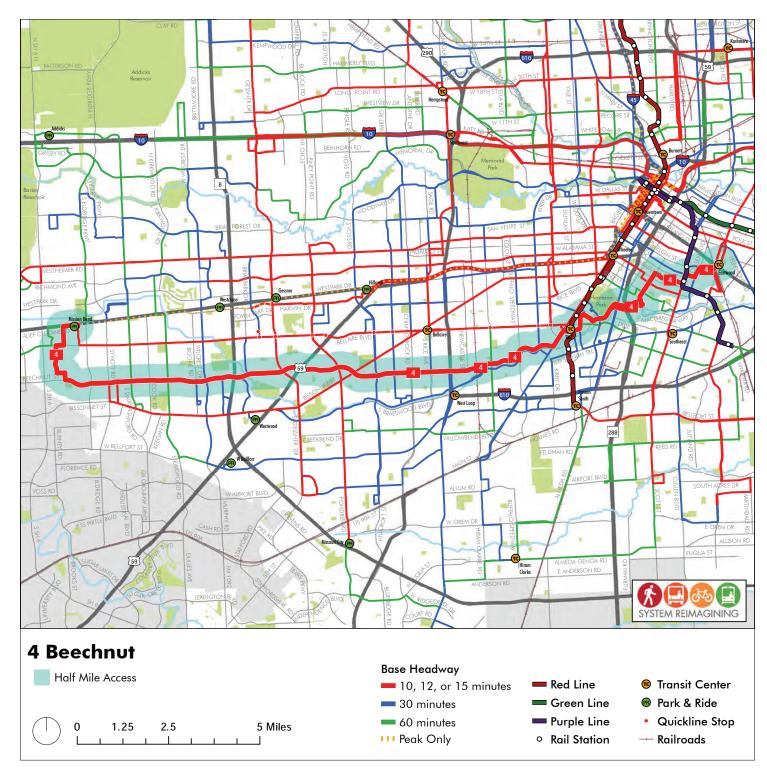
 Eastwood TC, L Elgin, L Cullen, R Holman, L Scott, R Cleburne, L Ennis, R N MacGregor, R Moursund, L Bertner, R Pressler, R TMC TC, R Pressler, L S Main, R N Braeswood, S Beechnut, R Sugarland Howell, L Pavilion Point, R Pavilion, R Bellaire, L Sugarland Howell, R Alief Clodine, R Mission Bend P&R

#### **Proposed Equipment:**

• 60' transit bus as fleet allows or 40' transit bus

Base headway includes weekday middays and weekends. Evening headway is 30 minutes. Span is consistent seven days a week.

### Transit System Reimagining METRO





#### **REVISED - Elgin Deviation**

### 9 Gulfton/Holman

#### **Sharpstown to Eastwood TC:**

Peak Headway	Base Headway	Span
15	30	18
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

Greenway Plaza, UH

#### **Rail Line Connections:**

• Ensemble/HCC Station (Red), Robertson Stadium/UH/TSU Station (Purple)

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 25 Richmond, 27 Shepherd, 33 Post Oak, 50 Broadway, 54 Scott, 63 Fondren, 82 Westheimer, 80 MLK/Lockwood, 152/153 Harwin Flyer

#### **Transit Center and Park & Ride Connections:**

Eastwood TC

#### **Eastbound Route:**

• Bonhomme & Clarewood, R Clarewood, L Fondren, L Bellaire, L Rookin, R High Star, L Hillcroft, R Gulfton, L West Loop frontage, R Westpark, L Kirby, R Southwest Freeway frontage, enter ramp after Shepherd, Exit Spur 527, Exit Louisiana, R Elgin, R Milam, L Holman, L Crawford, R Elgin, R Dowling, L Holman, L Cullen, R Elgin, S Lockwood, R Eastwood TC

#### **Westbound Route:**

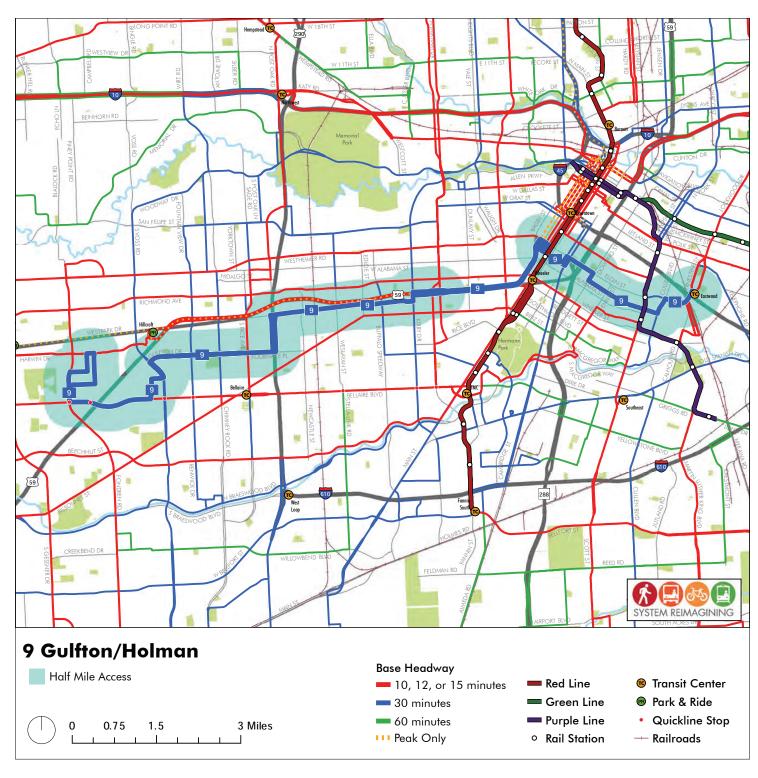
• Eastwood TC, L Munger, L Maplewood, S Elgin, L Cullen, R Holman, R Dowling, L Elgin, L LaBranch, R Holman, R Travis, L Elgin, L Smith, S Spur 527, S Southwest Freeway, Exit Shepherd, S Southwest Freeway frontage, L Kirby, R Westpark, L West Loop frontage, R Gulfton, L Hillcroft, R High Star, L Rookin, R Bellaire, R Fondren, R Bellerive, L Reims, R Harwin, R Bonhomme, Bonhomme & Clarewood

#### **Proposed Equipment:**

• 40' transit bus

Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.





### 23 Clay - West 43rd

#### **West Belt to Northline TC:**

Peak Headway	Base Headway	Span
30	60	14
Minutes	Minutes	Hours (approx.)

#### **Rail Line Connections:**

Northline Transit Center/HCC Station (Red)

#### **Frequent Network Connections:**

• 45 Tidwell West, 27 Shepherd, 46 Gessner, 56 Airline/Montrose, 85 Antoine/ Washington

#### **Transit Center and Park & Ride Connections:**

Northline TC/HCC

#### **Eastbound Route:**

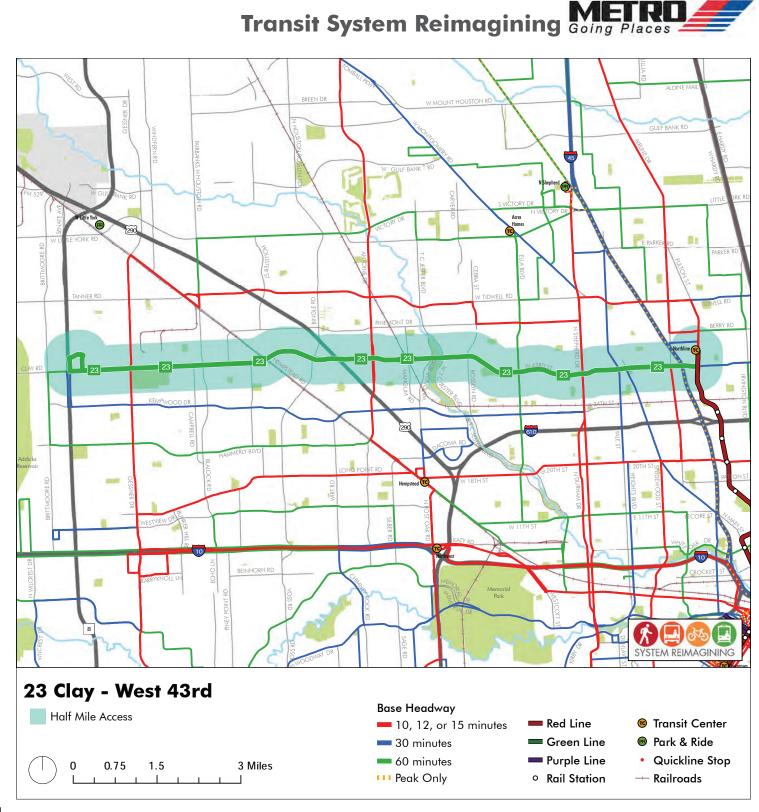
• Westway Park & Clay, L Clay, S 43rd, S Crosstimbers, L Fulton, L Northline TC

#### **Westbound Route:**

• Northline TC, R Fulton, R Crosstimbers, S 43rd, S Clay, R West Belt frontage, R Capital Park, R Westway Park, Westway Park & Clay

#### **Proposed Equipment:**

• 40' transit bus



Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.



#### **REVISED - Wheeler Station to Blodgett Routing**

### 25 Richmond

#### Frequent Network

#### **Eastwood TC Westchase:**

Peak Headway	Base Headway	Span
10	15	20
Minutes	Minutes	Hours (approx.)

#### Westchase to Mission Bend P&R:

Peak Headway	Base Headway	Span
20	30	18
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

Westchase, Uptown/Galleria, Greenway Plaza, UH, TSU

#### **Rail Line Connections:**

• Wheeler Station (Red), UH South/University Oaks Station (Purple)

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 27 Shepherd, 33 Post Oak, 40 Heights/Telephone/41 Kirby Polk, 46 Gessner, 50 Broadway, 54 Scott, 56 Airline/Montrose, 63 Fondren, 65 Bissonnet, 80 MLK/Lockwood, 82 Westheimer

#### **Transit Center and Park & Ride Connections:**

Mission Bend P&R, Wheeler TC, Eastwood TC

#### **Westbound Route:**

• Eastwood TC, L Lockwood, L Spur 5, R University, L Calhoun, R Wheeler, L Scott, R Blodgett, R Live Oak, L Wheeler, L Wheeler TC, R Fannin, R Blodgett, R Main, L Richmond, (short line: R Walnut Bend, L Meadowglen, Meadowglen & Wilcrest), L Dairy Ashford, R Ashford Point, L Synott, R Alief Clodine, L Metro, R Mission Bend P&R

#### **Eastbound Route:**

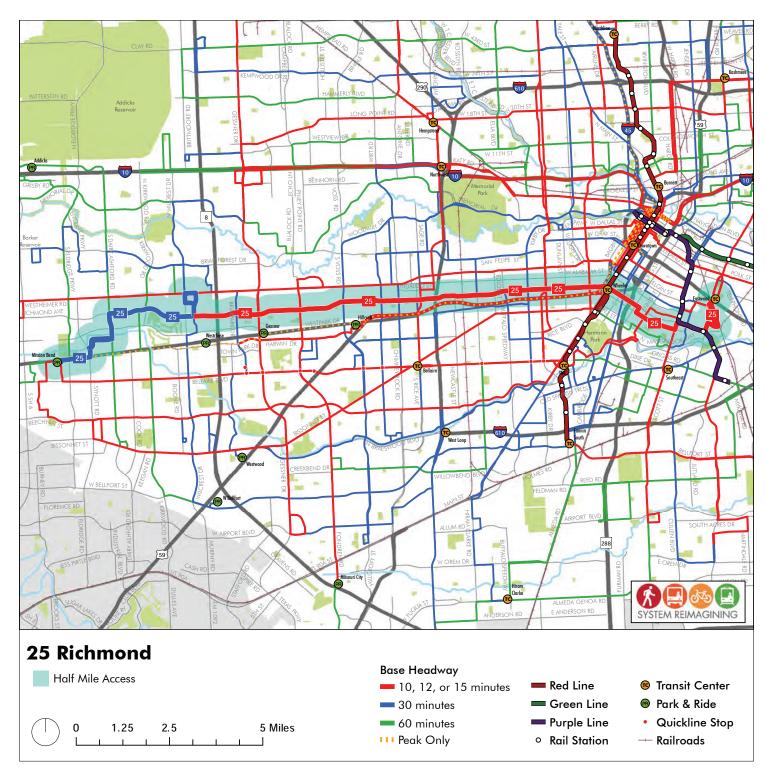
• Mission Bend P&R, R Alief Clodine, L Synott, R Ashford Point, L Dairy Ashford, R Richmond (short line: Meadowglen & Wilcrest, R Wilcrest, R Westheimer, R Walnut Bend, L Richmond), S Wheeler, R Live Oak, L Blodgett, L Scott, R Wheeler, L Calhoun, R University, L Spur 5, R Lockwood, R Eastwood TC

#### **Proposed Equipment:**

60' transit bus as fleet allows or 40' transit bus

Base headway includes weekday middays and weekends. Evening headway is 30 minutes. Span is consistent seven days a week.







### 26 Long Point/Cavalcade

#### **Frequent Network**

#### **Memorial City to Kashmere TC:**

Peak Headway	Base Headway	Span
15	15	18
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

Memorial City

#### **Rail Line Connections:**

• Cavalcade Station (Red)

#### **Frequent Network Connections:**

• 33 Post Oak, 27 Shepherd, 46 Gessner, 51/52 Hardy, 56 Airline/Montrose, 80 MLK/ Lockwood, 85 Antoine/Washington, 160s Memorial City Flyer

#### **Transit Center and Park & Ride Connections:**

• Hempstead Mini Terminal, Kashmere TC

#### **Eastbound Route:**

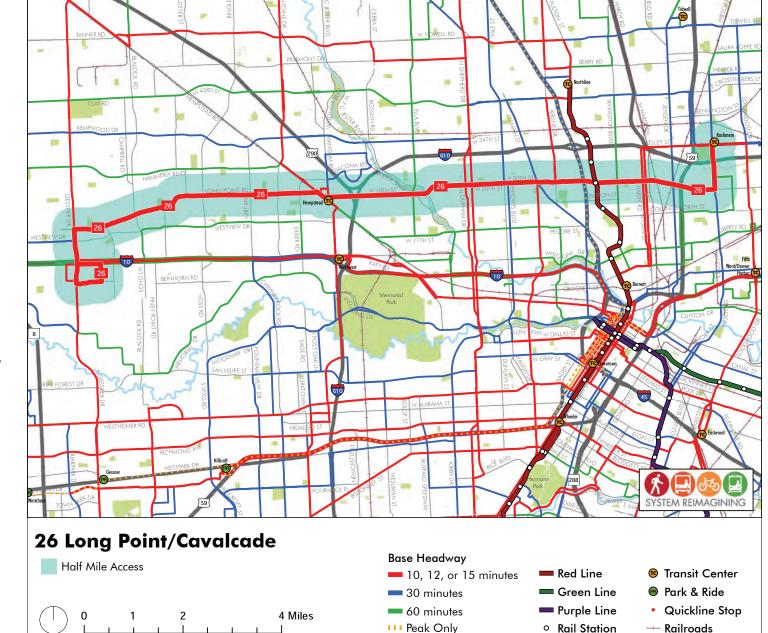
 Memorial City & Gaylord, R Barryknoll, R Gessner, R Long Point, R Hempstead, L 18th, S 20th, S Cavalcade, L Hirsch, R Kashmere TC

#### **Westbound Route:**

 Kashmere TC, L Hirsch, R Cavalcade, S 20th, S 18th, R Hempstead, L Long Point, L Gessner, L Katy Freeway frontage, R Memorial City, Memorial City & Gaylord

#### **Proposed Equipment:**

• 40' transit bus



Transit System Reimagining Going Places

Base headway includes weekday middays and weekends. Evening headway is 30 minutes. Span is consistent seven days a week.



### 36 Kempwood

#### **West Belt to Northline TC:**

Peak Headway	Base Headway	Span
15	30	18
Minutes	Minutes	Hours (approx.)

#### **Rail Line Connections:**

Northline Transit Center/HCC Station (Red)

#### **Frequent Network Connections:**

• 27 Shepherd, 45 Tidwell West, 46 Gessner, 56 Airline/Montrose, 85 Antoine/ Washington

#### **Transit Center and Park & Ride Connections:**

Northline TC

#### **Eastbound Route:**

• Westway Park & Clay, R Clay, L West Belt frontage, L Kempwood, S 34th, L Shepherd, R Crosstimbers, L IH 45 Frontage, R Lyerly, Lyerly & Fulton

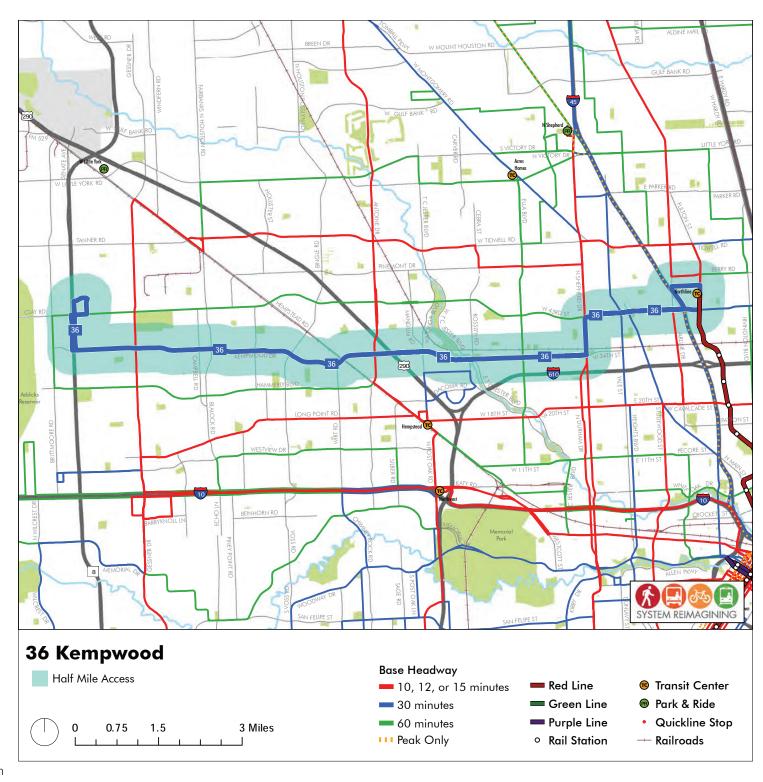
• Lyerly & Fulton, R Fulton, R Crosstimbers, L Shepherd, R 34th, S Kempwood, R West Belt frontage, R Capital Park, R Westway Park, Westway Park & Clay

#### **Proposed Equipment:**

• 40' transit bus

### Transit System Reimagining METRO





Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.

### **39 Katy Freeway**

#### **Sherwood Forest to Northwest TC:**

Peak Headway	Base Headway	Span
30	60	14
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

Memorial City

#### **Frequent Network Connections:**

 26 Long Point/Cavalcade, 33 Post Oak, 46 Gessner, 85 Antoine/Washington, 160s Memorial City Flyer

#### **Transit Center and Park & Ride Connections:**

Northwest TC

#### **Eastbound Route:**

 Sherwood Forest & Chatterton, R Katy Fwy frontage, U turn Kirkwood, L N Post Oak, R Old Katy, R Nowthwest TC

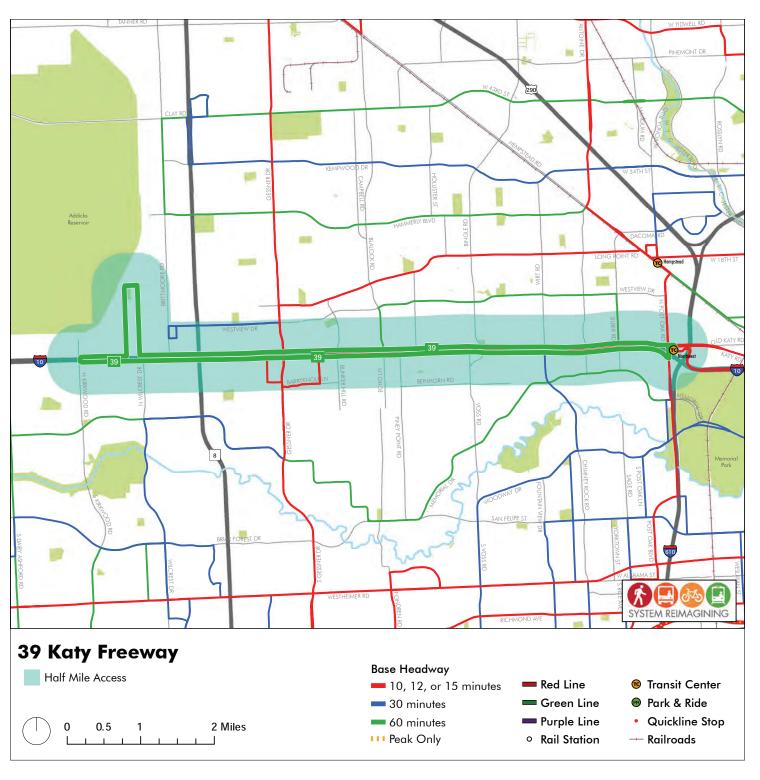
#### **Westbound Route:**

 Northwest TC, L Old Katy, S Katy Fwy frontage, R Upland, L Chatterton, L Sherwood Forest, Sherwood Forest & Chatterton

#### **Proposed Equipment:**

• 40' transit bus or 25' ARBOC bus

### Transit System Reimagining METRO



Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.



### 43 Kirkwood

#### **West Bellfort P&R to Briar Forest:**

Peak Headway	Base Headway	Span
30	60	14
Minutes	Minutes	Hours (approx.)

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 65 Bissonnet, 82 Westheimer

#### **Transit Center and Park & Ride Connections:**

W Bellfort P&R

#### **Northbound Route:**

• W Bellfort P&R, L Roark, R Bellfort, R Kirkwood, L Harwin, R W Houston Center, R Richmond, L Kirkwood, R Briar Forest, R Wilcrest, R Westheimer, R Hayes, Hayes & Westheimer

#### **Southbound Route:**

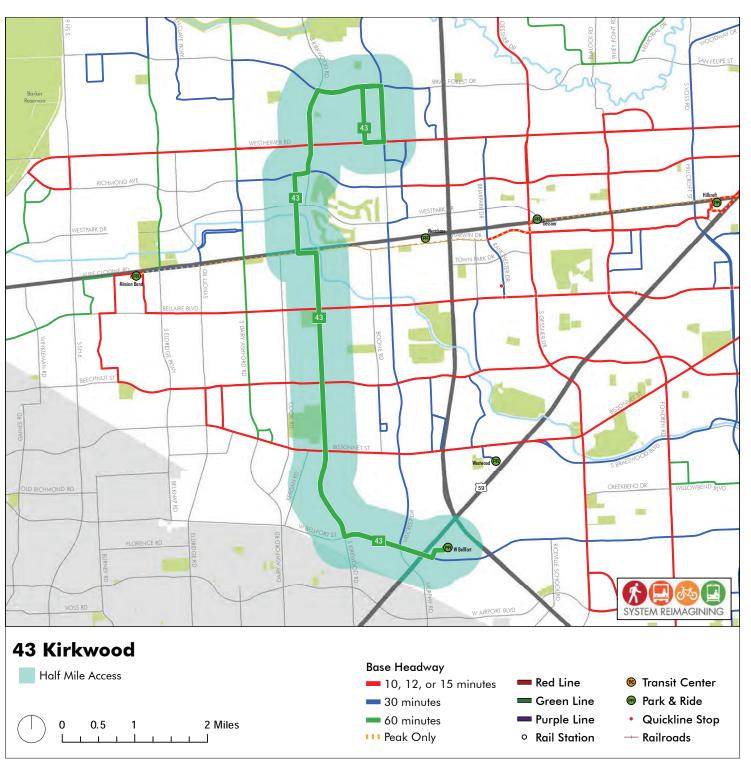
• Hayes & Westheimer, L Briar Forest, L Kirkwood, R Richmond, L W Houston Center, L Harwin, R Kirkwood, L Bellfort, L Roark, R W Bellfort P&R

#### **Proposed Equipment:**

• 25' Arboc bus

### Transit System Reimagining Going Places





Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.



### **46 Gessner**

#### **Frequent Network**

#### **West Airport to Tidwell:**

Peak Headway	Base Headway	Span
12	15	18
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

• Westchase, Memorial City

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 25 Richmond, 26 Long Point/Cavalcade, 45 Tidwell West, 65 Bissonnet, 82 Westheimer, 152/153 Harwin Flyer, 160s Memorial City Flyer

#### **Transit Center and Park & Ride Connections:**

Gessner P&R

#### **Northbound Route:**

 Fondren Meadow & Gessner, R Airport, R Gessner, R Hempstead, L Tidwell, R Fairbanks N Houston, Fairbanks N Houston & Tidwell

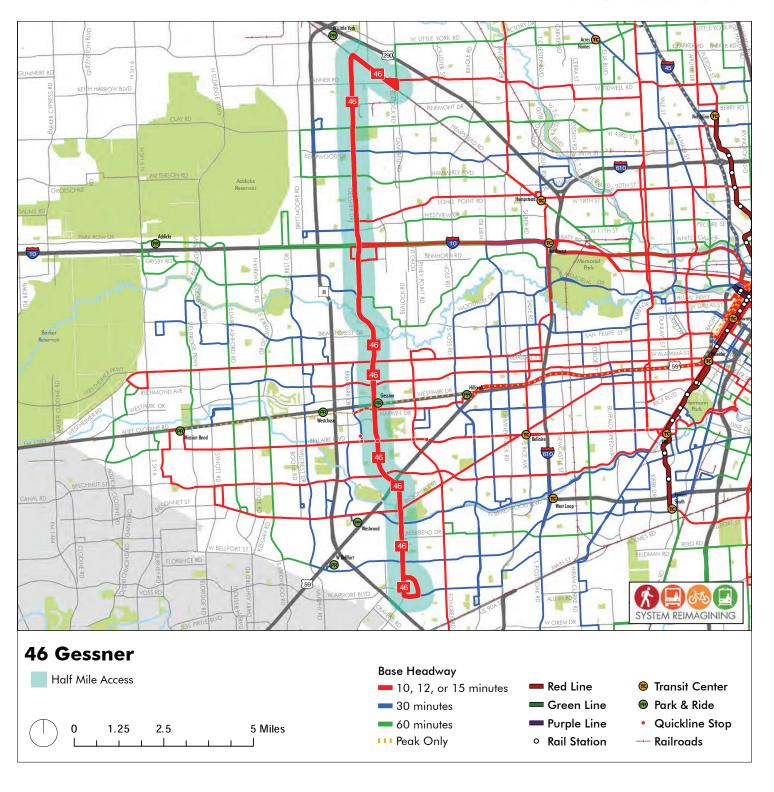
#### **Southbound Route:**

• Fairbanks N Houston & Tidwell, R Hempstead, L Gessner, L Fondren Meadow, Fondren Meadow & Gessner

#### **Proposed Equipment:**

• 60' transit bus as fleet allows or 40' transit bus

Base headway includes weekday middays and weekends. Evening headway is 30 minutes. Span is consistent seven days a week.





### **58 Hammerly**

#### **West Belt to Northwest TC:**

Peak Headway	Base Headway	Span
30	60	14
Minutes	Minutes	Hours (approx.)

#### **Frequent Network Connections:**

• 26 Long Point/Cavalcade, 33 Post Oak, 46 Gessner, 85 Antoine/Washington, 160s Memorial City Flyer

#### **Transit Center and Park & Ride Connections:**

Hempstead Mini Terminal, Northwest TC

#### **Eastbound Route:**

• Westway Park & Clay, R Clay, L Brittmore, L Hammerly, R Hempstead, R N Post Oak, L Old Katy, R Northwest TC

#### **Westbound Route:**

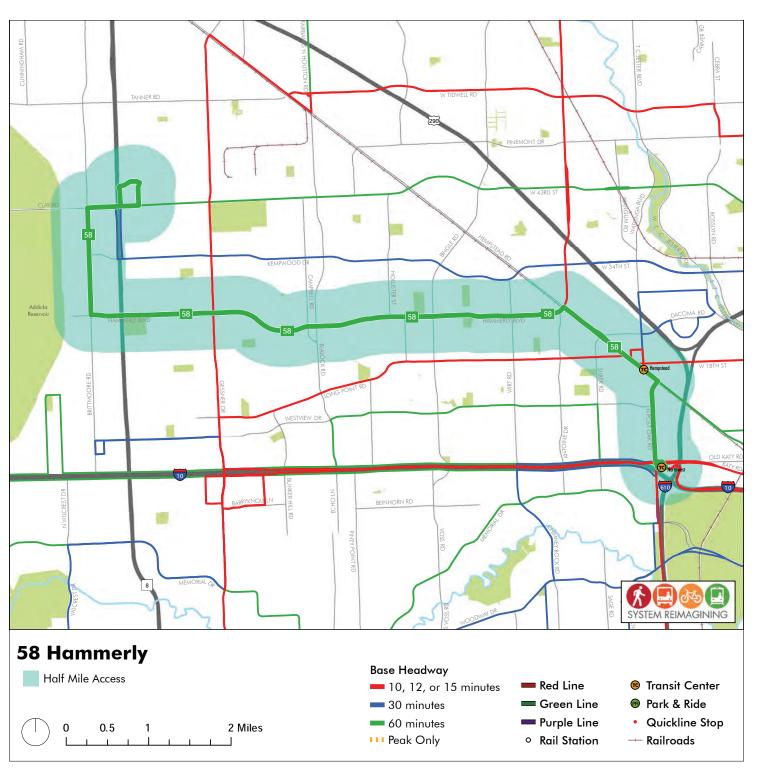
• Northwest TC, L Old Katy, R N Post Oak, L Hempstead, L Hammerly, R Brittmore, R Clay, L West Belt frontage, R Capital Park, R Westway Park, Westway Park & Clay

#### **Proposed Equipment:**

• 40' transit bus

### Transit System Reimagining Going Places





Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.

### **63 Fondren**

#### **Frequent Network**

#### **Missouri City P&R to Westheimer:**

Peak Headway	Base Headway	Span
15	15	20
Minutes	Minutes	Hours (approx.)

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 25 Richmond, 65 Bissonnet, 82 Westheimer, 152/153 Harwin Flyer

#### Transit Center and Park & Ride Connections:

Missouri City P&R

#### **Northbound Route:**

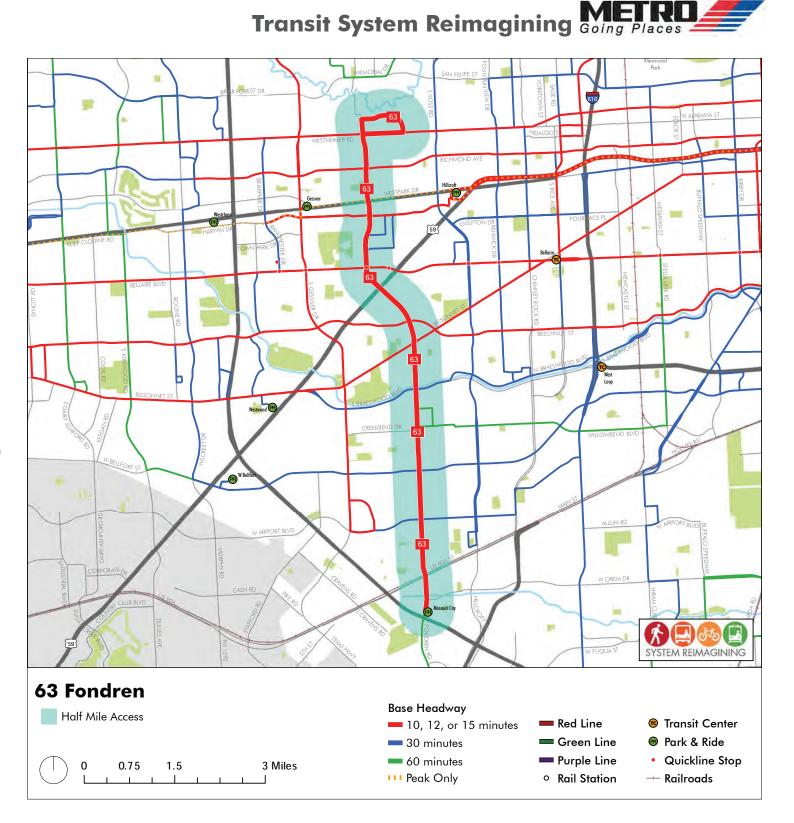
• Missouri City P&R, R Fondren, R Woodway, Woodway & Westheimer

#### **Southbound Route:**

• Woodway & Westheimer, R Westheimer, L Fondren, L Missouri City P&R

#### **Proposed Equipment:**

• 60' transit bus as fleet allows or 40' transit bus



Base headway includes weekday middays and weekends. Evening headway is 30 minutes. Span is consistent seven days a week.



### **67 Dairy Ashford**

#### **Addicks P&R to Bissonnet:**

Peak Headway	Base Headway	Span
30	60	14
Minutes	Minutes	Hours (approx.)

Extension to Addicks P&R pending completion of Park Row.

#### **Activity Centers:**

Energy Corridor

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 65 Bissonnet, 82 Westheimer

#### **Transit Center and Park & Ride Connections:**

Addicks P&R

#### **North Route:**

- Dairy View & Bissonnet, R Bissonnet, R Dairy Ashford, S Park Row, L Addicks P&R
- Interim layover at Barryknoll & Dairy Ashford pending completion of Park Row.

#### **Southbound Route:**

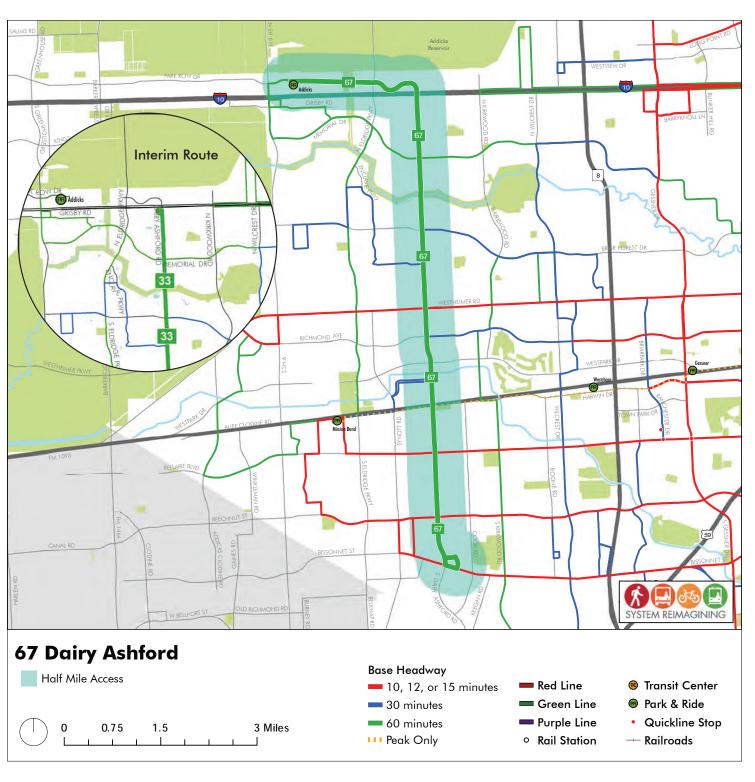
• Addicks P&R, R Park Row, S Dairy Ashford, L Brookglade, R Dairy View, Dairy View &

#### **Proposed Equipment:**

• 40' transit bus

### Transit System Reimagining Going Places





Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.

### **70** Memorial

#### **Brittmoore to Northwest TC:**

Peak Headway	Base Headway	Span
30	60	14
Minutes	Minutes	Hours (approx.)

Continues to/from 72 Westview.

Coordinated with 72 Westview to provide higher frequency between Brittmoore and Gessner.

#### **Activity Centers:**

• Uptown, Memorial City

#### **Frequent Network Connections:**

• 26 Long Point/Cavalcade, 33 Post Oak, 46 Gessner, 85 Antoine/Washington, 160s Memorial City Flyer

#### **Transit Center and Park & Ride Connections:**

Northwest TC

#### **Eastbound Route:**

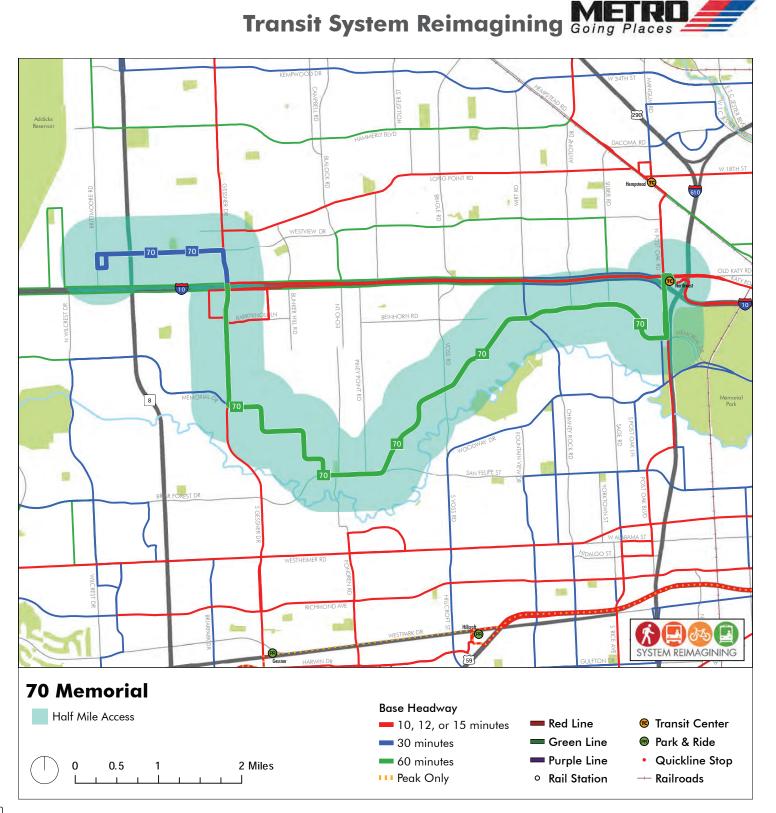
 Business Center & Westview Circle, R Westview Circle, R Brittmoore, R Westview, R Gessner, L Memorial, L N Post Oak, R Old Katy, R Northwest TC

#### **Westbound Route:**

 Northwest TC, L Old Katy, L N Post Oak, R Memorial, R Gessner, L Westview, L Business Center, Business Center & Westview

#### **Proposed Equipment:**

• 40' transit bus



Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.



#### **REVISED - Span**

### **72 Westview**

#### **Memorial City to Northwest TC:**

Peak Headway	Base Headway	Span
30	60	15
Minutes	Minutes	Hours (approx.)

Continues to/from 70 Memorial.

Coordinated with 70 Memorial to provide higher frequency between Brittmoore and Gessner.

#### **Activity Centers:**

Memorial City

#### **Frequent Network Connections:**

• 26 Long Point/Cavalcade, 33 Post Oak, 46 Gessner, 85 Antoine/Washington, 160s Memorial City Flyer

#### **Transit Center and Park & Ride Connections:**

Northwest TC

#### **Eastbound Route:**

• Business Center & Westview Circle, R Westview Circle, R Brittmoore, R Westview, R Gessner, L Katy Fwy Frontage, U turn Campbell, R Blalock, R Westview, R Silber, L Katy Fwy frontage, L N Post Oak, R Old Katy, R Northwest TC

#### **Westbound Route:**

• Northwest TC, L Old Katy, S Katy Fwy frontage, R Silber, L Westview, L Blalock, R Katy Fwy frontage, R Gessner, L Westview, L Business Center, Business Center & Westview Circle

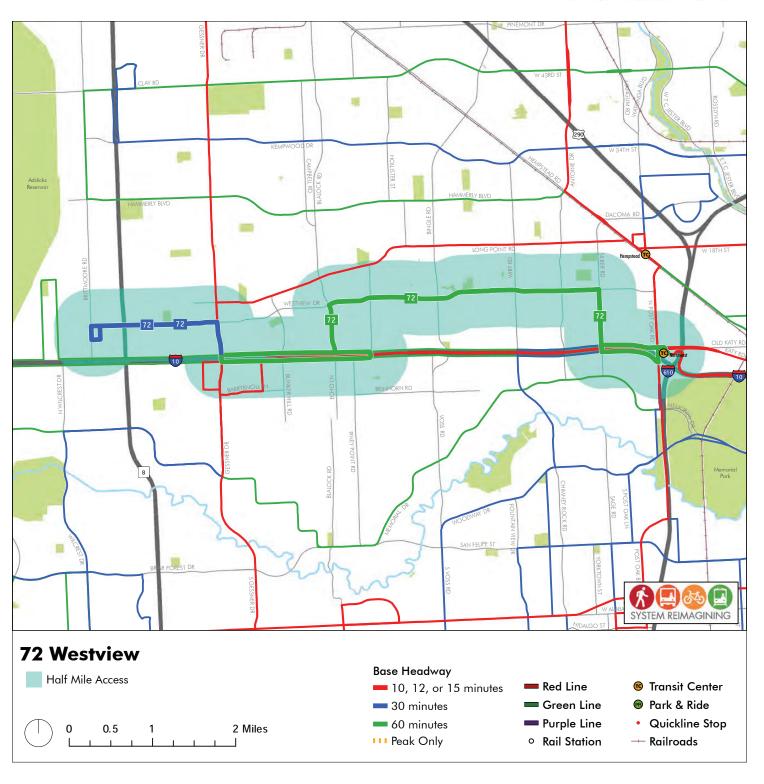
#### **Proposed Equipment:**

• 40' transit bus

days a week.

Base headway includes weekday middays, weekends, and evenings. Span is consistent seven







### 75 Eldridge

#### Addicks P&R to West Oaks Mall:

Peak Headway	Base Headway	Span
30	60	14
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

Energy Corridor

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 82 Westheimer

#### **Transit Center and Park & Ride Connections:**

• Mission Bend P&R, Addicks P&R

#### **Northbound Route:**

 Richmond & S Richmond, L Green Crest, R Westpark, L Addicks Clodine, L Bellaire, L Tres Lagunas, L Sierra Blanca, R Alief Clodine, R Mission Bend P&R, L Metro, R Alief Clodine, L Eldridge, L Memorial, R Hwy 6, R Park Row, R Addicks P&R

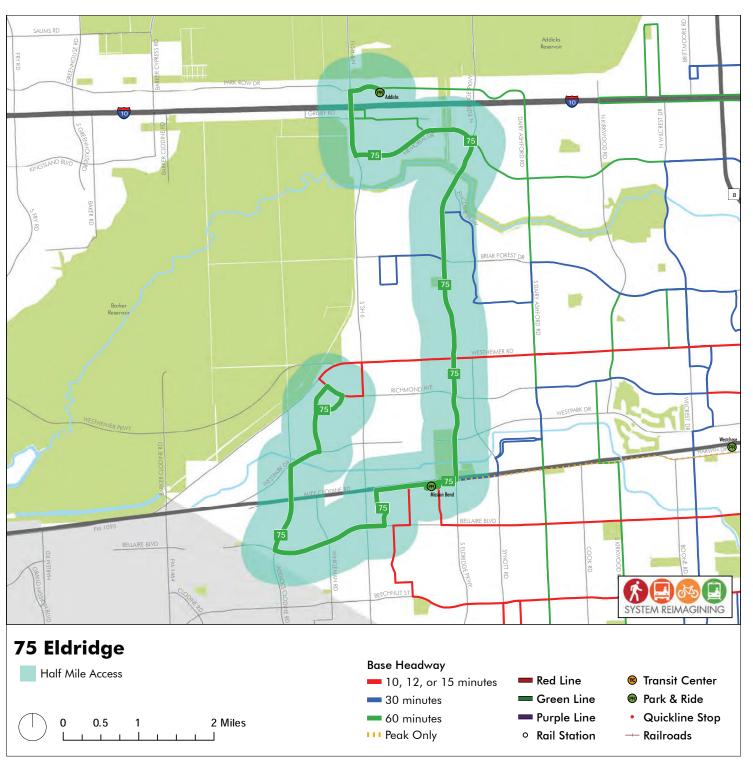
#### **Southbound Route:**

 Addicks P&R, L Park Row, L Hwy 6, L Memorial, R Eldridge, R Alief Clodine, L Metro, R Mission Bend P&R, L Metro, L Alief Clodine, L Sierra Blanca, R Tres Lagunas, R Bellaire, R Addicks Clodine, R Westpark, L Green Crest, R S Richmond, L Richmond, Richmond & S Richmond

#### **Proposed Equipment:**

• 40' transit bus or 25' Arboc bus

### Transit System Reimagining Going Places



Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.



### 82 Westheimer

#### **Frequent Network**

#### **West Oaks Mall to Downtown:**

Peak Headway	Base Headway	Span
8	10	20
Minutes	Minutes	Hours (approx.)

#### **Activity Centers:**

• Westchase, Uptown/Galleria, Midtown, Downtown

#### **Rail Line Connections:**

• Downtown (Red, Green, and Purple)

#### **Frequent Network Connections:**

• 27 Shepherd, 33 Post Oak, 40 Heights/Telephone/41 Kirby Polk, 46 Gessner, 51/52 Hardy, 54 Scott, 56 Airline/Montrose, 63 Fondren, 85 Antoine/Washington, 137 Northshore Flyer, 160s Memorial City Flyer

#### **Transit Center and Park & Ride Connections:**

Downtown TC

#### **Eastbound Route:**

• Richmond & S Richmond, R Westheimer, S Elgin, L Travis, L Congress, Congress & Smith

#### **Westbound Route:**

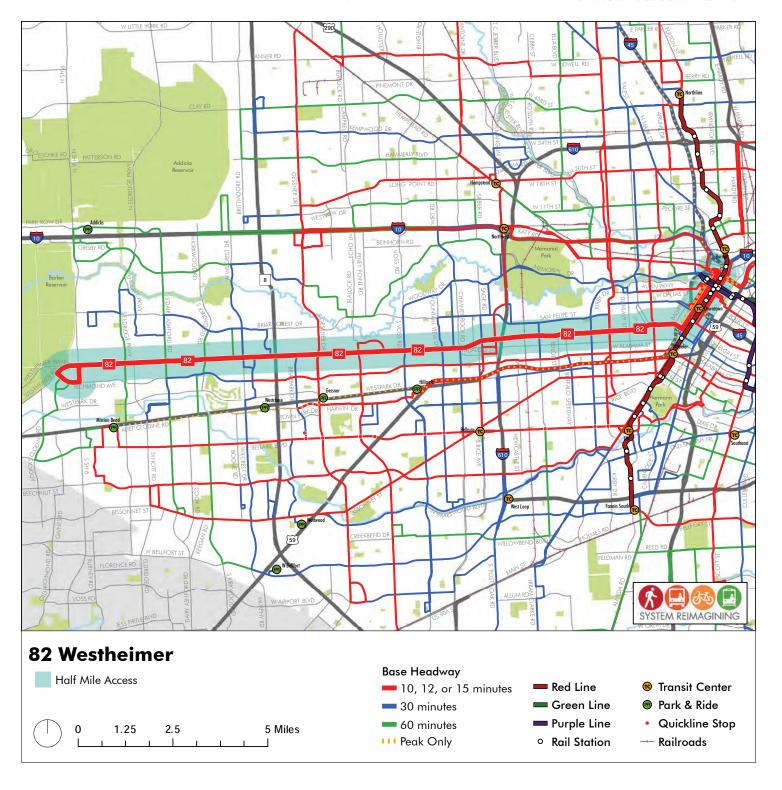
• Congress & Smith, R Franklin, R Milam, R Elgin, S Westheimer, L Addicks-Howell, R Richmond, Richmond & S Richmond

#### **Proposed Equipment:**

• 60' transit bus as fleet and street configuration allow or 40' transit bus

Base headway includes weekday middays and weekends. Evening headway is 20 minutes. Span is consistent seven days a week.







### 151 Westpark Express

#### **Weekday Peak Only**

#### Mission Bend P&R to Downtown:

Peak Headway	Base Headway	Span
15	-	2.5 AM 3 PM
Minutes	Minutes	Hours (approx.)

Local stops, Mission Bend P&R to Westchase P&R. Limited stops, Westchase P&R to Hillcroft P&R. Express to Midtown and Downtown. Additional peak frequency between Hillcroft P&R and Downtown.

#### **Activity Centers:**

• Westchase, Uptown/Galleria, Greenway Plaza, Midtown, Downtown

#### **Rail Line Connections:**

• Downtown (Red, Green and Purple)

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 40 Heights/Telephone/41 Kirby Polk, 46 Gessner, 51/52 Hardy, 54 Scott, 63 Fondren, 82 Westheimer, 152/153 Harwin Flyer, 137 Northshore Flyer, 160s Memorial City Flyer

#### **Transit Center and Park & Ride Connections:**

• Mission Bend P&R, Westchase P&R, Gessner P&R, Hillcroft P&R

#### **Eastbound Route:**

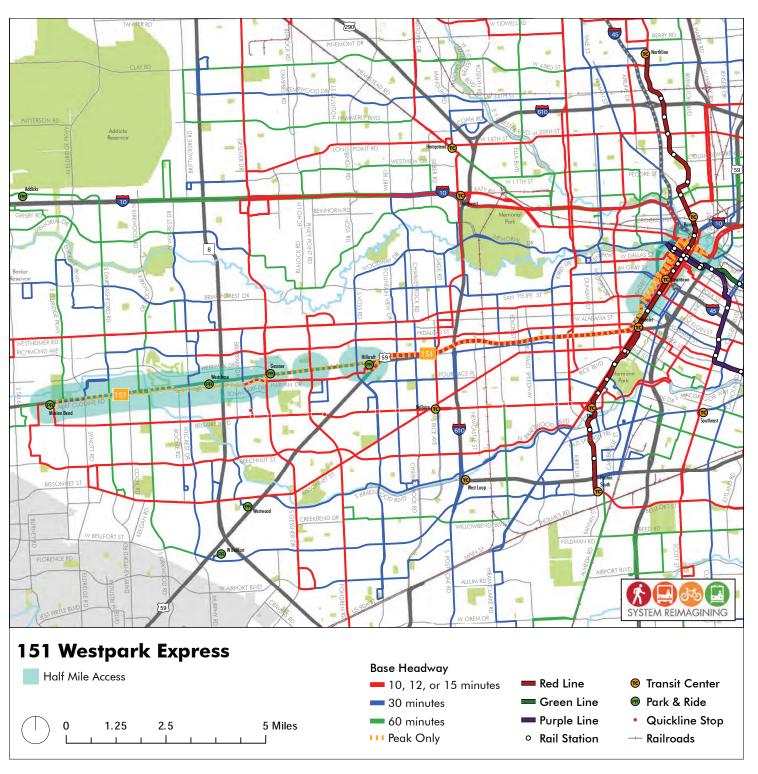
• Mission Bend P&R, L Metro, R Alief Clodine, S Harwin, Westchase TC, L Gessner, Gessner P&R, R Westpark, Hillcroft P&R, Southwest Fwy HOT or main lanes, Exit Spur 527, Exit Louisiana, R Franklin, R Jackson, R Congress, Congress & LaBranch

#### **Westbound Route:**

 Congress & La Branch, L Smith, S Spur 527, S Southwest Fwy HOT or main lanes, Exit Hillcroft P&R, L Westpark, Gessner P&R, L Gessner, R Harwin, Westchase P&R, S Alief Clodine, L Metro, R Mission Bend P&R

#### **Proposed Equipment:**

• 45' motorcoach or 40' transit bus or 60' articulated bus as fleet allows





### 152 Harwin Flyer

#### **Frequent Network**

#### **Westwood P&R to Wheeler TC:**

Peak Headway	Base Headway	Span
15	30	14
Minutes	Minutes	Hours (approx.)

Schedule coordinated with 153 Harwin Flyer to provide frequent service between Harwin & Ranchester and Wheeler TC.

#### **Activity Centers:**

Westchase

#### **Rail Line Connections:**

• Wheeler Station (Red)

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 25 Richmond, 46 Gessner, 63 Fondren, 65 Bissonnet, 82 Westheimer

#### **Transit Center and Park & Ride Connections:**

Westchase P&R, Hillcroft TC, Wheeler TC

#### **Eastbound Route:**

• Westwood P&R, R Centre, L Bissonnet, R Woodfair, L Club Creek, R Beechnut, L Corporate, R Bellaire, L Ranchester, R Harwin, Hillcroft P&R, Southwest Fwy HOT or main lanes, Exit Richmond, Wheeler TC

#### **Westbound Route:**

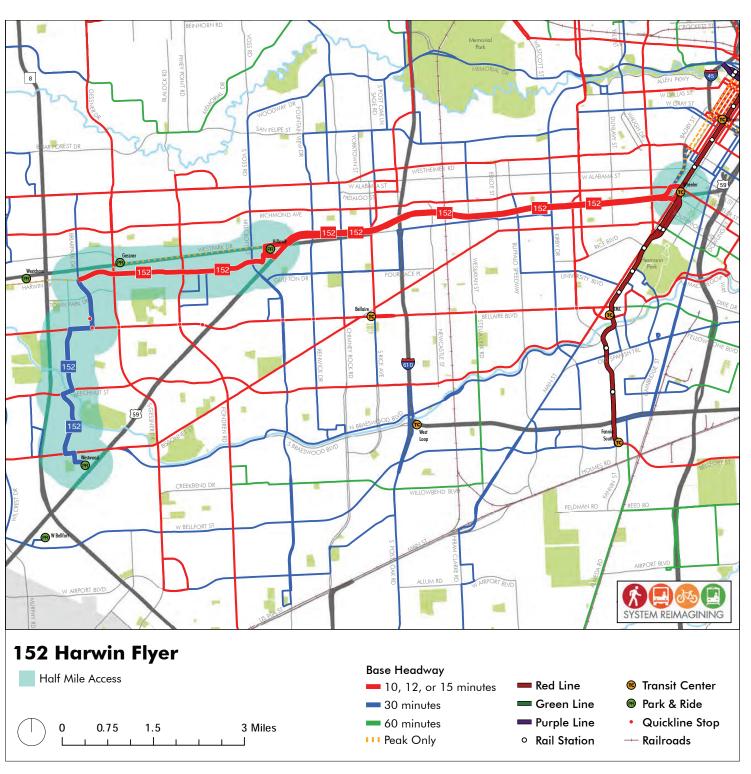
• Wheeler TC, L Richmond, L Spur 527, Southwest Fwy HOT or main lanes, Exit Hillcroft TC, R Harwin, L Ranchester, R Bellaire, L Corporate, R Beechnut, L Club Creek, R Woodfair, L Bissonnet, R Centre, L Westwood P&R

#### **Proposed Equipment:**

• 40' transit bus

### Transit System Reimagining METRO





Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.

### 153 Harwin Flyer

#### **Frequent Network**

#### **Briar Forest to Wheeler TC:**

Peak Headway	Base Headway	Span
15	30	18
Minutes	Minutes	Hours (approx.)

Schedule coordinated with 152 Harwin Flyer to provide frequent service between Harwin & Ranchester and Wheeler TC.

#### **Rail Line Connections:**

Wheeler Station (Red)

#### **Frequent Network Connections:**

• 25 Richmond, 46 Gessner, 63 Fondren, 65 Bissonnet, 82 Westheimer

#### **Transit Center and Park & Ride Connections:**

Westwood P&R, Hillcroft TC, Wheeler TC

#### **Eastbound Route:**

 Scholarship & Valedictorian, R Valedictorian, R Briar Forest, L Eldridge, R Parkway Plaza, R Enclave, R Westella, L Whittington, L Dairy Ashford, R Briar Forest, R City West, L Cityplace, R Rogerdale, L Westheimer, R Briarpark, S Ranchester, L Harwin, Hillcroft P&R, Southwest Fwy HOT or main lanes, Exit Richmond, Wheeler TC

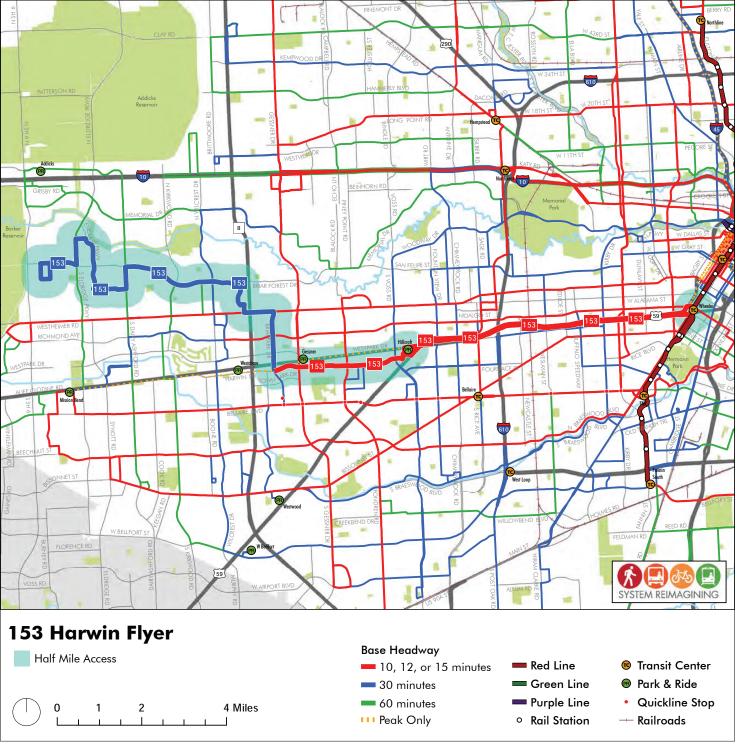
#### **Westbound Route:**

 Wheeler TC, L Richmond, L Spur 527, Southwest Fwy HOT or main lanes, Exit Hillcroft TC, R Harwin, R Ranchester, S Briarpark, L Westheimer, R Rogerdale, L Cityplace, R City West, L Briar Forest, L Dairy Ashford, R Whittington, R Westella, L Enclave, L Parkway Plaza, L Eldridge, R Briar Forest, L Briar Home, R Scholarship, Scholarship & Valedictorian

#### **Proposed Equipment:**

• 40' transit bus

## Transit System Reimagining Going Places PINEMONT DR PIN



Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.



### **160 Memorial City Flyer**

#### **Frequent Network**

#### **Memorial City to Downtown:**

Peak Headway	Base Headway	Span
10	15	18
Minutes	Minutes	Hours (approx.)

Frequent service between Memorial City and Downtown composed of 160, 161, and 162.

#### **Activity Centers:**

Memorial City, Uptown, Downtown

#### **Rail Line Connections:**

• Downtown (Red, Green and Purple)

#### **Frequent Network Connections:**

• 26 Long Point/Cavalcade, 33 Post Oak, 40 Heights/Telephone/41 Kirby Polk, 46 Gessner, 51/52 Hardy, 54 Scott, 82 Westheimer, 85 Antoine/Washington, 137 Northshore Flyer

#### **Transit Center and Park & Ride Connections:**

Northwest TC, Downtown TC

#### **Eastbound Route:**

 Memorial City & Barryknoll, R Barryknoll, R Gessner, R Katy Freeway, enter managed lanes, exit Northwest TC, ramps to Katy Freeway, enter Katy Freeway HOV, L Franklin, R Smith, L Pierce, L Downtown TC

#### **Westbound Route:**

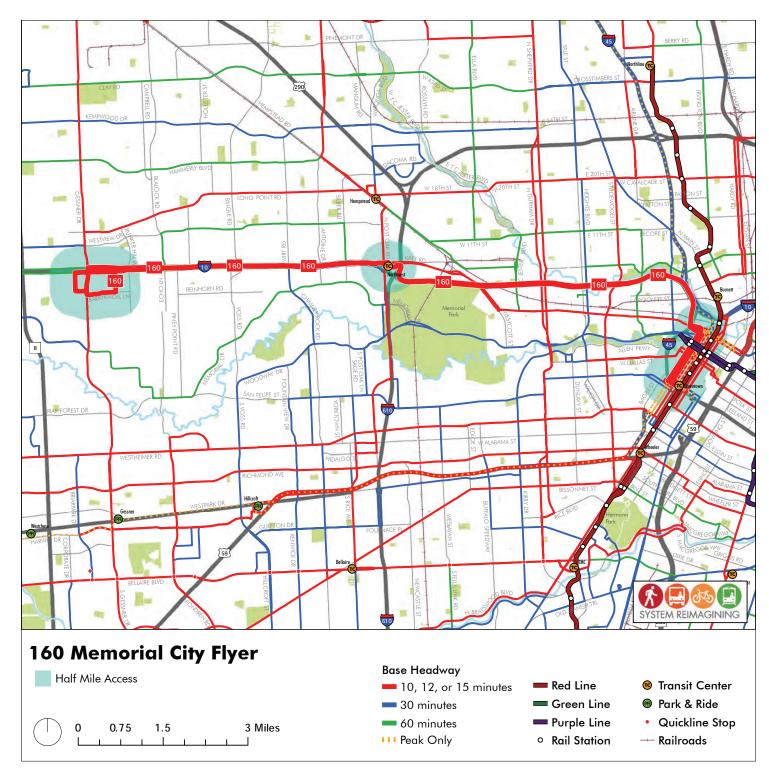
• Downtown TC, L St. Joseph, R Louisiana, L Congress, L Franklin, R Katy Freeway HOV, S Katy Freeway, exit Northwest TC, L Old Katy, S Katy Freeway managed lanes, exit Gessner, L Gessner, R Kingsride, R Frostwood, R Katy Freeway frontage, R Memorial City, Memorial City & Barryknoll

#### **Proposed Equipment:**

• 60' transit bus as fleet allows or 40' transit bus

Base headway includes weekday middays and weekends. Evening headway is 30 minutes. Span is consistent seven days a week.





### 161 Wilcrest Flyer

#### **West Bellfort P&R to Downtown:**

Peak Headway	Base Headway	Span
20	30	18
Minutes	Minutes	Hours (approx.)

Frequent service between Memorial City and Downtown composed of 160, 161, and 162.

#### **Activity Centers:**

• Westchase, Memorial City, Downtown

#### **Frequent Network Connections:**

• 2 Bellaire, 4 Beechnut, 25 Richmond, 26 Long Point/Cavalcade, 33 Post Oak, 40 Heights/Telephone/41 Kirby Polk, 46 Gessner, 51/52 Hardy, 54 Scott, 65 Bissonnet, 82 Westheimer, 85 Antoine/Washington, 137 Northshore Flyer

#### **Transit Center and Park & Ride Connections:**

• W Bellfort P&R, Northwest TC, Downtown TC

#### **Inbound Route:**

 W Bellfort P&R, L Roark, R Bellfort, R Wilcrest, R Westpark, L Walnut Bend, L Westheimer, R Wilcrest, R Memorial, L Gessner, R Katy Freeway, enter managed lanes, exit Northwest TC, ramps to Katy Freeway, enter Katy Freeway HOV, L Franklin, R Smith, L Pierce, L Downtown TC

#### **Outbound Route:**

 Downtown TC, L St. Joseph, R Louisiana, L Congress, L Franklin, R Katy Freeway HOV, S Katy Freeway, Exit Northwest TC, L Old Katy, S Katy Freeway Managed Lanes, exit Gessner, L Gessner, R Memorial, L Wilcrest, L Westheimer, R Walnut Bend, R Westpark, L Wilcrest, L Bellfort, L Roark, R W Bellfort P&R

#### **Proposed Equipment:**

• 40' transit bus

Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.

## Transit System Reimagining Going Places Long Point RD WESTVIEW DR DD WESTVI





#### **REVISED - Span**

### **162 Memorial Flyer**

#### Addicks P&R to Downtown:

Peak Headway	Base Headway	Span
20	60	16
Minutes	Minutes	Hours (approx.)

Potential for additional "West Belt" route if peak overloads occur. Additional frequency between Wilcrest and Northwest TC provided by 161 Wilcrest Flyer Frequent service between Memorial City and Downtown composed of 160, 161, and 162.

#### **Activity Centers:**

• Energy Corridor, Memorial City, Downtown

#### **Rail Line Connections:**

• Downtown (Red, Green and Purple)

#### **Frequent Network Connections:**

• 26 Long Point/Cavalcade, 33 Post Oak, 46 Gessner, 51/52 Hardy, 54 Scott, 82 Westheimer, 85 Antoine/Washington, 137 Northshore Flyer

#### **Transit Center and Park & Ride Connections:**

Addicks P&R, Northwest TC, Downtown TC

#### **Eastbound Route:**

• Addicks P&R, L Park Row, L Hwy 6, L Katy Fwy frontage, R Addicks Howell, L Grisby, R Westlake Park, L Memorial, L Gessner, R Katy Fwy frontage, enter main lanes, enter Managed Lanes, Exit Northwest TC, ramps to Katy Fwy, enter Katy Fwy HOV lane, L Frankin, R Congress, R Smith, L Pierce, L Downtown TC

#### **Westbound Route:**

• Downtown TC, L St. Joseph, R Louisiana, L Congress, L Franklin, R Katy Fwy HOV lane, S Katy Freeway, Exit Northwest TC, ramps to Katy Fwy Managed Lanes, exit Gessner, L Gessner, R Memorial, R Westlake Park, L Grisby, R Hwy 6, R Park Row, R Addicks P&R

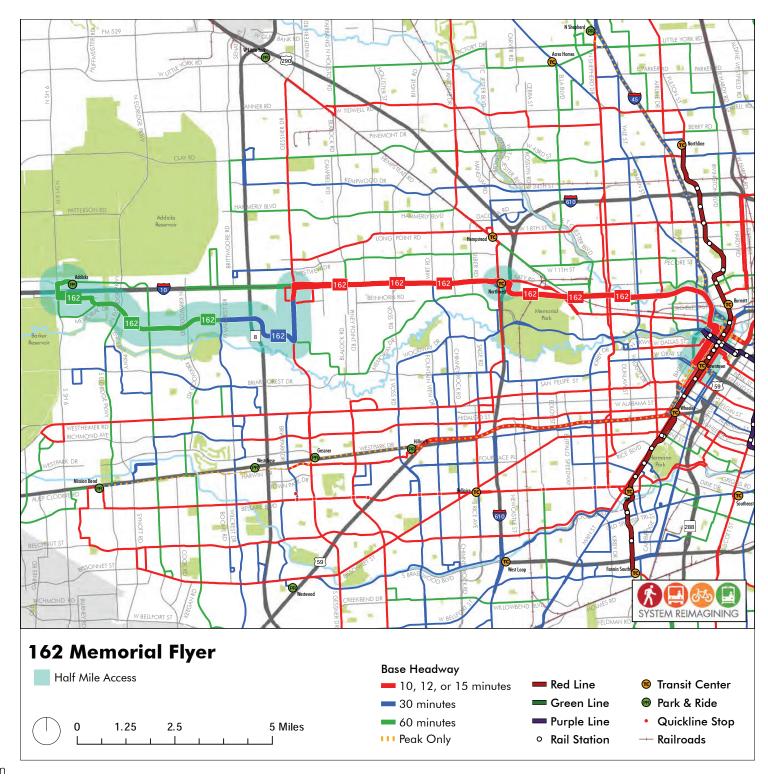
#### **Proposed Equipment:**

• 40' transit bus or 45' motorcoach

Base headway includes weekday middays, weekends, and evenings. Span is consistent seven days a week.

### Transit System Reimagining METRO





# **402 Bellaire Quickline**

### **Weekday Only**

### **Ranchester to TMC TC:**

Peak Headway	Base Headway	Span
10	15	13
Minutes	Minutes	Hours (approx.)

Route operates weekdays only.

Limited stops: Clarewood, Ranchester, Gessner, Fondren, PlazAmericas, Hillcroft, Renwick, Bellaire TC, Stella Link, Kirby, Greenbriar, TMC TC

### **Activity Centers:**

TMC

### **Rail Line Connections:**

• TMC Transit Center Station (Red)

### **Frequent Network Connections:**

• 4 Beechnut, 27 Shepherd, 33 Post Oak, 46 Gessner, 56 Airline/Montrose, 63 Fondren, 65 Bissonnet

### **Transit Center and Park & Ride Connections:**

• Bellaire TC, TMC TC

### **Eastbound Route:**

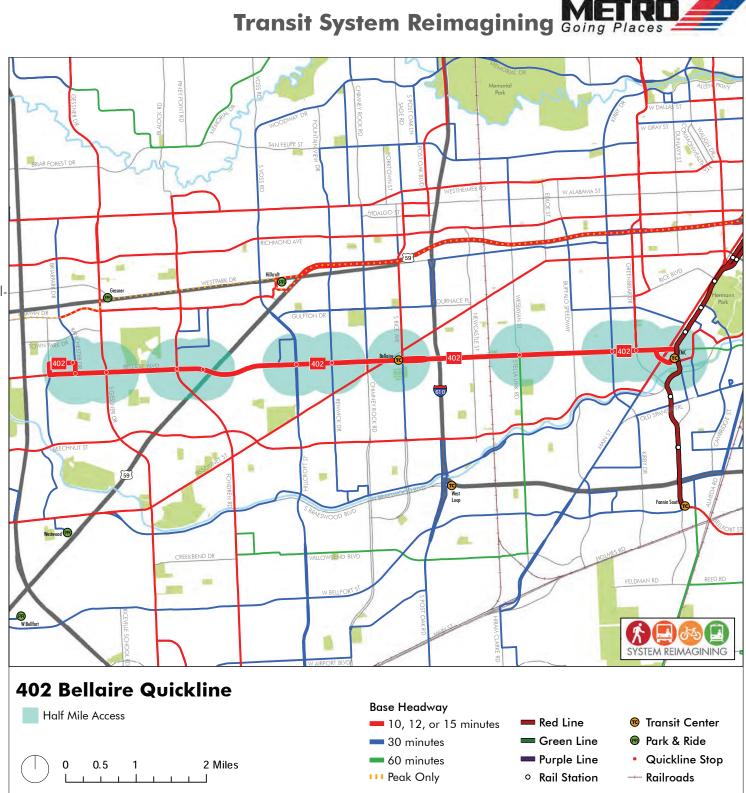
 Clarewood & Ranchester, R Ranchester, L Bellaire, Bellaire TC, S Holcombe, R Fannin, R TMC TC

### **Westbound Route:**

• TMC TC, R Pressler, L Holcombe, S Bellaire, Bellaire TC, S Bellaire, R Corporate, R Clarewood, Clarewood & Ranchester

### **Proposed Equipment:**

• 40' transit bus







# APPENDIX E METRO MARKET AND DEVELOPMENT DENSITY INDEX METHODOLOGY



# APPENDIX E

The following is a detailed description of the Market and Development Density Index Methodology. The index was created for the Metropolitan Transit Authority of Harris County (METRO) as part of the System Reimagining Initiative. The index is part of the METRO Transit System Existing Conditions Report completed in 2013 (Available at URL).

Some content has been abridged for relevance. Table, figure, and footnote numbers have been changed for consistency with this report.

### **INDEX METHODOLOGY**

The Market and Development Density Index is based on the insight that higher density development can occur as the market responds to firm and household desires to locate in areas with good transit mobility. The goal of the index is to help METRO identify areas of high development potential where bus service can add to the value of the location and potentially stimulate new development.

The index identifies areas of potential demand for both commercial and residential development in the near-to-mid term (0 to five years). Longer term potential for TOD will depend more heavily on public policy decisions and the level of investment in specific areas. The index is comprised of five components representing demographic and market factors that influence TOD potential. These indicators are defined briefly below, and described in more detail in the next section of this chapter.

- Population Density is measured as the number of people per square mile in a given block group.
- Change in Population Density measures the difference in block group population density between 2000 and 2010.
- Transit-Supportive Employment Density is measured as the number of transit-supportive jobs per square mile. The definition of transit-supportive employment is based on prior research conducted by the Center for Transit-Oriented Development and includes the knowledge-based, education, health care, entertainment and government sectors. To account for the effect of proximity to employment in adjacent neighborhoods, block-level employment is generalized to include a portion of surrounding employment within a mile
- Change in Employment Density measures the difference in employment density between 2002 and 2010.
- Assessed Property Value Density is calculated by adding the land and structure values for all residential and commercial properties in a given block group, and then dividing the total value by the block group area.

Each indicator is assigned a weight reflecting its relative impact on the total index score. The five indicators, associated weights and data sources are summarized in Table E-1. The specific steps involved in constructing the Market and Development Density Index were as follows:

- 1. Population, employment and property value data was compiled at the census block group level.
- 2. To address wide variations in data values, each data set was processed to create a more evenly distributed, compressed set of values.<sup>1</sup>
- 3. Each data set was scaled so that all values fall between 0 and 1, with the lowest data point set to 0 and the highest data point set to 1.
- 4. Each data set was multiplied by the indicator weight.
- 5. The index score for each block group was calculated by summing the scaled, weighted indicators.

The index is intended to evaluate relative market strength at the regional level and does not include the full range of factors that impact TOD potential, particularly factors that influence the walkability and bikeability of the neighborhood, access to retail or services, and other important components of a successful transit-oriented development. A future revision of the index may include an indicator of the built environment, such as intersection density. Input from local developers will also enable the index to be interpreted and applied in a way that acknowledges more nuanced, qualitative factors.



<sup>1 –</sup> In all of the raw data sets, the standard deviation was equal or greater than the mean, indicating askewed distribution. In other words, a few block groups have much higher or lower values than the majority of block groups. To even out the distribution, a logarithmic transportation was applied to each data set.

### **INDEX COMPONENTS**

The following section describes each of the indicators in greater depth, including the rationale for incorporating each component into the overall index, and the main findings for each indicator.

TABLE E-1:SU	TABLE E-1:SUMMARY OF MARKET AND DEVELOPMENT										
DENSITY INDEX COMPONENTS											
Indicator	Weight	Source									
Population Density	10%	2010 Census									
Change in Population Density	15%	2000 and 2010 Census									
Transit-Supportive Employment Density	30%	2010 LEHD OnTheMap									
Change in Employment Density	15%	2002 and 2010 LEHD OnTheMap									
Assessed Property Value Density	Assessed Property Value Density 30% 2010 assessor's data from the Houston-Galveston Area Council (H-GAC)										

### **POPULATION DENSITY**

High population density suggests current and historic market strength for compact and multifamily housing. Higher density places may also be more willing to accept additional density in comparison with lower-density, single family neighborhoods.

### POPULATION DENSITY CHANGE

In order to understand where recent population growth has taken place, the change in population density between 2000 and 2010 was calculated.

### TRANSIT-SUPPORTIVE EMPLOYMENT DENSITY

Proximity to employment centers is one of the most important factors influencing development around transit.<sup>2</sup> Households consider access to jobs when making residential location decisions, while businesses consider the commute trips of their workforce, and are attracted to existing employment clusters for the benefits that come from clustering. Due to the importance of employment centers and the agglomeration effect, employment-related factors are given the greatest combined weight out of all the index components.

Given the importance of employment centers as destinations for transit trips, major employment centers were identified in the Service Area1. These employment centers are listed in Table E-2.

More so than population density, employment is clustered in the CBD and to the west of the CBD. Almost all regional employment centers are located in this portion of the Service Area.

### CHANGE IN EMPLOYMENT DENSITY GROWTH

In order to understand where recent employment growth has taken place, the change in employment density between 2002 and 2010 was calculated.

TABLE E-2 SUM	MARY OF	METRO SERVICE	AREA EMPLOYN	MENT
Employment Center	Total Jobs	TOD Supportive Jobs	TOD Job Density (Jobs per SqMi)	Percent TOD Supportive Jobs
Downtown	151,500	95,000	53,700	63%
Texas Medical Center/ Rice University	80,600	78,600	36,800	98%
Greenway	79,000	64,800	59,100	82%
Westchase	51,500	31,800	6,800	62%
Uptown/Galleria	53,700	31,200	30,600	58%
NASA/Clear Lake	29,200	23,800	3,300	82%
Energy Corridor	30,800	19,900	5,400	65%
Memorial City/ Town & Country	21,300	17,700	10,900	83%
University of Houston/Texas Southern University	15,700	15,600	17,800	99%
Sharpstown	16,300	12,000	8,800	74%
Midtown	19,400	11,900	12,800	61%
Augusta/Fountain View	15,800	10,800	10,200	68%
Greenspoint	21,900	10,300	7,500	47%
Post Oak - East of 610	15,000	10,200	18,500	68%

### ASSESSED PROPERTY VALUE DENSITY

Assessed property values reflect the value of land, residential development and commercial development throughout the Service Area. Areas with strong real estate markets are likely to have higher land and building values, as well as higher density development, all of which will contribute to higher property values within a given area. Thus, this indicator reflects existing and historic market strength in a given location.



<sup>2 –</sup> Nadine Fogarty and Mason Austin, Rails to Real Estate: Development Patterns Along Three New Transit Lines. Center for Transit Oriented Development, March 2011. http://ctod.org/pdfs/2011R2R.pdf



# APPENDIX F EXISTING AND FUTURE TRAFFIC VOLUMES



	ROADWAY				E	EXISTING								FUTURE					
		Classification	La	anes	Width	ADT Range	ADT (High)	Lane Demand	Estimated 2040 ADT Range	Estimated 2040 ADT (High)	Future Lane Demand	Lane Availability Based on ROW	Lane Demand Not Met	Vehicle Demand Not Met	Daily Vehicle Passengers	Daily Vehicle Passengers Not Met	Lane Demand Not Met	Vehicle Demand not Met	Daily Vehicle Passengers not Met
	Bellepark to Kirkwood	T	-	4	- 80	30,500	30,500	4.1	37,000	37,000	4.9	4	0.9	6,750	46,250	8,438	0.9	6,750	8,438
Alief-Clodine		T	-	4	- 80	20,000-39,000	39,000	5.2	30,500-50,000	50,000	6.7	4	2.7	20,250	62,500	25,313	2.7	20,250	25,313
		T	-	4	- 80	24,000-25000	25,000	3.3	34,000-34,500	34,500	4.6	4	0.6	4,500	43,125	5,625	0.6	4,500	5,625
		T		4	- 80	11,000-27,000	27,000	3.6	23,000-36,000	36,000	4.8	4	0.8	6,000	45,000	7,500	0.8	6,000	7,500
		T -		4	- 100							4							
		T	_	4	- 100	22.000	22,000	2.9	26,500	26,500	3.5	6	-2.5	-18,750	33,125	-23,438	-2.5	-18,750	-23,438
	Katy Fwy. to Park Row	T	_	6	- 100 - 100	22,000 28,000	28,000	3.7	33,500	33,500	4.5	6	-2.5 -1.5	-10,750	41,875	-14,063	0.5	3,750	4,688
	Park Row to Saums Saums to N. City Limit	T	Н—	4	- 100	29,500	29,500	3.9	35,500	35,500	4.7	6	-1.3	-9,750	44,375	-12,188	0.7	5,250	6,563
		MJ	-	4	- 60	25,500	23,300	0.0	33,300	33,300	7.7	4	-1.0	-5,750	44,070	-12,100	0.7	0,200	0,500
		P		8	- 135	57,000-58,000	58,000	7.7	90,500-98,000	98,000	13.1	8	5.1	38,250	122,500	47,813	5.1	38,250	47,813
		Р		8	- 150	51,000	51,000	6.8	90,000	90,000	12.0	8	4	30,000	112,500	37,500	4.0	30,000	37,500
		Р	-	8	- 130	50,000	50,000	6.7	98,000	98,000	13.1	8	5.1	38,250	122,500	47,813	5.1	38,250	47,813
	West Belt to Wilcrest	Р	-	6	- 120	41,000-54,000	54,000	7.2	61,000-79,000	79,000	10.5	8	2.5	18,750	98,750	23,438	4.5	33,750	42,188
		Р	-	6	- 120	34,000-43,000	43,000	5.7	50,000-56,500	56,500	7.5	8	-0.5	-3,750	70,625	-4,688	1.5	11,250	14,063
		Р	-	6	- 120	35,500	35,500	4.7	47,500	47,500	6.3	8	-1.7	-12,750	59,375	-15,938	0.3	2,250	2,813
		P	_	6	- 120	30,500	30,500	4.1	40,500	40,500	5.4	8	-2.6	-19,500	50,625	-24,375	-0.6	-4,500	-5,625
		Р	_	6	- 120	34,000-39,500	39,500	5.3	49,500-53,500	53,500	7.1	8	-0.9	-6,750	66,875	-8,438	1.1	8,250	10,313
		Р	Н—	6	- 120	33,500	33,500	4.5	45,500	45,500	6.1	8	-1.9	-14,250	56,875	-17,813	0.1	750	937
		T -		4	- 100	26,000	26,000	3.5	31,500	31,500	4.2	6	-1.8	-13,500	39,375	-16,875	0.2	1,500	1,875
		T	Н—	4	- 100	22,500	22,500	3.0	26,000	26,000	3.5	6	-2.5	-18,750	32,500	-23,438	-0.5	-3,750	-4,688
		T	Н—	4	- 100	21,500-22,500	22,500	3.0	25,000-28,000	28,000	3.7	6	-2.3	-17,250	35,000	-21,563	-0.3	-2,250	-2,813
		T	Н—	4	- 100	16,500	16,500	2.2	20,000	20,000	2.7	6	-3.3	-24,750	25,000	-30,938	-1.3	-9,750	-12,188
		T		4	- 100 - 110	17,500 14,500-19,500	17,500 19,500	2.3	21,500 16,000-24,500	21,500 24,500	2.9	6	-3.1 -2.7	-23,250 -20,250	26,875 30,625	-29,063 -25,313	-1.1 -0.7	-8,250 -5,250	-10,313 -6,563
	Clay Rd. to Hempstead  Bellaire Blvd. to Harwin	MJ	Н—	4	- 80	14,500-19,500	19,500	2.0	16,000-24,500	24,500	3.3	4	-2.1	-20,250	30,625	-25,313	-0.7	-5,250	-0,503
		MJ	-	4	- 80	23,500-28,500	28,500	3.8	43,500-54,000	54,000	7.2	4	3.2	24,000	67,500	30,000	3.2	24,000	30,000
	Memorial to Gessner	T	-	4	- 100	34,000-40,000	40,000	5.3	49,000-53,500	53,500	7.1	6	1.1	8,250	66,875	10,313	3.1	23,250	29,063
		T	_	4	- 100	33,500-35,500	35,500	4.7	44,000-44,500	44,500	5.9	6	-0.1	-750	55,625	-937	1.9	14,250	17,813
		Т	-	4	- 100	33,000-39,000	39,000	5.2	44,000-47,000	47,000	6.3	6	0.3	2,250	58,750	2,813	2.3	17,250	21,563
		Т	-	4	- 100	34,500-37,500	37,500	5.0	44,000-46,000	46,000	6.1	6	0.1	750	57,500	937	2.1	15,750	19,688
		T	-	4	- 100	29,000-31,500	31,500	4.2	37,000-44,000	44,000	5.9	6	-0.1	-750	55,000	-937	1.9	14,250	17,813
		T	-	4	- 100	26,500-29,500	29,500	3.9	37,500-40,500	40,500	5.4	6	-0.6	-4,500	50,625	-5,625	1.4	10,500	13,125
		T	-	4	- 100	33,000	33,000	4.4	44,000	44,000	5.9	6	-0.1	-750	55,000	-937	1.9	14,250	17,813
		T	-	4	- 100	20,000	20,000	2.7	31,000	31,000	4.1	6	-1.9	-14,250	38,750	-17,813	0.1	750	937
		T	-	4	- 80	24,500	24,500	3.3	93,500	93,500	12.5	4	8.5	63,750	116,875	79,688	8.5	63,750	79,688
		T	-	4	- 80	20,000	20,000	2.7	51,000	51,000	6.8	4	2.8	21,000	63,750	26,250	2.8	21,000	26,250
		T	_	4	- 80	16,000	16,000	2.1	37,500	37,500	5.0	4	1	7,500	46,875	9,375	1.0	7,500	9,375
		T	-	4	- 80	20,000	20,000	2.7	47,500	47,500	6.3	4	2.3	17,250	59,375	21,563	2.3	17,250	21,563
		T	Н—	4	- 80	27,500	27,500	3.7	39,500	39,500	5.3	4	1.3	9,750	49,375	12,188	1.3	9,750	12,188
		T	Н—	4	- 80	31,500-35,000	35,000	4.7	47,500-48,500	48,500	6.5	4	2.5	18,750	60,625	23,438	2.5	18,750	23,438
		MJ		4	- 70	17,500	17,500	2.3	21,500	21,500	2.9	4	-1.1	-8,250	26,875	-10,313	-1.1	-8,250	-10,313
		MJ MJ	Н—	4	- 70	19,500 21,500	19,500	2.6	26,500 24,500	26,500 24,500	3.5	4	-0.5 -0.7	-3,750	33,125	-4,688	-0.5 -0.7	-3,750 -5,250	-4,688 6.563
		MJ MJ	-	4	- 70 - 70	18,500	21,500 18,500	2.9	42,000	42,000	5.6	4	1.6	-5,250 12,000	30,625 52,500	-6,563 15,000	1.6	-5,250 12,000	-6,563 15,000
	Hammerly to Emnora	MJ	-	4	- 70	14,000	14,000	1.9	20,000	20,000	2.7	4	-1.3	-9,750	25,000	-12,188	-1.3	-9,750	-12,188
	Emnora to Kempwood	MJ		4	- 70	12,000	12,000	1.6	18,000	18,000	2.4	4	-1.6	-12,000	22,500	-15,000	-1.6	-12,000	-15,000
		MJ	Н—	4	- 70	16,000	16,000	2.1	19,000	19,000	2.5	4	-1.5	-11,250	23,750	-14,063	-1.5	-11,250	-14,063
		MJ	_	4	- 70	13,000-14,000	14,000	1.9	17,000-18,000	18,000	2.4	4	-1.6	-12,000	22,500	-15,000	-1.6	-12,000	-15,000
		Р	-	6	- 100	27,500-35,500	35,500	4.7	38,000-46,500	46,500	6.2	6	0.2	1,500	58,125	1,875	0.2	1,500	1,875
		Р	-	6	- 100	32,000-38,000	38,000	5.1	42,000-50,500	50,500	6.7	6	0.7	5,250	63,125	6,563	0.7	5,250	6,563
		Р	-	6	- 100	30,000-34,000	34,000	4.5	38,500-50,000	50,000	6.7	6	0.7	5,250	62,500	6,563	0.7	5,250	6,563
		Р	-	6	- 100	35,000	35,000	4.7	44,000	44,000	5.9	6	-0.1	-750	55,000	-937	-0.1	-750	-937
		P	-	6	- 100	28,000-31,000	31,000	4.1	36,000-44,000	44,000	5.9	6	-0.1	-750	55,000	-937	-0.1	-750	-937
		P	Н—	6	- 100	24,500	24,500	3.3	33,500	33,500	4.5	6	-1.5	-11,250	41,875	-14,063	-1.5	-11,250	-14,063
		MJ	-	4	- 100	22,000	22,000	2.9	29,500	29,500	3.9	6	-2.1	-15,750	36,875	-19,688	-0.1	-750	-938
		T	_	4	- 100							6							
		T -		6	- 100	39,500-54,000	54,000	7.2	59,000-78,000	78,000	10.4	6	4.4	33,000	97,500	41,250	4.4	33,000	41,250
		T -	Н—	6	- 100	42,000-52,000	52,000	6.9	67,000-85,000	85,000	11.3	6	5.3	39,750	106,250	49,688	5.3	39,750	49,688
		T	_	6	- 100	33,000-39,000	39,000	5.2	43,500-46,500	46,500	6.2	6	0.2	1,500	58,125	1,875	0.2	1,500	1,875
		T	Н—	6	- 100	29,000	29,000	3.9	37,500	37,500	5.0	6	-1	-7,500	46,875	-9,375	-1.0	-7,500	-9,375
		T T	Н—	6	- 100 - 100	40,000 34,000-33,000	40,000 33,000	5.3 4.4	47,000 42,500-43,000	47,000 43,000	6.3 5.7	6	-0.3	2,250 -2,250	58,750 53,750	2,813	0.3 -0.3	2,250 -2,250	2,813 -2,813
												n	-11.5	-/ /50					



	ROADWAY		OPPO	RTUNITIES				CONCLUSION	COMMENTS
	Segment	Bike	Ped	Transit	Increase Number of Lanes	Percent Persons in Other Modes***	Percent Persons in Other Modes***		
	Bellepark to Kirkwood					18%	18%		
Alief-Clodine	Kirkwood to Dairy-Ashford					41%	41%	Area of Concern	
Aller-Clodine	Dairy-Ashford to Synott					13%	13%	Area of Concern	Acquire ROW?
	Synott to W. City Limit					17%	17%		
Barker-Clodine	N. City Limit to Westheimer Pkwy.					-	-		
	Westheimer Pkwy. to Westheimer					-	-		
	Katy Fwy. to Park Row	?	?			-71%	-71%	Leave As Is	
	Park Row to Saums	?	?	?	x	-34%	11%		Widen for cars, transit or bike/ped?
	Saums to N. City Limit	?	?	?	х	-27%	15%		
	Gessner to Bunker Hill	?	?			-	-		
	Fondren to S. Gessner		Х	DL?		39%	39%		
	S. Gessner to Ranchester		х	DL?		33%	33%	Area of Concern	No room to widen
	Ranchester to West Belt		х	DL?		39%	39%	Aica of Concern	
	West Belt to Wilcrest		х	DL?	х	24%	43%		High v/c even if widened
	Wilcrest to Kirkwood		х	DL?	х	-7%	20%		
	Kirkwood to Cook		х	DL?	х	-27%	5%		
	Cook to Dairy-Ashford		х	DL?	х	-48%	-11%		Add dedicated transit lane?
	Dairy-Ashford to Synott		х	DL?	х	-13%	15%		
	Synott to W. City Limit		х	DL?	х	-31%	2%		
	Katy Fwy. to Westview	?	?		X	-43%	5%		
	Westview to Long Point	?	?		Х	-72%	-14%		
	Long Point to Hammerly	?	?		х	-62%	-8%	Possible Opportunity for Ped/Bicycle	Widen for bike/ped
	Hammerly to Kempwood	?	?		х	-124%	-49%	. Sociolo Opportunity for 1 euroloyole	
	Kempwood to Clay Rd.	?	?		х	-108%	-38%		
	Clay Rd. to Hempstead	?	?		х	-83%	-21%		
	Bellaire Blvd. to Harwin	?	?			-	-		
	Harwin to Westheimer					44%	44%		High v/c; no ROW available
	Memorial to Gessner				x	15%	43%		
	Gessner to West Belt				х	-2%	32%		
	West Belt to Wilcrest				x	5%	37%		
	Wilcrest to Kirkwood				x	2%	34%		High v/c even if widened
	Kirkwood to Dairy-Ashford				x	-2%	32%		
	Dairy-Ashford to Eldridge				x	-11%	26%		
	Eldridge to Parkway Plaza				х	-2%	32%		
	Parkway Plaza to SH 6				х	-46%	2%		
	Katy Fwy. to Westview					68%	68%		
	Westview to Hammerly					41%	41%		
	Hammerly to Kempwood					20%	20%		High v/c; no ROW
	Kempwood to Clay Rd.					36%	36%		
	Clay Rd. to N. City Limit					25%	25%		
	W. Little York to Hempstead					39%	39%		
	Katy Fwy. to Westview					-38%	-38%		
	Westview to Long Point					-14%	-14%		
	Westview to Long Point					-21%	-21%		
	Blalock to Hammerly	model?	model?	model?	model?	29%	29%	,	
	Hammerly to Emnora					-49%	-49%	Leave As Is	
	Emnora to Kempwood					-67%	-67%		
	Kempwood to Clay Rd.					-59%	-59%		
	Clay Rd. to Tanner					-67%	-67%		
	Hempstead to Campbell					3%	3%		
	Campbell to Gessner Rd.					10%	10%		
	Gessner Rd. to Brittmoore					11%	11%		
	Brittmoore to Addicks-Fairbanks					-2%	-2%		High v/c; no ROW
	Addicks-Fairbanks to SH 6					-2%	-2%		3,
	Pine Forest to Queenston					-34%	-34%		
	Bellaire to Alief-Clodine	?	?		x	-53%	-3%	Widen	Possible bike/ped
	Eldridge to Katy Fwy.	•	· ·		^		-570	· · · · · · · · · · · · · · · · · · ·	. III. Sid Siller pou
	Katy Fwy. to Memorial			?		42%	42%		
	Memorial to Briar Forest			?		42%	42%		
				?					
	Briar Forest to Westheimer			?		3%	3%		Poplace vehicle lane w/ transit?
	Machinian and Disharand			7	I .	-20%	-20%		Replace vehicle lane w/ transit?
	Westheimer to Richmond					-n/			
	Westheimer to Richmond  Richmond to Westpark  Westpark to Alief-Clodine			?		5% -5%	5% -5%		_

<sup>\*</sup> Lane Demand based on 7,500 veh/lane/day



<sup>\*\*</sup> For ROW's greater than 160', assumed maximum number of lanes as 10

<sup>\*</sup> Future Lanes Needed - based on West Houston Mobility Plan traffic model; the Future Lanes needed represents the number of lanes necessary to keep the v/c ratio of the corridor segment below 1.25

<sup>\*\*</sup> Future Lanes Available - indicates the maximum number of vehicle lanes available based on the width of existing corridor right-of-way; assumes no additional gain in right-of-way width

<sup>\*</sup> Average vehicle occupancy assumed to be 1.25 persons/vehicle

<sup>\*\*\*</sup> Assumes all unmet person demand is in other modes

				E,	XISTING								FUTURE					
	Classification	Li	anes	Width	ADT Range	ADT (High)	Lane Demand	Estimated 2040 ADT Range	Estimated 2040 ADT (High)	Future Lane Demand	Lane Availability Based on ROW	Lane Demand Not Met	Vehicle Demand Not Met	Daily Vehicle Passengers	Daily Vehicle Passengers Not Met	Lane Demand Not Met	Vehicle Demand not Met	Daily Vehicle Passengers not Met
	Р -	-	6	- 100	23,500-36,000	36,000	4.8	29,500-42,000	42,000	5.6	6	-0.4	-3,000	52,500	-3,750	-0.4	-3,000	-3,750
	Р -	-	6	- 200	34,000-36,000	36,000	4.8	40,000-43,000	43,000	5.7	10	-4.3	-32,250	53,750	-40,313	-0.3	-2,250	-2,813
	Р -	_	6	- 100	55,000	55,000	7.3	68,500	68,500	9.1	6	3.1	23,250	85,625	29,063	3.1	23,250	29,063
	Р -	_	6	- 110	39,500	39,500	5.3	49,000	49,000	6.5	6	0.5	3,750	61,250	4,688	0.5	3,750	4,688
	Р -	_	6	- 100	31,500-41,500	41,500	5.5	43,000-50,500	50,500	6.7	6	0.7	5,250	63,125	6,563	0.7	5,250	6,563
	P -	_	6	- 100	34,500	34,500	4.6	43,500	43,500	5.8	6	-0.2	-1,500	54,375	-1,875	-0.2	-1,500	-1,875
	Р -	_	6	- 120	29,000-31,500	31,500	4.2	40,500-43,000	43,000	5.7	8	-2.3	-17,250	53,750	-21,563	-0.3	-2,250	-2,813
	MJ -	-	4	- 90	47 500 07 500	07.500		40.000.00.000	00.000		4		10 770	40.000	45.000		0.050	0.040
	T -	_	4	- 100	17,500-27,500	27,500	3.7	19,000-32,000	32,000	4.3	6	-1.7	-12,750	40,000	-15,938	0.3	2,250	2,813
	T -	_	4	- 100	22,000	22,000	2.9	27,500	27,500	3.7	6	-2.3	-17,250	34,375	-21,563	-0.3	-2,250	-2,813
	T -	_	6	- 100 - 100	45,000-45,500	45,500	6.1	64,000-65,500	65,500	8.7 10.5	6	2.7 4.5	20,250	81,875	25,313	2.7 4.5	20,250	25,313
	T -	_	6	- 100	47,500-50,000	50,000 56,000	6.7	68,500-78,500	78,500	10.3	6	4.3	33,750	98,125 96,250	42,188 40,313	4.5	33,750	42,188
	MJ -	_	4	- 60	39,000-56,000	30,000	7.5	58,500-77,000	77,000	10.3	4	4.3	32,250	90,250	40,313	4.3	32,250	40,313
	T -	_	4	- 100	10,000-16,000	16,000	2.1	13,000-19,000	19,000	2.5	6	-3.5	-26,250	23,750	-32,813	-1.5	-11,250	-14,063
	T -	_		- 80			1.8			3.3	4	-0.7	-20,250	31,250	-6,563	-0.7	-5,250	
	T .	_	4	- 80	13,500 22,000-26,000	13,500	3.5	25,000 37,000-41,000	25,000 41,000	5.5	4	1.5	-5,250 11,250	51,250 51,250	-6,563 14,063	-0.7 1.5	-5,250 11,250	-6,563 14,063
Campbell to Gessner	T .	_	4	- 80		26,000			41,000	6.3	4	2.3				2.3	17,250	14,063
	T -	_	4	- 80	30,000-31,000 4,500	31,000 4,500	4.1 0.6	43,000-47,000 28,000	47,000 28,000	3.7	4	-0.3	17,250 -2,250	58,750 35,000	21,563 -2,813	-0.3	-2,250	21,563 -2,813
Fondren to Gessner	T -	-	4	- 70	27,000-30,500	30,500	4.1	40,000-41,000	41,000	5.5	4	1.5	11,250	51,250	14,063	1.5	-2,250 11,250	14,063
Gessner to Ranchester	T .	_	4	- 80	24,500	24,500	3.3	40,000-41,000	41,000	5.5	4	1.5	11,250	51,250	14,063	1.5	11,250	14,063
Ranchester to West Belt	T -	_	4	- 70	30,000	30,000	4.0	52,500	52,500	7.0	4	3	22,500	65,625	28,125	3.0	22,500	28,125
West Belt to Wilcrest	T -	_	4	- 80	30,000-41,000	41,000	5.5	41,500-57,000	57,000	7.6	4	3.6	27,000	71,250	33,750	3.6	27,000	33,750
	T -	_	4	- 80	26,000	26,000	3.5	35,500	35,500	4.7	4	0.7	5,250	44,375	6,563	0.7	5,250	6,563
	Р -	_	6	- 120	17,500-20,500	20,500	2.7	23,000-33,500	33,500	4.7	8	-3.5	-26,250	41,875	-32,813	-1.5	-11,250	-14,063
	Р .	-	6	- 120	26,000-30,000	30,000	4.0	30,000-36,500	36,500	4.9	8	-3.1	-23,250	45,625	-29,063	-1.1	-8,250	-10,313
	Р .	_	6	- 120	29,000	29,000	3.9	35,500	35,500	4.7	8	-3.3	-24,750	44,375	-30,938	-1.3	-9,750	-12,188
Little York to Brittmoore	Р .	_	6	- 120	18,000-28,500	28,500	3.8	19,000-25,000	25,000	3.3	8	-5.5	-35,250	31,250	-44,063	-2.7	-20,250	-25,313
Blalock to Campbell	T -	_	4	- 100	22,500	22,500	3.0	37,000	37,000	4.9	6	-1.1	-8,250	46,250	-10,313	0.9	6,750	8,438
	T -	_	4	- 100	23,500-29,500	29,500	3.9	38,500-43,000	43,000	5.7	6	-0.3	-2,250	53,750	-2,813	1.7	12,750	15,938
	T -	_	4	- 100	22,500-28,500	28,500	3.8	38,000-38,500	38,500	5.1	6	-0.9	-6,750	48,125	-8,438	1.1	8,250	10,313
	T -	_	4	- 100	13,500	13,500	1.8	34,000	34,000	4.5	6	-1.5	-11,250	42,500	-14,063	0.5	3,750	4,688
	Т -	_	4	- 100	10,000	10,000	1.0	04,000	04,000	4.0	6	1.0	11,200	42,000	14,000	0.0	0,700	4,000
	Т -	_	4	- 100	32,500-40,500	40,500	5.4	47,000-56,500	56,500	7.5	6	1.5	11,250	70,625	14,063	3.5	26,250	32,813
	Т -	_	4	- 100	42,000-45,000	45,000	6.0	51,500-54,000	54,000	7.2	6	1.2	9,000	67,500	11,250	3.2	24,000	30,000
Buffalo Bayou to Briar Forest	Т -	_	4	- 100	39,000	39,000	5.2	47,500	47,500	6.3	6	0.3	2,250	59,375	2,813	2.3	17,250	21,563
	T -	_	4	- 100	39,000-45,500	45,500	6.1	46,500-54,500	54,500	7.3	6	1.3	9,750	68,125	12,188	3.3	24,750	30,938
	T -	_	4	- 100	30,500	30,500	4.1	43,000	43,000	5.7	6	-0.3	-2,250	53,750	-2,813	1.7	12,750	15,938
	Т -	_	4	- 100	29,500	29,500	3.9	42,500	42,500	5.7	6	-0.3	-2,250	53,125	-2,813	1.7	12,750	15,938
Westpark to Alief-Clodine	Т -	_	4	- 100	27,500	27,500	3.7	34,000	34,000	4.5	6	-1.5	-11,250	42,500	-14,063	0.5	3,750	4,688
Alief-Clodine to Bellaire	Т -	_	4	- 100	29,000-33,500	33,500	4.5	36,500-47,500	47,500	6.3	6	0.3	2,250	59,375	2,813	2.3	17,250	21,563
	Р -	_	6	- 100	31,500-37,000	37,000	4.9	39,500-45,500	45,500	6.1	6	0.1	750	56,875	937	0.1	750	937
		_	4	- 70	26,500	26,500	3.5	40,500	40,500	5.4	4	1.4	10,500	50,625	13,125	1.4	10,500	13,125
		_	4	- 70	25,500	25,500	3.4	39,000	39,000	5.2	4	1.2	9,000	48,750	11,250	1.2	9,000	11,250
	T -	_	4	- 120	20,000-50,500	50,500	6.7	22,000-58,500	58,500	7.8	8	-0.2	-1,500	73,125	-1,875	3.8	28,500	35,625
	MJ -	_	2	- 60							4							
	MJ -	_	2	- 60							4							
	T -	_	4	- 100	9,000-25,000	25,000	3.3	10,000-37,000	37,000	4.9	6	-1.1	-8,250	46,250	-10,313	0.9	6,750	8,438
	T -	-	4	- 100	34,000-35,000	35,000	4.7	45,000-47,000	47,000	6.3	6	0.3	2,250	58,750	2,813	2.3	17,250	21,563
	T -	-	4	- 100	30,000-32,000	32,000	4.3	41,000-43,000	43,000	5.7	6	-0.3	-2,250	53,750	-2,813	1.7	12,750	15,938
	T -	_	4	- 100	22,000-27,000	27,000	3.6	38,500-41,500	41,500	5.5	6	-0.5	-3,750	51,875	-4,688	1.5	11,250	14,063
	T -	-	4	- 100	18,500-32,500	32,500	4.3	31,500-51,000	51,000	6.8	6	0.8	6,000	63,750	7,500	2.8	21,000	26,250
	T -	-	4	- 80	22,000-24,500	24,500	3.3	24,500-40,500	40,500	5.4	4	1.4	10,500	50,625	13,125	1.4	10,500	13,125
	T -	-	4	- 100	13,000	13,000	1.7	24,500	24,500	3.3	6	-2.7	-20,250	30,625	-25,313	-0.7	-5,250	-6,563
	T -	-	4	- 120	25,000	25,000	3.3	41,000	41,000	5.5	8	-2.5	-18,750	51,250	-23,438	1.5	11,250	14,063
	T -	-	4	- 70	22,500	22,500	3.0	32,500	32,500	4.3	4	0.3	2,250	40,625	2,813	0.3	2,250	2,813
	T -	-	4	- 110	12,000-30,500	30,500	4.1	24,000-40,000	40,000	5.3	6	-0.7	-5,250	50,000	-6,563	1.3	9,750	12,188
	T -	-	4	- 100							6							
	T -	-	4	- 100	11,000	11,000	1.5	18,000	18,000	2.4	6	-3.6	-27,000	22,500	-33,750	-1.6	-12,000	-15,000
	T -	-	4	- 100							6							
	MJ -	-	4	- 70	28,000-34,500	34,500	4.6	32,500	32,500	4.3	4	0.3	2,250	40,625	2,813	0.3	2,250	2,813



	ROADWAY		OPPO	RTUNITIES	1			CONCLUSION	COMMENTS
		Bike	Ped	Transit	Increase Number of Lanes	Percent Persons in Other Modes***	Percent Persons in Other Modes***		
			х	DL?		-7%	-7%	Loovo As Is	
			х	DL?		-75%	-5%		
			х	DL?		34%	34%		
			х	DL?		8%	8%	Area of Concern	Replace vehicle lane w/ transit?
			х	DL?		10%	10%		·
			х	DL?		-3%	-3%		
			х	DL?		-40%	-5%		
						-	-		
Fairbanks-N Houston		?	?		?	-40%	7%	Possible Opportunity for Ped/Bicycle	Continuation of Blalock
						-63%	-8%	Leave As Is	
						31%	31%		
						43%	43%	Area of Concern	High v/c; no ROW
						42%	42%		ang. i.e., i.e.
						-	-		
		?	?		?	-138%	-59%		Bike/ped on Patterson and Morton?
						-21%	-21%		Emorpod of Fractional and Morton.
	Campbell to Gessner					27%	27%		High v/c; no ROW
						37%	37%	Area of Concern	riigii v/o, rio rio v
	West Belt to Brittmoore					-8%	-8%	Leave As Is	
	Fondren to Gessner					27%	27%	Leave As is	
						27%	27%		
								Area of Concern	Agguiro DOW2
						43%	43%	Area of Concern	Acquire ROW?
						47%	47%		
						15%	15%		
		?	?	?	?	-78%	-34%		
		?	?	?	?	-64%	-23%		Excess capacity available
		?	?	?	?	-70%	-27%		
		?	?	?	?	-141%	-81%		
					Х	-22%	18%	Leave As Is	
					X	-5%	30%		
					X	-18%	21%		
					X	-33%	11%		
						-	-		
					х	20%	46%		
					х	17%	44%	Area of Concern	High v/c even if widened
					х	5%	36%		
					x	18%	45%		
					x	-5%	30%		
					x	-5%	30%		
					x	-33%	11%		
					x	5%	36%		High v/c even if widened
						2%	2%	Area of Concorn	High v/c; no ROW
						26%	26%	Area of Concern	High v/c; no ROW
Long Point						23%	23%		
					х	-3%	49%	Widen	
						-	-		
						-	-		
					х	-22%	18%	Widen	
					x	5%	37%	Area of Concern	High v/c even if widened
					х	-5%	30%		
					х	-9%	27%	Widen	
					X	12%	41%		High v/c even if widened
					· · · · · ·	26%	26%	Area of Concern	High v/c; no ROW
			x	DL?	X	-83%	-21%	Leave As Is	J, 11011
			x	DL?	x	-46%	27%	200.07010	Add dedicated transit lane?
			x	DL?	X	7%	7%		Continue on Dairy Ashford?
I alk NOW	Broadfield to SH 6			DL?		-13%	24%		Continue on Daily Ashiolu?
			X		X				
	SH 6 to Eldridge Pkwy.	?	x ?	DL?	?	150%	67%	Widen	Pike/ped on Greenke/Mede=2
		(	′		,	-150%	-67%		Bike/ped on Groeshke/Morton?
					1	7%	7%	Does Not Yet Exist	Abandon

<sup>\*</sup> Lane Demand based on 7,500 veh/lane/day



<sup>\*\*</sup> For ROW's greater than 160', assumed maximum number of lanes as 10

<sup>\*</sup> Future Lanes Needed - based on West Houston Mobility Plan traffic model; the Future Lanes needed represents the number of lanes necessary to keep the v/c ratio of the corridor segment below 1.25

<sup>\*\*</sup> Future Lanes Available - indicates the maximum number of vehicle lanes available based on the width of existing corridor right-of-way; assumes no additional gain in right-of-way width

<sup>\*</sup> Average vehicle occupancy assumed to be 1.25 persons/vehicle

<sup>\*\*\*</sup> Assumes all unmet person demand is in other modes

F	ROADWAY				EXISTING								FUTURE					
		Classification	Lanes	s Width	h ADT Range	ADT (High)	Lane Demand	Estimated 2040 ADT Range	Estimated 2040 ADT (High)	Future Lane Demand	Lane Availability Based on ROW	Lane Demand Not Met	Vehicle Demand Not Met	Daily Vehicle Passengers	Daily Vehicle Passengers Not Met	Lane Demand Not Met	Vehicle Demand not Met	Daily Vehicle Passengers not Met
		T	- 6	- 120	45,000-48,000	48,000	6.4	64,500-68,000	68,000	9.1	8	1.1	8,250	85,000	10,313	3.1	23,250	29,063
		T	- 6	- 100		27,500	3.7	48,000	48,000	6.4	6	0.4	3,000	60,000	3,750	0.4	3,000	3,750
		T	- 6	- 100		30,000	4.0	42,500	42,500	5.7	6	-0.3	-2,250	53,125	-2,813	-0.3	-2,250	-2,813
			- 6	- 100		38,500	5.1	60,000-61,000	61,000	8.1	6	2.1	15,750	76,250	19,688	2.1	15,750	19,688
		T	- 4 - 4	- 100 - 100		30,500 36,500	4.1	41,500 35,000-46,500	41,500 46,500	5.5 6.2	6	-0.5 0.2	-3,750 1,500	51,875 58,125	-4,688 1,875	1.5 2.2	11,250 16,500	14,063 20,625
	Dairy-Ashford to City Limit	T	- 4	- 100		30,000	4.9	31,500-39,000	39,000	5.2	6	-0.8	-6,000	48,750	-7,500	1.2	9,000	11,250
		T	- 4	- 100		12,500	1.7	28,000	28,000	3.7	6	-2.3	-17,250	35,000	-21,563	-0.3	-2,250	-2,813
		T	- 4	- 100		12,500	1.7	28,000	28,000	3.7	6	-2.3	-17,250	35,000	-21,563	-0.3	-2,250	-2,813
		T	- 4	- 100		,			23,777		6		.,,					
		MJ	- 4	- 80		36,500	4.9	33,000-50,000	50,000	6.7	4	2.7	20,250	62,500	25,313	2.7	20,250	25,313
		MJ	- 4	- 70	30,000	30,000	4.0	45,000	45,000	6.0	4	2	15,000	56,250	18,750	2.0	15,000	18,750
		MJ	- 4	- 70	26,500	26,500	3.5	42,000	42,000	5.6	4	1.6	12,000	52,500	15,000	1.6	12,000	15,000
		T	- 4	- 100	14,000	14,000	1.9	27,000	27,000	3.6	6	-2.4	-18,000	33,750	-22,500	-0.4	-3,000	-3,750
		Р	- 6	- 180		63,000	8.4	73,000-91,000	91,000	12.1	10	2.1	15,750	113,750	19,688	6.1	45,750	57,188
		P	- 8	- 160		93,000	12.4	91,000-112,000	112,000	14.9	8	6.9	51,750	140,000	64,688	6.9	51,750	64,688
		P	- 8	- 160		91,500	12.2	100,500-111,500	111,500	14.9	8	6.9	51,750	139,375	64,688	6.9	51,750	64,688
		P	- 8	- 160		104,500	13.9	113,500-135,000	135,000	18.0	8	10	75,000	168,750	93,750	10.0	75,000	93,750
			- 6	- 120		90,500	12.1	101,000	101,000	13.5	8	5.5	41,250	126,250	51,563	7.5	56,250	70,313
		P P	- 6 - 6	- 120 - 120		79,500 71,000	10.6 9.5	90,000 85,000	90,000 85,000	12.0 11.3	8	3.3	30,000 24,750	112,500 106,250	37,500 30,938	6.0 5.3	45,000 39,750	56,250 49,688
		MJ	- 4	- 80		1,500	0.2	12,500	12,500	1.7	4	-2.3	-17,250	15,625	-21,563	-2.3	-17,250	-21,563
		MJ	- 4	- 80	-	16,500	2.2	21,500	21,500	2.9	4	-1.1	-8,250	26,875	-10,313	-1.1	-8,250	-10,313
		MJ	- 4	- 80		16,000	2.1	23,500-23,500	23,500	3.1	4	-0.9	-6,750	29,375	-8,438	-0.9	-6,750	-8,438
	Alief-Clodine to Bellaire	MJ	- 4	- 70		15,000	2.0	18,000-20,500	20,500	2.7	4	-1.3	-9,750	25,625	-12,188	-1.3	-9,750	-12,188
		Т	- 4	- 100	17,000-19,500	19,500	2.6	43,500-44,000	44,000	5.9	6	-0.1	-750	55,000	-937	1.9	14,250	17,813
		T	- 4	- 100	15,000-17,500	17,500	2.3	24,500-42,500	42,500	5.7	6	-0.3	-2,250	53,125	-2,813	1.7	12,750	15,938
		T	- 4	- 100	19,500	19,500	2.6	46,000	46,000	6.1	6	0.1	750	57,500	937	2.1	15,750	19,688
	Hempstead to Fairbanks-N Houston	Т	- 4	- 100	21,000	21,000	2.8	35,000	35,000	4.7	6	-1.3	-9,750	43,750	-12,188	0.7	5,250	6,563
		MJ	- 4	- 70							4							
		MJ	- 2	- 60							4							
		Р	- 8	- 120		97,000	12.9	127,500-133,000	133,000	17.7	8	9.7	72,750	166,250	90,938	9.7	72,750	90,938
		P	- 8	- 150		85,500	11.4	117,000-122,000	122,000	16.3	8	8.3	62,250	152,500	77,813	8.3	62,250	77,813
		P	- 8	- 120		95,000	12.7	105,500-141,500	141,500	18.9	8	10.9	81,750	176,875	102,188	10.9	81,750	102,188
		P P	- 8 - 8	- 120 - 120		81,500 89,000	10.9	106,000-118,500 105,500-120,000	118,500 120,000	15.8 16.0	8	7.8	58,500 60,000	148,125 150,000	73,125 75,000	7.8 8.0	58,500 60,000	73,125 75,000
	Dairy-Ashford to Eldridge	P	- 8	- 120		84,500	11.3	101,000-112,500	112,500	15.0	8	7	52,500	140,625	65,625	7.0	52,500	65,625
		P	- 8	- 120		78,000	10.4	92,000-121,000	121,000	16.1	8	8.1	60,750	151,250	75,938	8.1	60,750	75,938
		P	- 6	- 120		64,000	8.5	48,000-80,000	80,000	10.7	8	2.7	20,250	100,000	25,313	4.7	35,250	44,063
		P	- 6	- 120		24,500	3.3	29,000-32,500	32,500	4.3	8	-3.7	-27,750	40,625	-34,688	-1.7	-12,750	-15,938
		T	- 4	- 100		24,500	3.3	29,000-32,500	32,500	4.3	6	-1.7	-12,750	40,625	-15,938	0.3	2,250	2,813
		Т	- 4	- 100	11,500	11,500	1.5				6							
		T	- 6	- 110		38,500	5.1	50,000-57,000	57,000	7.6	6	1.6	12,000	71,250	15,000	1.6	12,000	15,000
			- 4			42,500	5.7	63,000-65,000	65,000	8.7	6	2.7	20,250	81,250	25,313	4.7	35,250	44,063
		T	- 4	- 100		36,500	4.9	41,000-54,500	54,500	7.3	6	1.3	9,750	68,125	12,188	3.3	24,750	30,938
		T	- 4	- 100		26,000	3.5	38,000-40,000	40,000	5.3	6	-0.7	-5,250	50,000	-6,563	1.3	9,750	12,188
		T	- 4			33,500	4.5	37,500-49,000	49,000	6.5	6	0.5	3,750	61,250	4,688	2.5	18,750	23,438
		T	- 4	- 100		21,500	2.9	31,500-36,000	36,000	4.8	6	-1.2	-9,000	45,000	-11,250	0.8	6,000	7,500
		T T	- 4 - 2	- 100 - 70		20,000	2.7 3.1	34,500 22,500-30,000	34,500 30,000	4.6	6	-1.4 0	-10,500 0	43,125	-13,125 0	0.6 2.0	4,500 15,000	5,625 18,750
	Gessner to West Belt	T	- 4	- 100		33,500	4.5	30,000-55,500	55,500	7.4	6	1.4	10,500	37,500 69,375	13,125	3.4	25,500	31,875
	West Belt to Brittmoore	T	- 4	- 100		16,500	2.2	39,000	39,000	5.2	6	-0.8	-6,000	48,750	-7,500	1.2	9,000	11,250
		T	- 6			43,500	5.8	57,000-58,000	58,000	7.7	4	3.7	27,750	72,500	34,688	1.7	12,750	15,938
		T	- 6	- 90		46,000	6.1	67,000-77,500	77,500	10.3	4	6.3	47,250	96,875	59,063	4.3	32,250	40,313
		T	- 6			41,000	5.5	68,000-71,000	71,000	9.5	4	5.5	41,250	88,750	51,563	3.5	26,250	32,813
			- 6	- 100		29,500	3.9	65,500	65,500	8.7	6	2.7	20,250	81,875	25,313	2.7	20,250	25,313
		Т	- 6	- 90		30,500	4.1	60,500	60,500	8.1	4	4.1	30,750	75,625	38,438	2.1	15,750	19,688
		T	- 6	- 90	29,500-40,500	40,500	5.4	52,500-69,500	69,500	9.3	4	5.3	39,750	86,875	49,688	3.3	24,750	30,938



ROADWAY		OPPC	RTUNITIES				CONCLUSION	COMMENTS
	Bike	Ped	Transit	Increase Number of Lanes	Percent Persons in Other Modes***	Percent Persons in Other Modes***		
					12%	34%		
					6%	6%		High v/c even if widened
					-5%	-5%	Area of Concern	3
					26%	26%		
				x	-9%	27%		
				х	3%	35%		<u> </u>
				х	-15%	23%		
				х	-62%	-8%		
				Х	-62%	-8%		
					- 440/	- 440/		
					41% 33%	41% 33%	Area of Concern	High v/c; no ROW
Richmond to Westheimer					29%	29%		High VC, No ROW
	?	?		?	-67%	-11%	Leave As Is	Bike/ped opportunity
		x	DL?	· ·	17%	50%	2007071010	
		x	DL?		46%	46%		
		х	DL?		46%	46%		High v/c even if widened
		х	DL?		56%	56%		
		х	DL?	х	41%	56%		
		х	DL?	x	33%	50%		Add transit lane?
		х	DL?	х	29%	47%		
					-138%	-138%		
					-38%	-38%	Leave As Is	
					-29%	-29%		
					-48%	-48%		
				X	-2% -5%	32% 30%		
Campbell to Hempstead				x	2%	34%		
				X	-28%	15%		
				_ ^	-	-		
					-	-		
		х	DL?		55%	55%		
		х	DL?		51%	51%		
		х	DL?		58%	58%		
		х	DL?		49%	49%	Area of Concern	High v/c even if widened
		х	DL?		50%	50%	Alea of Concern	
		х	DL?		47%	47%		Replace vehicle lane w/ transit?
		х	DL?		50%	50%		
		х	DL?	х	25%	44%		
		X	DL?	X	-85%	-39%		
		х	DL?	X	-39%	7%		
					040/	- 249/		High v/c even if widened
					21% 31%	21% 54%	Area of Concern	riigii v/c everi ii widefied
West Belt to Wilcrest				x	18%	45%	AIGA UI CUIICEIII	
				X	-13%	24%		
				X	8%	38%		
				x	-25%	17%		
			İ	х	-30%	13%		
				х	0%	50%		
				х	19%	46%		
				х	-15%	23%		
					48%	22%		
					61%	42%	Area of Concern	High v/c even if widened
					58%	37%	, 100 31 001100111	
					31%	31%		
					51%	26%		Lang discourage a fall of the control of
Westpark to Bellaire					57%	36%		Lane discrepancy - existing vs. future

<sup>\*</sup> Lane Demand based on 7,500 veh/lane/day



 $<sup>^{\</sup>star\star}$  For ROW's greater than 160', assumed maximum number of lanes as 10

<sup>\*</sup> Future Lanes Needed - based on West Houston Mobility Plan traffic model; the Future Lanes needed represents the number of lanes necessary to keep the v/c ratio of the corridor segment below 1.25

<sup>\*\*</sup> Future Lanes Available - indicates the maximum number of vehicle lanes available based on the width of existing corridor right-of-way; assumes no additional gain in right-of-way width

<sup>\*</sup>Average vehicle occupancy assumed to be 1.25 persons/vehicle

<sup>\*\*\*</sup> Assumes all unmet person demand is in other modes



# APPENDIX G IMPLEMENTATION TOOLS



# APPENDIX G

- 1. Tax Increment Financing (Tax Code, Chapter 311) is a tool that local governments can use to publicly finance needed structural improvements and enhanced infrastructure within a reinvestment zone. These improvements are usually undertaken to promote existing businesses and/or to attract new business to the area.
- 2. Tax Abatement (Tax Code, Chapter 312) is an agreement between a taxing unit and a property owner that exempts all or part of an increase in the value of real property and/or tangible personal property from taxation for a period not to exceed 10 years. Counties, cities, and special districts may enter into tax abatement agreements; school districts may not. Taxing units must adopt guidelines and criteria that govern abatements, prior to offering tax abatement agreements. These guidelines and criteria are effective for 2 years; after which they must be reviewed, revised and re-adopted by the governing body of the taxing unit.
- 3. An **appraised value limitation (Tax Code, Chapter 313)** is an agreement in which a taxpayer agrees to build or install property and create jobs in exchange for an eight-year limitation on the taxable property value for school district maintenance and operations tax (M&O) purposes and a tax credit. The minimum limitation varies by school district. The application for a limitation on the appraised value for M&O purposes is submitted directly to the school district and requires an application fee, which is established by each school district.

4. The **Development Corporation Act of 1979 (Local Government Code, Chapters 501-505)** authorizes cities to adopt a sales and use tax and establish a Type A or a Type B economic development corporation, or both to administer the tax funds, provided that city voters approve this special, dedicated tax at an election held for that purpose. All cities located in a county with a population of less than 500,000 may impose the Type A sales tax if the new combined local sales tax rate would not exceed 2 percent. Some cities located in counties with a population of 500,000 or more (Bexar, Dallas, El Paso, Harris, Hidalgo, Tarrant and Travis) also may adopt Type A sales tax for economic development efforts but a city's eligibility varies from county to county.

Type A sales tax can fund manufacturing and industrial facilities; research and development facilities; recycling facilities; distribution centers; small warehouse facilities and distribution centers; military facilities; primary job training facilities; corporate headquarter facilities; job training classes; career centers; telephone call centers; business infrastructure; airport facilities; and operation of commuter rail, light rail or commuter buses.

All cities are eligible to adopt the Type B sales tax if the combined local sales tax rate would not exceed 2 percent. Type B sales tax funds may be used for the same purposes as listed for Type A. In addition, Type B sales tax can also fund retail business incentives (if city population is less than 20,000); sports and athletic facilities; entertainment, tourist and convention facilities; public parks and related open space improvements; affordable housing; and water supply and conservation programs (with special voter approval).

- 5. Local Government Code Chapter 387 allows counties to create County Assistance Districts that are funded by a portion of sales taxes. Any county may adopt this sales tax, in all or part of the county, if the new combined local sales tax rate would not exceed 2 percent at any location within the district. A county may create up to four county assistance districts, but not more than one district may be created in a commissioner's precinct. The commissioners' court may serve as the governing body of the district; or alternatively, the commissioners' court, by order, may appoint a board of directors to administer the district. A county assistance district may fund construction, maintenance or improvement of roads or highways; provision of law enforcement and detention services; maintenance or improvement of libraries, museums, parks or other recreational facilities; promotion of economic development and tourism; firefighting and fire prevention services and provision of services that benefit the public welfare.
- 6. The Texas Enterprise Zone Program (Government Code, Chapter 2303) is an economic development tool that allows local communities to partner with the State of Texas to promote job creation and capital investment in economically distressed areas of the state. Local communities may provide incentives such as tax abatements, fee waivers and reduced regulations to businesses within an enterprise zone. They also may nominate businesses as enterprise projects. Enterprise projects are selected by the state and may be eligible for sales tax refunds and other benefits.
- 7. Chapters 380 (cities) and 381 (counties) of the Local Government Code grant cities and counties broad discretion to make loans and grants of public funds or the provision of public services, at little or no cost, to promote all types of business development including industrial, commercial and retail projects. Each agreement can be uniquely tailored to address the specific needs of both the local government entity and the business prospect.

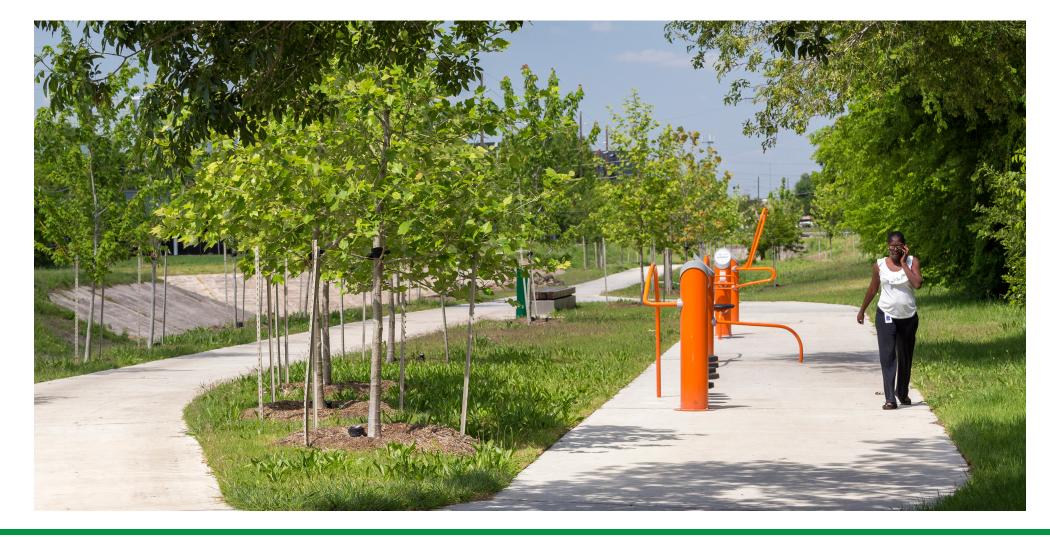


- 8. Home rule cities, general law cities and 62 counties are authorized to impose a **local hotel occupancy tax** within their jurisdictions. For most cities the tax rate may not exceed 7 percent of the price paid for the use of a hotel room. The tax rate for eligible counties varies. Cities with populations under 35,000 also may impose the hotel occupancy tax in the city's extraterritorial jurisdiction (ETJ). If a city adopts the hotel occupancy tax within its ETJ, the combined rate of state, county, and municipal hotel occupancy taxes may not exceed 15 percent. Expenditures of hotel occupancy tax funds must comply with a "twopart test." First, each expense must promote the hotel and convention industry (i.e. "put heads in hotel beds"). Second, each disbursement also must conform to at least one of seven statutorily-designated categories. The categories are: convention and visitor centers; convention registration; advertising the city; promotion of the arts; historic restoration and preservation; sporting events, if the city is located in a county with a population of 1,000,000 or less; and tourist transportation systems.
- 9. Public Improvement Districts (PID) (Local Government Code, Chapter 372) offer cities and counties a means for improving their infrastructure to promote economic growth in an area. The Public Improvement District Assessment Act allows cities and counties to levy and collect special assessments on properties that are within the city or its extraterritorial jurisdiction. Additional financing options are available to certain large counties.

PIDs may be formed to create water, wastewater, health and sanitation, or drainage improvements; street and sidewalk improvements; mass transit improvements; parking improvements; library improvements; park, recreation and cultural improvements; landscaping and other aesthetic improvements; art installation; creation of pedestrian malls or similar improvements; supplemental safety services for the improvement of the district, including public safety and security services; or supplemental business-related services for the improvement of the district, including advertising and business recruitment and development.

- 10. A **Neighborhood Empowerment Zone (Local Government Code, Chapter 378)** is a designated area within a municipality that is created to promote one or more of the following:
- Affordable housing;
- An increase in economic development;
- An increase in the quality of social services, education or public safety; or,
- The rehabilitation of affordable housing in the zone.







# APPENDIX G

